

# National Testing Agency

**Question Paper Name:** Paper I EHG 10th April 2019 Shift 1  
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**Display Marks:** Yes

## Paper I

**Group Number :** 1  
**Group Id :** 416529157  
**Group Maximum Duration :** 0  
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**Revisit allowed for view? :** No  
**Revisit allowed for edit? :** No  
**Break time:** 0  
**Group Marks:** 360

## Physics

**Section Id :** 416529265  
**Section Number :** 1  
**Section type :** Online  
**Mandatory or Optional:** Mandatory  
**Number of Questions:** 30  
**Number of Questions to be attempted:** 30  
**Section Marks:** 120  
**Display Number Panel:** Yes  
**Group All Questions:** No

**Sub-Section Number:** 1  
**Sub-Section Id:** 416529405  
**Question Shuffling Allowed :** Yes

**Question Number : 1 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**  
**Correct Marks : 4 Wrong Marks : 1**



Given below in the left column are different modes of communication using the kinds of waves given in the right column.

- |                                |                   |
|--------------------------------|-------------------|
| A. Optical Fibre Communication | P. Ultrasound     |
| B. Radar                       | Q. Infrared Light |
| C. Sonar                       | R. Microwaves     |
| D. Mobile Phones               | S. Radio Waves    |

From the options given below, find the most appropriate match between entries in the left and the right column.

Options :

1. A - Q, B - S, C - R, D - P
2. A - Q, B - S, C - P, D - R
3. A - S, B - Q, C - R, D - P
4. A - R, B - P, C - S, D - Q

Question Number : 1 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

नीचे बाएँ स्तंभ में विभिन्न संचार विधायें एवं दायें स्तंभ में तरंगों के प्रकार दिये गये हैं ।

- |                        |                  |
|------------------------|------------------|
| A. ऑप्टिकल फाइबर संचार | P. पराध्वनि      |
| B. रेडार               | Q. अवरक्त प्रकाश |
| C. सोनार               | R. सूक्ष्म तरंगे |
| D. मोबाइल फोन          | S. रेडियो तरंगे  |

दिये गये विकल्पों में, दायें तथा बायें स्तम्भ की प्रविष्टियों का सर्वोचित मिलान क्या होगा ?

Options :

1. A - Q, B - S, C - R, D - P



3. A - S, B - Q, C - R, D - P

4. A - R, B - P, C - S, D - Q

Question Number : 1 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

નીચે આપેલ જમણીબાજુના સ્તંભ (કોલમ) માં દર્શાવેલ તરંગોના પ્રકારથી મળતા જુદાજુદા પ્રકારના સંદેશાવ્યવહાર/સંચાર પદ્ધતિ ડાબીબાજુના સ્તંભમાં દર્શાવેલ છે.

- |                                |                                  |
|--------------------------------|----------------------------------|
| A. ઓપ્ટિકલ ફાઇબર સંદેશાવ્યવહાર | P. પરાત્રાવ્ય ધ્વનિ (Ultrasound) |
| B. રડાર                        | Q. પારસ્કત પ્રકાશ                |
| C. સોનાર                       | R. સૂક્ષ્મ તરંગો (માઇક્રો વેવ)   |
| D. મોબાઇલ ફોન                  | S. રેડિયો તરંગો                  |

નીચે આપેલા વિકલ્પો પૈકી ડાબીબાજુના મુદ્દાને અને જમણીબાજુની કોલમ (સ્તંભ)ના આનુષંગિક તરંગ સાથેનું સૌથી યોગ્ય જોડકું જોડો.

Options :

1. A - Q, B - S, C - R, D - P

2. A - Q, B - S, C - P, D - R

3. A - S, B - Q, C - R, D - P

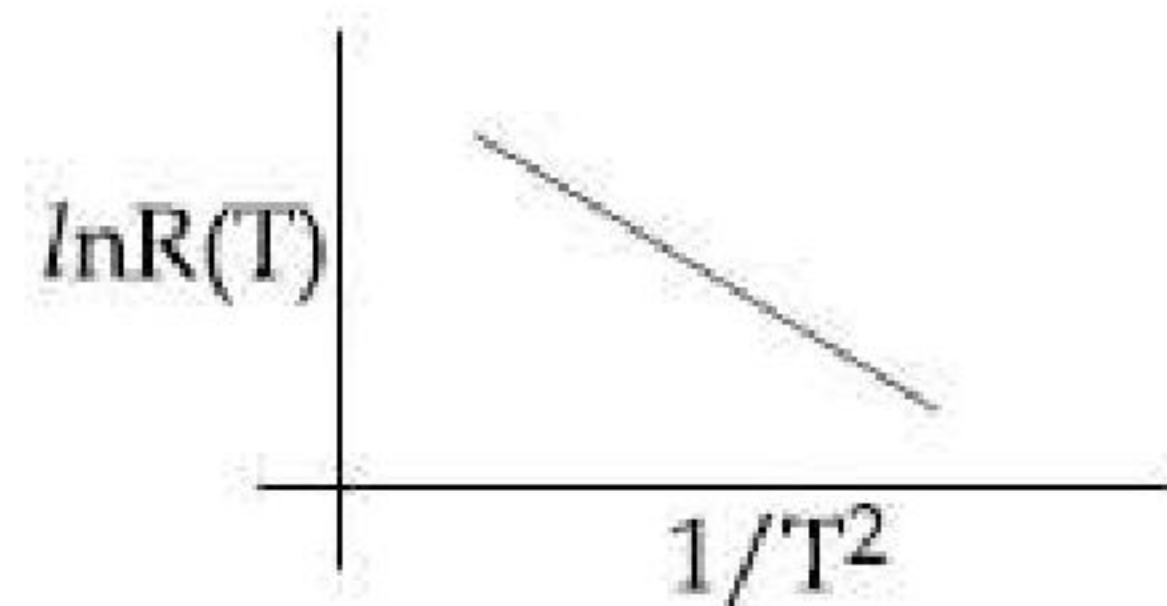
4. A - R, B - P, C - S, D - Q

Question Number : 2 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1



In an experiment, the resistance of a material is plotted as a function of temperature (in some range). As shown in the figure, it is a straight line.



One may conclude that :

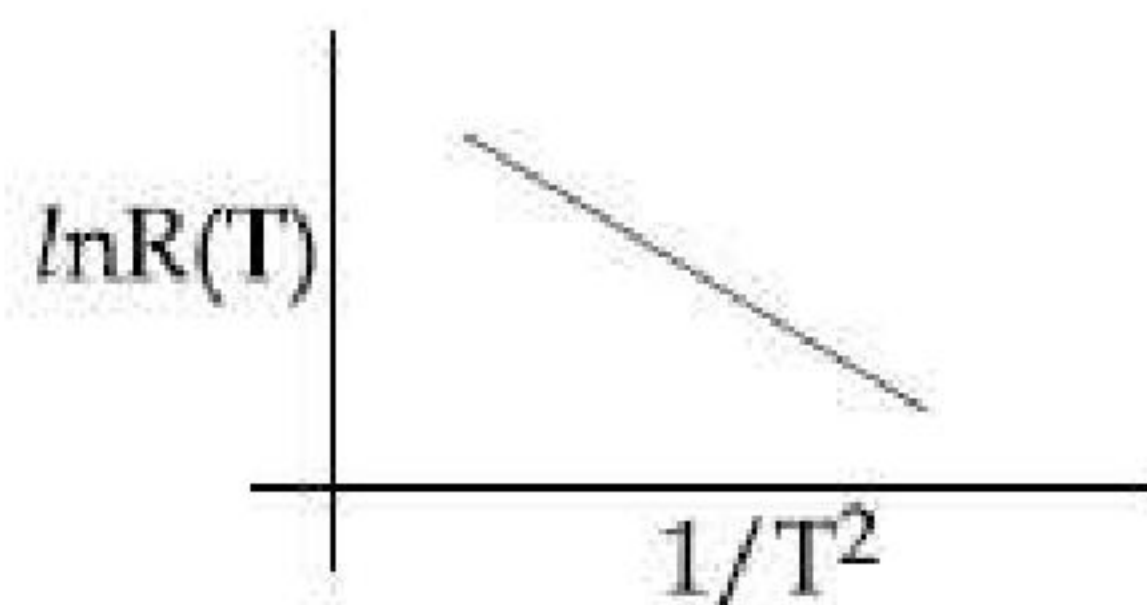
Options :

1.  $R(T) = \frac{R_0}{T^2}$
2.  $R(T) = R_0 e^{-T^2/T_0^2}$
3.  $R(T) = R_0 e^{-T_0^2/T^2}$
4.  $R(T) = R_0 e^{T^2/T_0^2}$

Question Number : 2 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक प्रयोग में, एक पदार्थ के प्रतिरोध का तापमान के फलन में (किसी परास में) ग्राफ बनाया जाता है। दिखाये गये चित्रानुसार यह एक सरल रेखा है। इससे निष्कर्ष निकाल सकते हैं कि :



Options :

1.  $R(T) = \frac{R_0}{T^2}$
2.  $R(T) = R_0 e^{-T^2/T_0^2}$

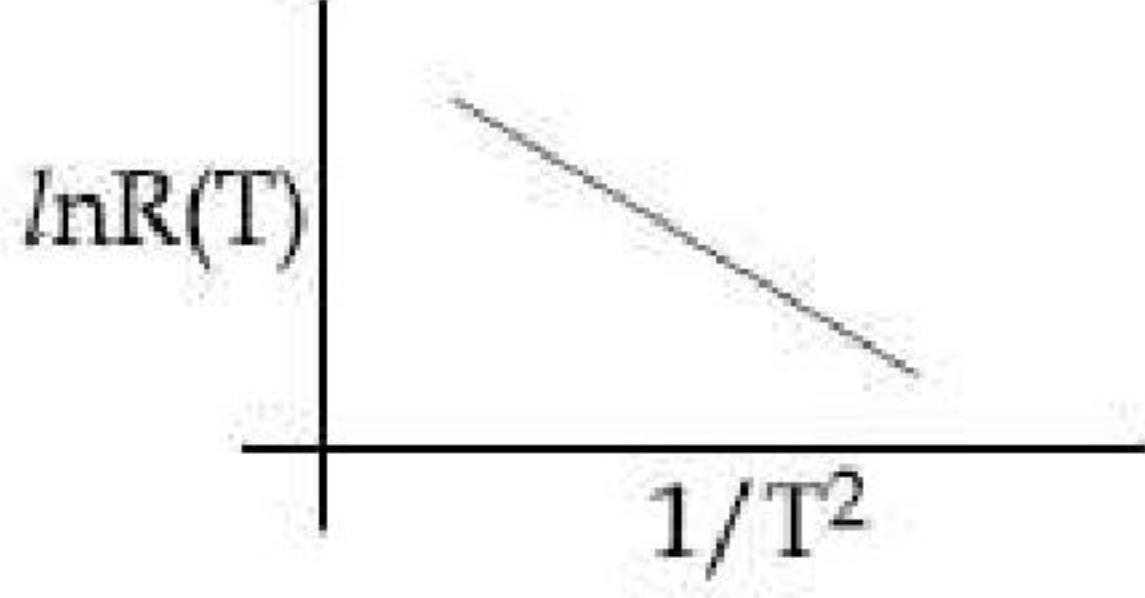


4.  $R(T) = R_0 e^{T^2/T_0^2}$

Question Number : 2 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

એક પ્રયોગમાં, કોઈ પદાર્થ માટે અવરોધ ને (કોઈ ચોક્કસ ગાળા માટે) તાપમાનના વિધેય તરીકે દર્શાવેલ છે. આકૃતિમાં દર્શાવ્યા મુજબ તે એક સુરેખા છે.



આપણે તારણ બાંધી શકીએ કે :

Options :

1.  $R(T) = \frac{R_0}{T^2}$

2.  $R(T) = R_0 e^{-T^2/T_0^2}$

3.  $R(T) = R_0 e^{-T_0^2/T^2}$

4.  $R(T) = R_0 e^{T^2/T_0^2}$

Question Number : 3 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A particle of mass  $m$  is moving along a trajectory given by

$$x = x_0 + a \cos \omega_1 t$$

$$y = y_0 + b \sin \omega_2 t$$

The torque, acting on the particle about the origin, at  $t=0$  is :

Options :

1.  $+my_0 a \omega_1^2 \hat{k}$

$m(-x_0 b + y_0 a) \omega_1^2 \hat{k}$



3.  $-m(x_0 b \omega_2^2 - y_0 a \omega_1^2) \hat{k}$

4. Zero

Question Number : 3 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

દ્રવ્યમાન  $m$  કે એક પિણ્ડ કા પથ નિમ્ન હૈ :

$$x = x_0 + a \cos \omega_1 t$$

$$y = y_0 + b \sin \omega_2 t$$

$t=0$  પર, મૂલબિંદુ કે સાપેક્ષ પિણ્ડ પર લગને વાલા જડત્વ આઘૂર્ણ હોગા :

Options :

1.  $+m y_0 a \omega_1^2 \hat{k}$

2.  $m(-x_0 b + y_0 a) \omega_1^2 \hat{k}$

3.  $-m(x_0 b \omega_2^2 - y_0 a \omega_1^2) \hat{k}$

4. શૂન્ય

Question Number : 3 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

એક  $m$  દળ ધરાવતો કણ નીચે દર્શાવ્યા મુજબના ગતિપથ ઉપર ગતિ કરે છે.

$$x = x_0 + a \cos \omega_1 t$$

$$y = y_0 + b \sin \omega_2 t$$

ઉગમબિંદુને અનુરૂપ,  $t=0$  સમયે, કણ ઉપર લાગતું ટોર્ક \_\_\_\_\_ છે.

Options :

1.  $+m y_0 a \omega_1^2 \hat{k}$

2.  $m(-x_0 b + y_0 a) \omega_1^2 \hat{k}$



3.  $-m(x_0 b \omega_2^2 - y_0 a \omega_1^2) \hat{k}$

4.  $\frac{2}{3} \sqrt{\frac{2}{3}}$

Question Number : 4 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A ball is thrown upward with an initial velocity  $V_0$  from the surface of the earth. The motion of the ball is affected by a drag force equal to  $m\gamma v^2$  (where  $m$  is mass of the ball,  $v$  is its instantaneous velocity and  $\gamma$  is a constant). Time taken by the ball to rise to its zenith is :

Options :

1.  $\frac{1}{\sqrt{2\gamma g}} \tan^{-1} \left( \sqrt{\frac{2\gamma}{g}} V_0 \right)$

2.  $\frac{1}{\sqrt{\gamma g}} \ln \left( 1 + \sqrt{\frac{\gamma}{g}} V_0 \right)$

3.  $\frac{1}{\sqrt{\gamma g}} \tan^{-1} \left( \sqrt{\frac{\gamma}{g}} V_0 \right)$

4.  $\frac{1}{\sqrt{\gamma g}} \sin^{-1} \left( \sqrt{\frac{\gamma}{g}} V_0 \right)$

Question Number : 4 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक गेंद को पृथ्वी की सतह से आरम्भिक वेग  $V_0$  से ऊपर की ओर फेंका जाता है। गेंद की गति एक अवरोधक बल  $m\gamma v^2$  से प्रभावित होती है। यहाँ  $m$  गेंद का द्रव्यमान,  $v$  उसका तात्कालिक वेग तथा  $\gamma$  एक स्थिरांक है। गेंद द्वारा अपने शीर्षबिंदु तक पहुँचने में लगा समय होगा :

Options :



1.  $\frac{1}{\sqrt{2\gamma g}} \tan^{-1} \left( \sqrt{\frac{2\gamma}{g}} V_0 \right)$

2.  $\frac{1}{\sqrt{\gamma g}} \ln \left( 1 + \sqrt{\frac{\gamma}{g}} V_0 \right)$

3.  $\frac{1}{\sqrt{\gamma g}} \tan^{-1} \left( \sqrt{\frac{\gamma}{g}} V_0 \right)$

4.  $\frac{1}{\sqrt{\gamma g}} \sin^{-1} \left( \sqrt{\frac{\gamma}{g}} V_0 \right)$

Question Number : 4 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

પૃથ્વીની સપાટી પરથી એક બોલને  $V_0$  જેટલા પ્રારંભિક વેગથી ઉદ્વર્ધદિશામાં ફેંકવામાં આવે છે. આ બોલની ગતિ, મૂલ્યની દ્રષ્ટિએ,  $m\gamma v^2$  (જ્યાં,  $m$  એ બોલનું દળ અને  $\gamma$  એક અચળાંક) થાય તેવા drag બળ (ઘસાડાવવું) ની અસર અનુભવે છે. બોલને તેના ગતિના zenith (મહત્તમ ઊંચાઈ) સુધી પહોંચતા લાગતો સમય \_\_\_\_\_ થશે.

Options :

1.  $\frac{1}{\sqrt{2\gamma g}} \tan^{-1} \left( \sqrt{\frac{2\gamma}{g}} V_0 \right)$

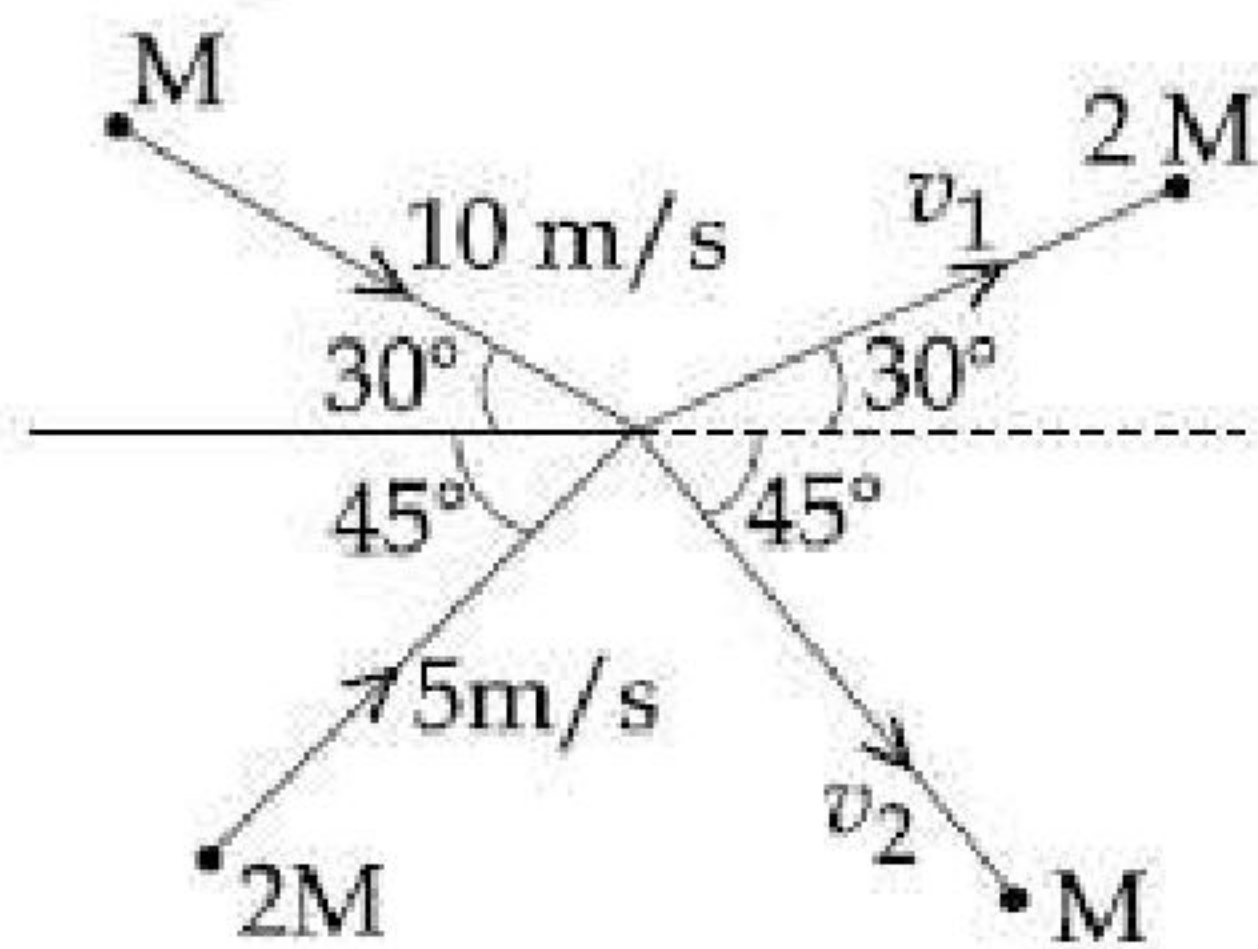
2.  $\frac{1}{\sqrt{\gamma g}} \ln \left( 1 + \sqrt{\frac{\gamma}{g}} V_0 \right)$

3.  $\frac{1}{\sqrt{\gamma g}} \tan^{-1} \left( \sqrt{\frac{\gamma}{g}} V_0 \right)$

4.  $\frac{1}{\sqrt{\gamma g}} \sin^{-1} \left( \sqrt{\frac{\gamma}{g}} V_0 \right)$



Two particles, of masses  $M$  and  $2M$ , moving, as shown, with speeds of  $10 \text{ m/s}$  and  $5 \text{ m/s}$ , collide elastically at the origin. After the collision, they move along the indicated directions with speeds  $v_1$  and  $v_2$  respectively. The values of  $v_1$  and  $v_2$  are nearly :



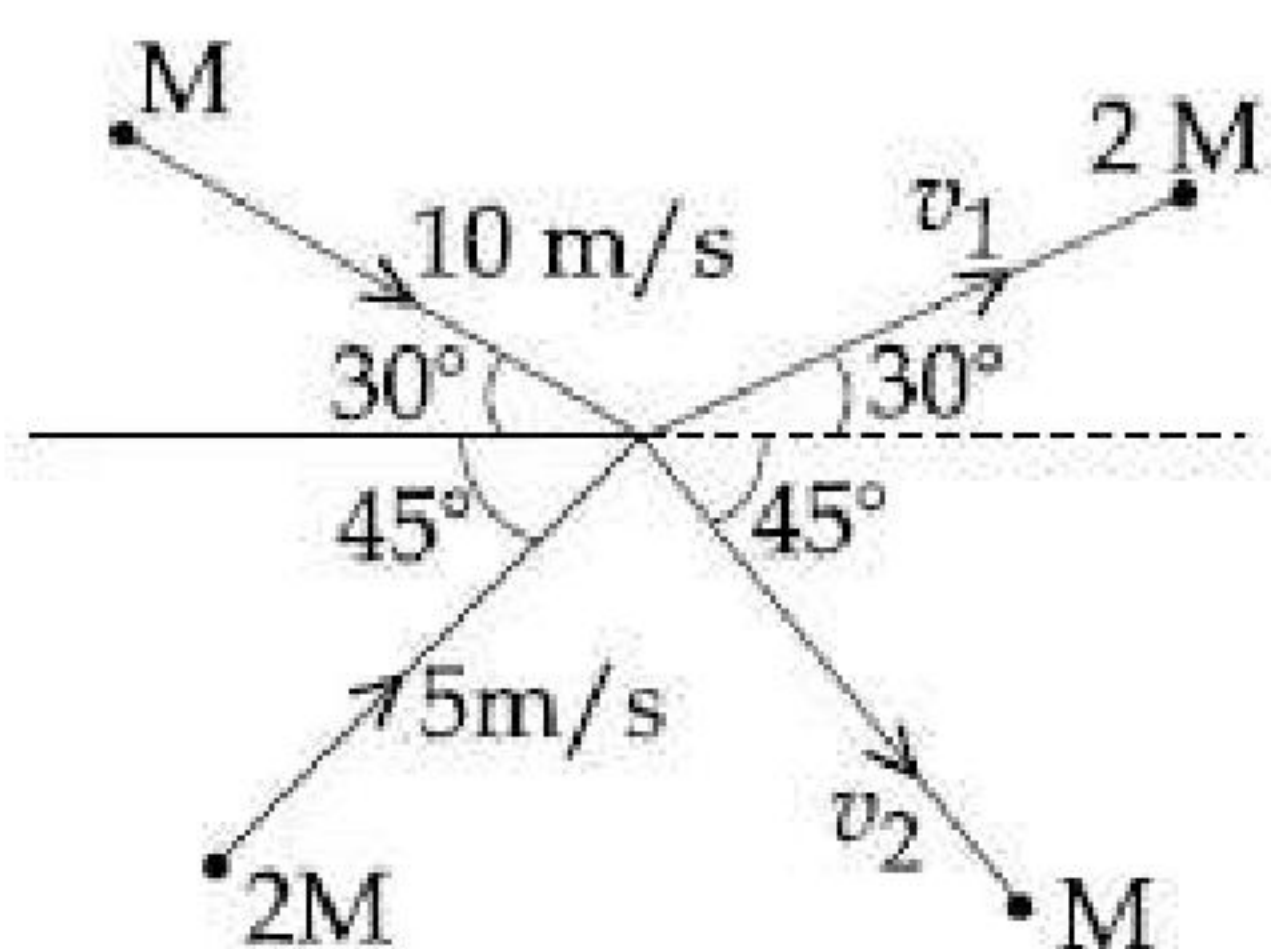
Options :

1.  $6.5 \text{ m/s}$  and  $3.2 \text{ m/s}$
2.  $3.2 \text{ m/s}$  and  $12.6 \text{ m/s}$
3.  $6.5 \text{ m/s}$  and  $6.3 \text{ m/s}$
4.  $3.2 \text{ m/s}$  and  $6.3 \text{ m/s}$

Question Number : 5 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

द्रव्यमान  $M$  व  $2M$  के दो कण गति  $10 \text{ m/s}$  तथा  $5 \text{ m/s}$ , क्रमशः, से चित्रानुसार चलते हुये मूल बिंदु पर प्रत्यास्थ संघट्ट करते हैं। संघट्ट के बाद वो क्रमशः  $v_1$  तथा  $v_2$  की गति से दिखायी गयी दिशाओं में चलते हैं।  $v_1$  तथा  $v_2$  के निकटतम मान होंगे :



Options :

1.  $6.5 \text{ m/s}$  तथा  $3.2 \text{ m/s}$



2. 3.2 m/s તથા 12.6 m/s

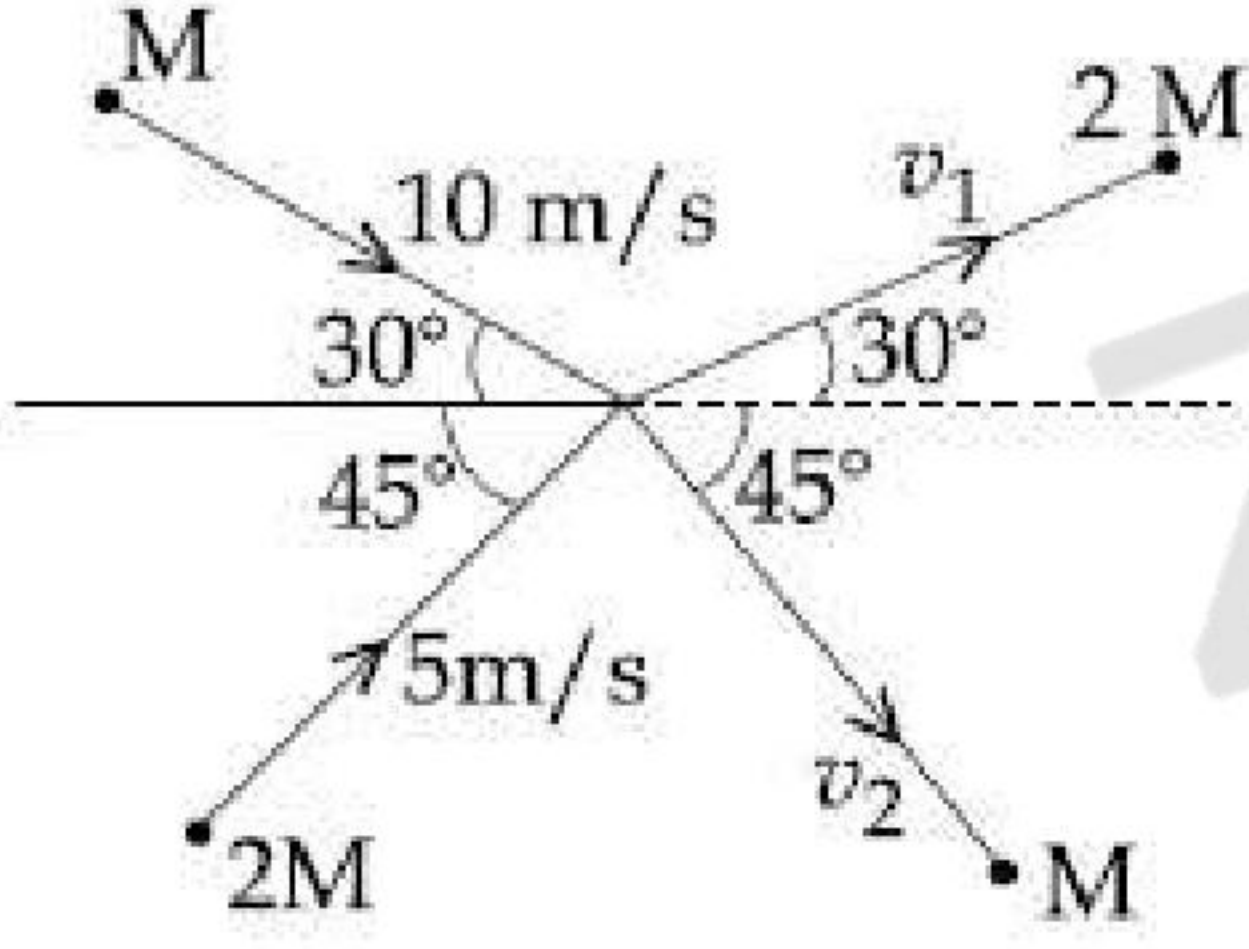
3. 6.5 m/s તથા 6.3 m/s

4. 3.2 m/s તથા 6.3 m/s

Question Number : 5 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

M અને 2 M દળ ધરાવતા બે પદાર્થો, આકૃતિમાં દર્શાવ્યા મુજબ 10 m/s અને 5 m/s ની ઝડપથી ગતિ કરતા-કરતાં, ઉગમબિંદુ આગળ સ્થિતિસ્થાપક સંઘાત (અથડામણ) અનુભવે છે. અથડામણ બાદ, બે બોલ અનુક્રમે  $v_1$  અને  $v_2$  ઝડપથી દર્શાવેલ દિશામાં ગતિ કરે છે.  $v_1$  અને  $v_2$  નું મૂલ્ય \_\_\_\_\_ (ની નજીકનું) થશે.



Options :

1. 6.5 m/s અને 3.2 m/s

2. 3.2 m/s અને 12.6 m/s

3. 6.5 m/s અને 6.3 m/s

4. 3.2 m/s અને 6.3 m/s

Question Number : 6 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1



Two coaxial discs, having moments of inertia  $I_1$  and  $\frac{I_1}{2}$ , are rotating with respective angular velocities  $\omega_1$  and  $\frac{\omega_1}{2}$ , about their common axis. They are brought in contact with each other and thereafter they rotate with a common angular velocity. If  $E_f$  and  $E_i$  are the final and initial total energies, then  $(E_f - E_i)$  is :

Options :

1.  $-\frac{I_1 \omega_1^2}{12}$

2.  $-\frac{I_1 \omega_1^2}{24}$

3.  $\frac{I_1 \omega_1^2}{6}$

4.  $\frac{3}{8} I_1 \omega_1^2$

Question Number : 6 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

जड़त्व आघूर्ण  $I_1$  तथा  $\frac{I_1}{2}$  की दो समअक्षीय डिस्क

कोणीय वेग  $\omega_1$  तथा  $\frac{\omega_1}{2}$ , क्रमशः, से अपनी उभयनिष्ठ

अक्ष के परितः घूम रही हैं। जब दोनों डिस्क को सटा दिया जाता है तो वे बराबर कोणीय वेग से घूमते हैं।

यदि  $E_f$  तथा  $E_i$  अंतिम एवं प्रारम्भिक कुल ऊर्जाएँ हों तो  $(E_f - E_i)$  का मान होगा :

Options :

1.  $-\frac{I_1 \omega_1^2}{12}$



3.  $\frac{I_1 \omega_1^2}{6}$

4.  $\frac{3}{8} I_1 \omega_1^2$

Question Number : 6 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

$I_1$  અને  $\frac{I_1}{2}$  જેટલી જડત્વની ચાકમાત્રા ધરાવતી બે સમઅક્ષીય તક્તિઓ તેમની સામાન્ય અક્ષોને અનુલક્ષીને અનુક્રમે  $\omega_1$  અને  $\frac{\omega_1}{2}$  જેટલા કોણીય વેગોથી ચાકગતિ કરે છે. જ્યારે બે તક્તિઓને સંપર્કમાં લાવવામાં આવે છે ત્યારે તેઓ સામાન્ય કોણીય વેગથી પરિભ્રમણ કરે છે. જો  $E_f$  અને  $E_i$  અનુક્રમે અંતિમ અને પ્રારંભિક કુલ ઉર્જાઓ હોય તો  $(E_f - E_i)$  થશે :

Options :

1.  $-\frac{I_1 \omega_1^2}{12}$

2.  $-\frac{I_1 \omega_1^2}{24}$

3.  $\frac{I_1 \omega_1^2}{6}$

4.  $\frac{3}{8} I_1 \omega_1^2$

Question Number : 7 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A thin disc of mass  $M$  and radius  $R$  has mass per unit area  $\sigma(r) = kr^2$  where  $r$  is the distance from its centre. Its moment of inertia about an axis going through its centre of mass and perpendicular to its



1.  $\frac{MR^2}{6}$

2.  $\frac{2MR^2}{3}$

3.  $\frac{MR^2}{2}$

4.  $\frac{MR^2}{3}$

Question Number : 7 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

દ્રવ્યમાન  $M$  તથા ત્રિજ્યા  $R$  કી એક પતલી ડિસ્ક કા પ્રતિ ઇકાઈ ક્ષેત્રફલ દ્રવ્યમાન  $\sigma(r) = kr^2$  હૈ જહાં  $r$  કેન્દ્ર સે દૂરી હૈ। ડિસ્ક કે કેન્દ્ર સે જાને વાલી તથા ઇસકે લમ્બવત્ અક્ષ કે પરિતઃ જડત્વ આઘૂર્ણ હોગા :

Options :

1.  $\frac{MR^2}{6}$

2.  $\frac{2MR^2}{3}$

3.  $\frac{MR^2}{2}$

4.  $\frac{MR^2}{3}$

Question Number : 7 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

$M$  દળ અને  $R$  ત્રિજ્યા ધરાવતી એક તકતિનું એકમ ક્ષેત્રફળ ટીક દળ  $\sigma(r) = kr^2$  છે, જ્યાં  $r$  એ તેના કેન્દ્રથી અંતર છે. તેના દ્રવ્યમાન કેન્દ્રમાંથી પસાર થતી અને તેના સમતલને લંબ અક્ષને સાપેક્ષે તેની જડત્વની ચાકમાત્રા



1.  $\frac{MR^2}{6}$

2.  $\frac{2MR^2}{3}$

3.  $\frac{MR^2}{2}$

4.  $\frac{MR^2}{3}$

Question Number : 8 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The value of acceleration due to gravity at Earth's surface is  $9.8 \text{ ms}^{-2}$ . The altitude above its surface at which the acceleration due to gravity decreases to  $4.9 \text{ ms}^{-2}$ , is close to : (Radius of earth =  $6.4 \times 10^6 \text{ m}$ )

Options :

1.  $2.6 \times 10^6 \text{ m}$

2.  $6.4 \times 10^6 \text{ m}$

3.  $1.6 \times 10^6 \text{ m}$

4.  $9.0 \times 10^6 \text{ m}$

Question Number : 8 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

पृथ्वी की सतह पर गुरुत्वीय त्वरण का मान  $9.8 \text{ ms}^{-2}$  है। पृथ्वी की सतह से वह ऊँचाई, जहाँ गुरुत्वीय त्वरण घटकर  $4.9 \text{ ms}^{-2}$  हो जाती है, होगी : (पृथ्वी की त्रिज्या =  $6.4 \times 10^6 \text{ m}$ )

Options :

1.  $2.6 \times 10^6 \text{ m}$



3.  $1.6 \times 10^6 \text{ m}$

4.  $9.0 \times 10^6 \text{ m}$

Question Number : 8 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

પૃથ્વીની સપાટી ઉપર ગુરુત્વીયપ્રવેગનું મૂલ્ય  $9.8 \text{ ms}^{-2}$  અને તેની ત્રિજ્યા  $6.4 \times 10^6 \text{ m}$  છે. તેની સપાટીથી \_\_\_\_\_ ઊંચાઈએ કે જ્યાં ગુરુત્વપ્રવેગનું મૂલ્ય ઘટીને  $4.9 \text{ ms}^{-2}$  થશે.

Options :

1.  $2.6 \times 10^6 \text{ m}$

2.  $6.4 \times 10^6 \text{ m}$

3.  $1.6 \times 10^6 \text{ m}$

4.  $9.0 \times 10^6 \text{ m}$

Question Number : 9 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The ratio of surface tensions of mercury and water is given to be 7.5 while the ratio of their densities is 13.6. Their contact angles, with glass, are close to  $135^\circ$  and  $0^\circ$ , respectively. It is observed that mercury gets depressed by an amount  $h$  in a capillary tube of radius  $r_1$ , while water rises by the same amount  $h$  in a capillary tube of radius  $r_2$ . The ratio,  $(r_1/r_2)$ , is then close to :

Options :

1.  $2/5$

2.  $4/5$

3.  $2/3$



Question Number : 9 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

પારા તથા પાની કે પૃષ્ઠ તનાવ કા અનુપાત 7.5 હૈ જબકિ  
उनके घनत्व का अनुपात 13.6 है। उनके काँच के साथ  
संपर्क कोण के लगभग मान, क्रमशः,  $135^\circ$  तथा  $0^\circ$  हैं।  
यह पाया जाता है कि पारा एक त्रिज्या  $r_1$  की केशिका  
नली में ऊँचाई  $h$  से अवनत होता है जबकि पानी त्रिज्या  
 $r_2$  की केशिका नली में उसी ऊँचाई  $h$  से उन्नत होता है।  
अनुपात  $r_1/r_2$  का निकट मान होगा :

Options :

1.  $2/5$
2.  $4/5$
3.  $2/3$
4.  $3/5$

Question Number : 9 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

પારા અને પાણી માટે પૃષ્ઠતાણોનો ગુણોત્તર 7.5 છે જ્યારે  
તેમની ઘનતાનો ગુણોત્તર 13.6 છે. તેમનો કાચ સાથેનો  
સંપર્ક કોણ અનુક્રમે  $135^\circ$  અને  $0^\circ$  ની નજીકનો છે. એવું  
જોવા મળે છે કે પારા  $r_1$  ત્રિજ્યા ધરાવતી કેશનળીમાં  $h$   
જેટલો અવનમિત (નીચે ઉતરે છે) થાય જ્યારે પાણી  $r_2$   
ત્રિજ્યા ધરાવતી કેશનળીમાં  $h$  જેટલું ઊંચું ચડે છે.  
ગુણોત્તર,  $(r_1/r_2)$ , નું મૂલ્ય \_\_\_\_\_ ની નજીકનું  
હશે.

Options :

1.  $2/5$
2.  $4/5$
3.  $2/3$
4.  $3/5$



Correct Marks : 4 Wrong Marks : 1

$n$  moles of an ideal gas with constant volume heat capacity  $C_V$  undergo an isobaric expansion by certain volume. The ratio of the work done in the process, to the heat supplied is :

Options :

1.  $\frac{4nR}{C_V - nR}$

2.  $\frac{nR}{C_V - nR}$

3.  $\frac{4nR}{C_V + nR}$

4.  $\frac{nR}{C_V + nR}$

Question Number : 10 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक नियत आयतन ऊष्मा धारिता  $C_V$  की आदर्श गैस के  $n$  मोल का समदाबीय प्रसार किसी आयतन से होता है। प्रक्रिया में किये गये कार्य का दी गई ऊष्मा से अनुपात है :

Options :

1.  $\frac{4nR}{C_V - nR}$

2.  $\frac{nR}{C_V - nR}$

3.  $\frac{4nR}{C_V + nR}$

4.  $\frac{nR}{C_V + nR}$



$n$  મોલ અને  $C_V$  જેટલી અચળ કદ ઊષ્માધારિતા ધરાવતો આદર્શ વાયુ ચોક્કસ કદ થી સમદાબીય પ્રસરણ અનુભવે છે. આ પ્રક્રિયામાં થતા કાર્ય અને આપાત (આપેલી) ઊષ્માણો ગુણોત્તર \_\_\_\_\_ થશે.

Options :

1.  $\frac{4nR}{C_V - nR}$

2.  $\frac{nR}{C_V - nR}$

3.  $\frac{4nR}{C_V + nR}$

4.  $\frac{nR}{C_V + nR}$

Question Number : 11 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A  $25 \times 10^{-3} \text{ m}^3$  volume cylinder is filled with 1 mol of  $\text{O}_2$  gas at room temperature (300 K). The molecular diameter of  $\text{O}_2$ , and its root mean square speed, are found to be 0.3 nm and 200 m/s, respectively. What is the average collision rate (per second) for an  $\text{O}_2$  molecule ?

Options :

1.  $\sim 10^{12}$

2.  $\sim 10^{11}$

3.  $\sim 10^{10}$

4.  $\sim 10^{13}$

Question Number : 11 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1



एक  $25 \times 10^{-3} \text{ m}^3$  आयतन के सिलेंडर में 1 mol  $\text{O}_2$  गैस कक्षीय तापमान (300 K) पर भरी है।  $\text{O}_2$  के आण्विक व्यास तथा वर्ग माध्य मूल वेग के मान क्रमशः 0.3 nm तथा 200 m/s पाये जाते हैं। किसी  $\text{O}_2$  अणु के संघट्ट दर का मान (प्रति सेकण्ड) क्या होगा?

Options :

1.  $\sim 10^{12}$
2.  $\sim 10^{11}$
3.  $\sim 10^{10}$
4.  $\sim 10^{13}$

Question Number : 11 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

એક  $25 \times 10^{-3} \text{ m}^3$  વાળો નળાકાર ઓરડાના તાપમાને (300 K) 1 mol  $\text{O}_2$  વાયુથી ભરેલો છે.  $\text{O}_2$  અણુનો વ્યાસ અને સરેરાશ ઝડપ નું મૂલ્ય અનુક્રમે 0.3 nm અને 200 m/s જેટલું નોંધાય છે. કોઈ ચોક્કસ  $\text{O}_2$  અણુ માટેનો સરેરાશ સંઘાતનો (પ્રતિ સેકન્ડ) દર કેટલો હશે?

Options :

1.  $\sim 10^{12}$
2.  $\sim 10^{11}$
3.  $\sim 10^{10}$
4.  $\sim 10^{13}$

Question Number : 12 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The displacement of a damped harmonic oscillator is given by

$x(t) = e^{-0.1t} \cos(10\pi t + \phi)$ . Here t is in seconds.

The time taken for its amplitude of



Options :

1. 4 s
2. 27 s
3. 7 s
4. 13 s

Question Number : 12 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक अवमन्दित आवर्ती दोलक का विस्थापन निम्न है,  
 $x(t) = e^{-0.1t} \cos(10\pi t + \phi)$ . यहाँ  $t$  सेकण्ड में है।  
इसके दोलन आयाम को अपने आरम्भिक मान से आधा  
होने में लगे समय का सन्निकट मान होगा :

Options :

1. 4 s
2. 27 s
3. 7 s
4. 13 s

Question Number : 12 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

અવમંદિત દોલકનું સ્થાનાંતર નીચે મુજબ આપી શકાય  
છે  
 $x(t) = e^{-0.1t} \cos(10\pi t + \phi)$ . અહીં,  $t$  સેકન્ડમાં છે.  
તેના કંપવિસ્થાનું મૂલ્ય તેના પ્રારંભિક મૂલ્ય કરતા અડધું  
થાય તે માટે લાગતો સમય \_\_\_\_\_ ની નજીકનો  
હશે.

Options :

1. 4 s
2. 27 s



4. 13 s

Question Number : 13 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A stationary source emits sound waves of frequency 500 Hz. Two observers moving along a line passing through the source detect sound to be of frequencies 480 Hz and 530 Hz. Their respective speeds are, in  $\text{ms}^{-1}$ ,

(Given speed of sound = 300 m/s)

Options :

1. 12, 18

2. 16, 14

3. 8, 18

4. 12, 16

Question Number : 13 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक स्थिर स्रोत 500 Hz आवृत्ति से ध्वनि उत्सर्जित करता है। दो श्रोता एक ही रेखा, जो कि स्रोत से होकर जाती है, में चलते हैं तो उन्हें ध्वनि की आवृत्ति 480 Hz और 530 Hz सुनाई देती है। इन श्रोताओं की चाल क्रमशः  $\text{ms}^{-1}$  में होगी :

(दिया है : ध्वनि की चाल = 300 m/s)

Options :

1. 12, 18

2. 16, 14

3. 8, 18

4. 12, 16



Correct Marks : 4 Wrong Marks : 1

એક ઉદ્દગમ 500 Hz ની પ્રાકૃતિક આવૃત્તિ ધરાવતો ધ્વનિ ઉત્પન્ન કરે છે. બે અવલોકનકારો ઉદ્દગમને જોડતી એક જ રેખામાં ગતિ કરે છે અને 480 Hz અને 530 Hz આવૃત્તિ ધરાવતો ધ્વનિ નોંધે છે. અવલોકનકારોની સાપેક્ષ ગતિ \_\_\_\_\_ થશે.  
(ધ્વનિની ઝડપ  $300\text{ms}^{-1}$  છે)

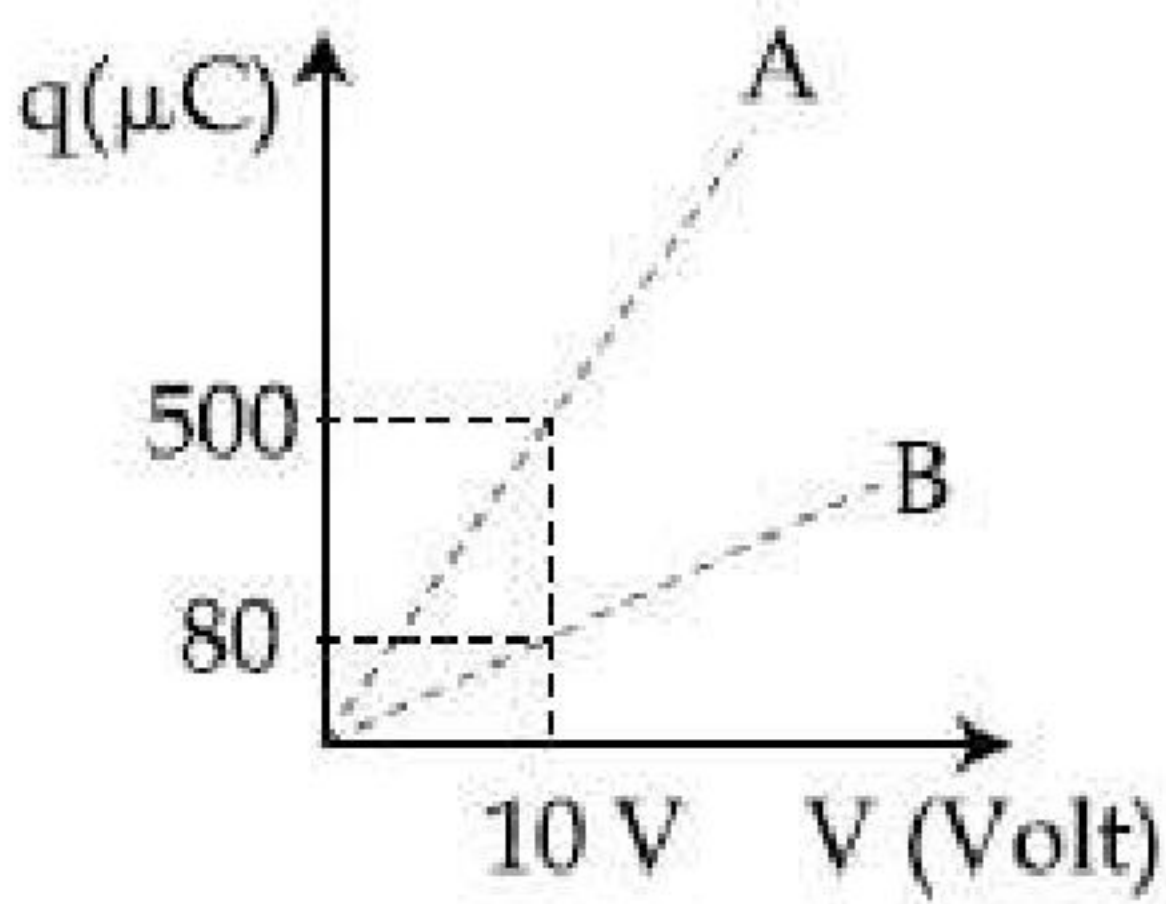
Options :

1. 12, 18
2. 16, 14
3. 8, 18
4. 12, 16

Question Number : 14 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Figure shows charge (q) versus voltage (V) graph for series and parallel combination of two given capacitors. The capacitances are :

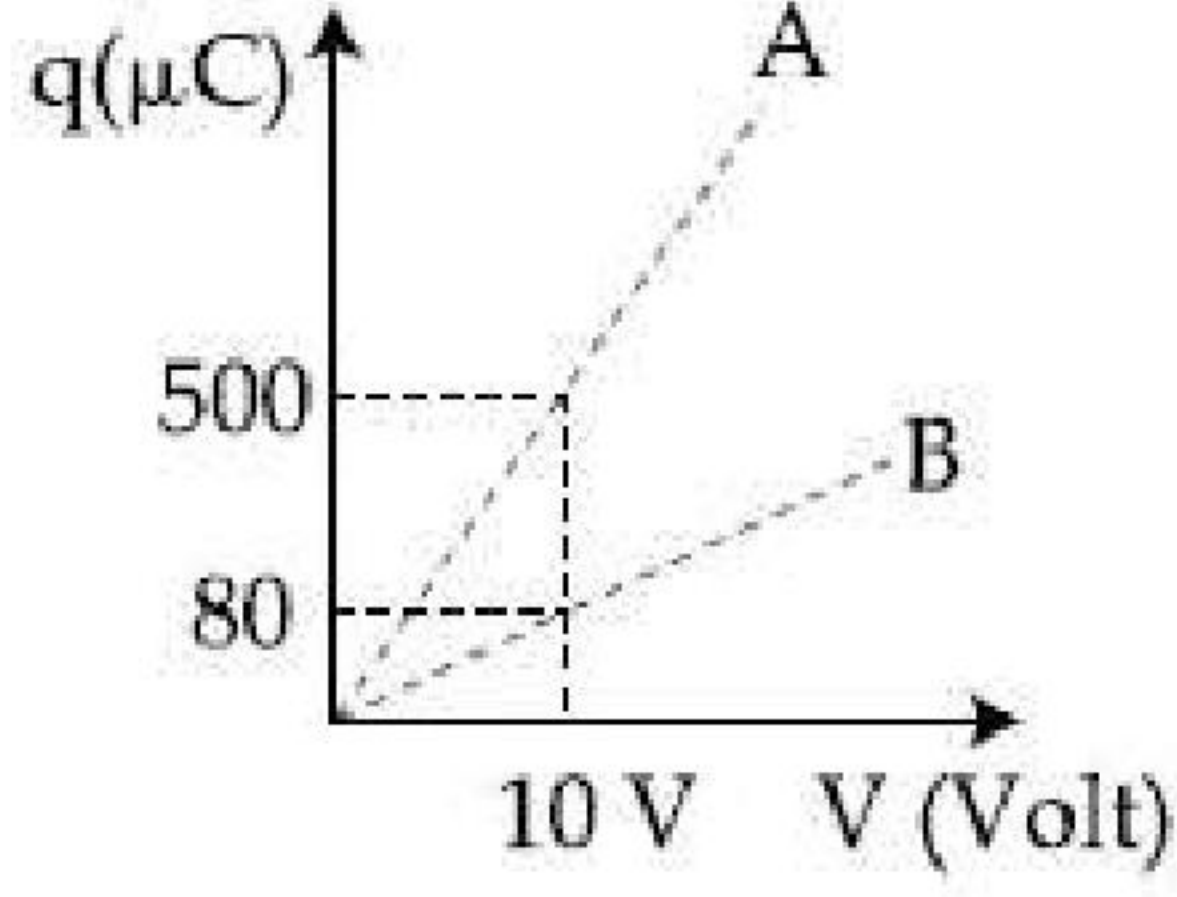


Options :

1.  $50\ \mu\text{F}$  and  $30\ \mu\text{F}$
2.  $20\ \mu\text{F}$  and  $30\ \mu\text{F}$
3.  $40\ \mu\text{F}$  and  $10\ \mu\text{F}$
4.  $60\ \mu\text{F}$  and  $40\ \mu\text{F}$



दो दिये गये संधारित्रों को श्रेणी तथा समान्तर क्रम में लगाने पर उनका आवेश ( $q$ ) तथा वोल्ट ( $V$ ) के बीच का संबंध ग्राफ चित्र में दर्शाया गया है। इनकी धारिताओं के मान होंगे :



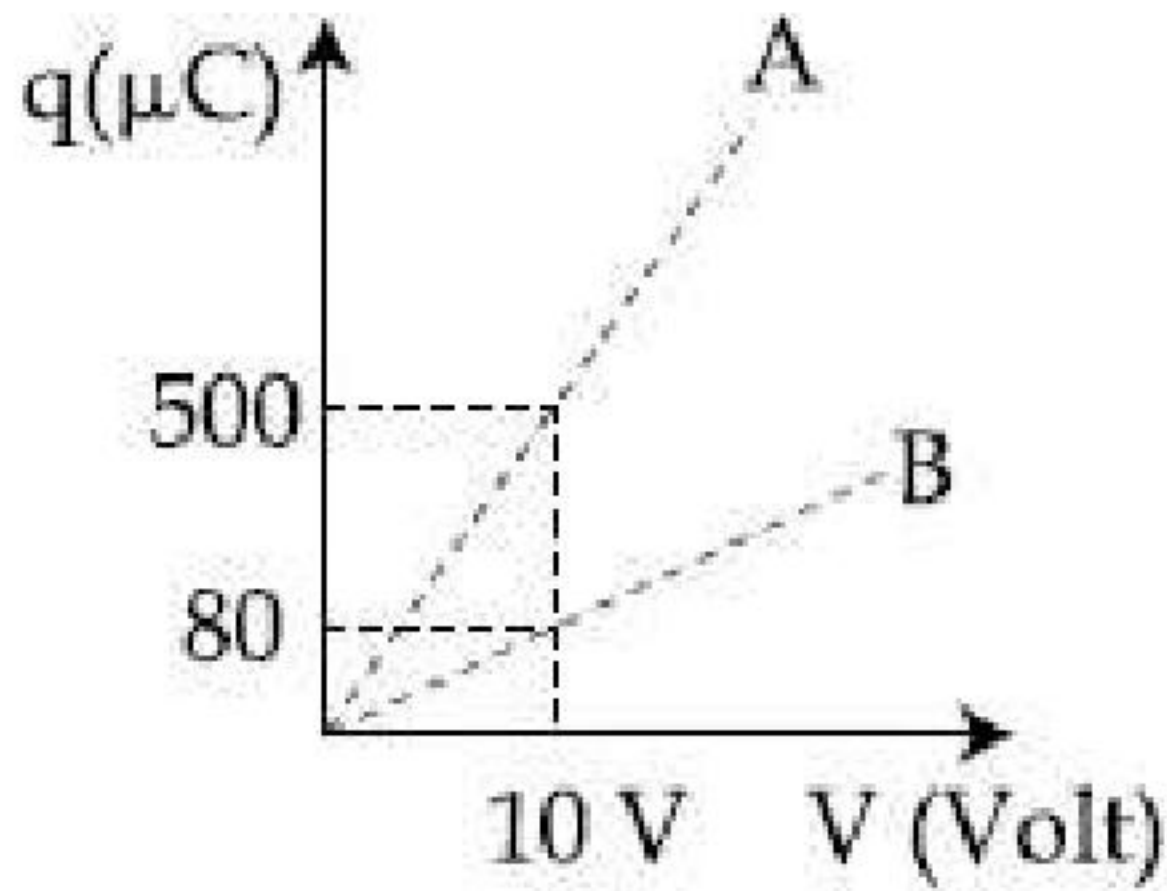
Options :

1.  $50 \mu\text{F}$  तथा  $30 \mu\text{F}$
2.  $20 \mu\text{F}$  तथा  $30 \mu\text{F}$
3.  $40 \mu\text{F}$  तथा  $10 \mu\text{F}$
4.  $60 \mu\text{F}$  तथा  $40 \mu\text{F}$

Question Number : 14 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

આકૃતિ, શ્રેણીમાં અને સમાંતરમાં જોડેલા આપેલા કેપેસિટરો (સંધારકો) માટે ( $q$ ) વિદ્યુત્તંત્ર ( $V$ ) ના આલેખો દર્શાવે છે. સંધારકોની સંધારકતા (કેપેસિટન્સ) \_\_\_\_\_.



Options :

1.  $50 \mu\text{F}$  અને  $30 \mu\text{F}$
2.  $20 \mu\text{F}$  અને  $30 \mu\text{F}$
3.  $40 \mu\text{F}$  અને  $10 \mu\text{F}$



4.  $60\ \mu\text{F}$  અને  $40\ \mu\text{F}$

Question Number : 15 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A cylinder with fixed capacity of 67.2 lit contains helium gas at STP. The amount of heat needed to raise the temperature of the gas by  $20^\circ\text{C}$  is : [Given that  $R = 8.31\ \text{J mol}^{-1}\ \text{K}^{-1}$ ]

Options :

1. 700 J
2. 748 J
3. 374 J
4. 350 J

Question Number : 15 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक नियत आयतन 67.2 ली. के सिलेंडर में मानक तापमान एवं दबाव (STP) पर हीलियम गैस भरी है। गैस का तापमान  $20^\circ\text{C}$  से बढ़ाने के लिए आवश्यक ऊष्मा होगी :

[ दिया है :  $R = 8.31\ \text{J mol}^{-1}\ \text{K}^{-1}$  ]

Options :

1. 700 J
2. 748 J
3. 374 J
4. 350 J

Question Number : 15 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1



એક 67.2 lit જેટલું અચળ કદ ધરાવતા નળાકારમાં STP એ હીલીયમ વાયુ ભરેલો છે. 20°C જેટલું તાપમાન વધારવા માટે જરૂરી ઉષ્માનો જથ્થો \_\_\_\_\_ છે  
[R=8.31 J mol<sup>-1</sup> K<sup>-1</sup> આપેલ છે.]

Options :

1. 700 J
2. 748 J
3. 374 J
4. 350 J

Question Number : 16 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A uniformly charged ring of radius 3a and total charge q is placed in xy-plane centred at origin. A point charge q is moving towards the ring along the z-axis and has speed v at z=4a. The minimum value of v such that it crosses the origin is :

Options :

1.  $\sqrt{\frac{2}{m}} \left( \frac{1}{15} \frac{q^2}{4\pi\epsilon_0 a} \right)^{1/2}$
2.  $\sqrt{\frac{2}{m}} \left( \frac{2}{15} \frac{q^2}{4\pi\epsilon_0 a} \right)^{1/2}$
3.  $\sqrt{\frac{2}{m}} \left( \frac{1}{5} \frac{q^2}{4\pi\epsilon_0 a} \right)^{1/2}$
4.  $\sqrt{\frac{2}{m}} \left( \frac{4}{15} \frac{q^2}{4\pi\epsilon_0 a} \right)^{1/2}$

Question Number : 16 Question Type : MCQ Option Shuffling : Yes Display Question Number



કુલ આવેશ  $q$  તથા ત્રિજ્યા  $3a$  का एक एकसमान आवेशित वलय  $xy$ -समतल में मूलबिंदु पर केन्द्रित रखा है। एक बिन्दु आवेश  $q$  इस वलय की तरफ  $z$ -अक्ष पर चल रहा है। इसकी  $z=4a$  पर चाल  $v$  है। मूलबिंदु को पार करने के लिए  $v$  का न्यूनतम मान होगा :

Options :

1.  $\sqrt{\frac{2}{m}} \left( \frac{1}{15} \frac{q^2}{4\pi\epsilon_0 a} \right)^{1/2}$

2.  $\sqrt{\frac{2}{m}} \left( \frac{2}{15} \frac{q^2}{4\pi\epsilon_0 a} \right)^{1/2}$

3.  $\sqrt{\frac{2}{m}} \left( \frac{1}{5} \frac{q^2}{4\pi\epsilon_0 a} \right)^{1/2}$

4.  $\sqrt{\frac{2}{m}} \left( \frac{4}{15} \frac{q^2}{4\pi\epsilon_0 a} \right)^{1/2}$

Question Number : 16 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

એકસમાન રીતે વિદ્યુતભારીત અને  $3a$  જેટલી ત્રિજ્યા ધરાવતી રીંગ પરનો કુલ વિદ્યુતભાર  $q$  છે જેને ઉગમબિંદુ આગળ  $xy$ -સમતલમાં મૂકવામાં આવે છે. એક બિંદુવત્ વિદ્યુતભાર  $q$  એ રીંગ તરફ  $z$  અક્ષની દિશામાં  $v$  ઝડપથી  $z=4a$  થી ગતિ કરે છે. બિંદુવત્ વિદ્યુતભારને રીંગને ઓળંગવા (કોસ કરવા) આપેલ ઓછામાં ઓછો જરૂરી  $v$  \_\_\_\_\_ છે.

Options :

1.  $\sqrt{\frac{2}{m}} \left( \frac{1}{15} \frac{q^2}{4\pi\epsilon_0 a} \right)^{1/2}$

2.  $\sqrt{\frac{2}{m}} \left( \frac{2}{15} \frac{q^2}{4\pi\epsilon_0 a} \right)^{1/2}$



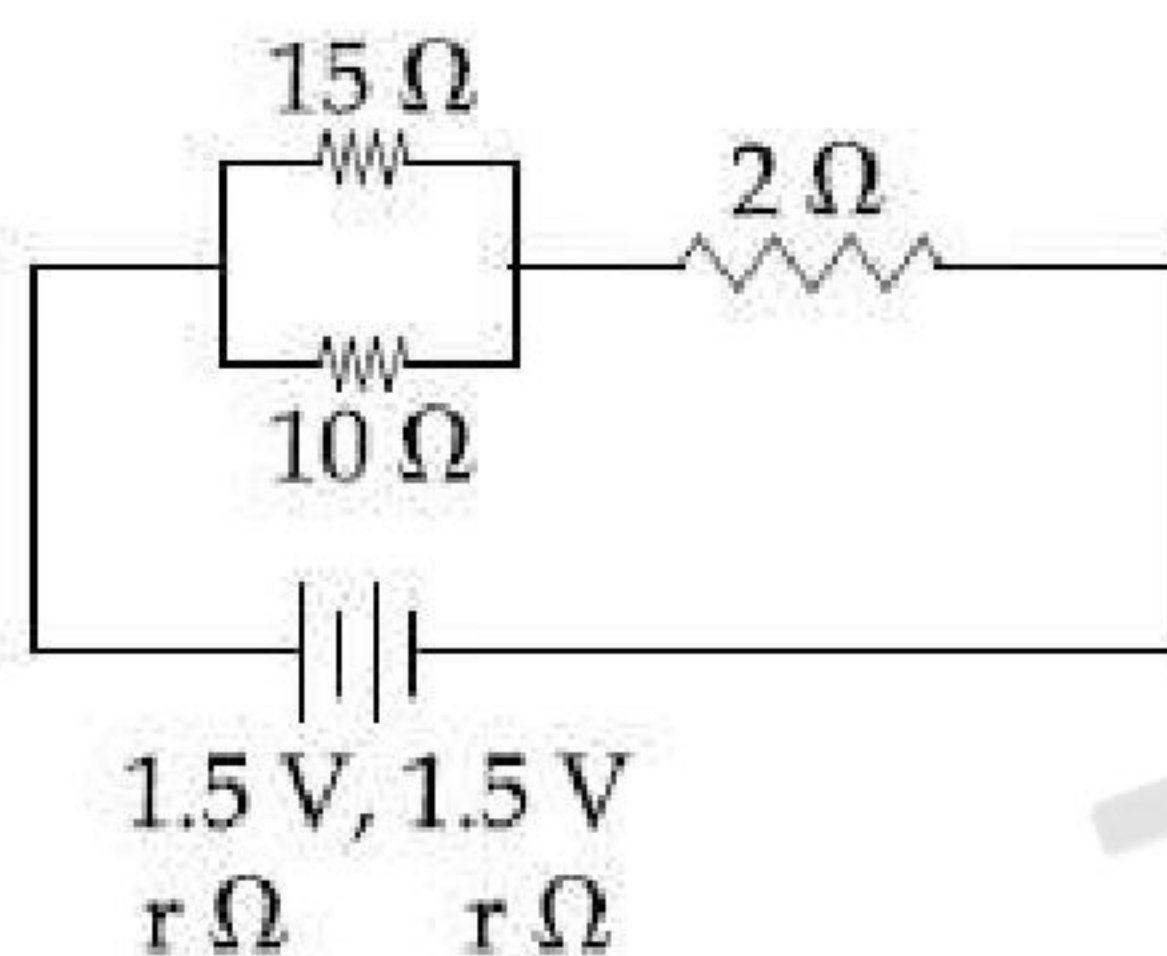
3.  $\sqrt{\frac{2}{m} \left( \frac{1}{5} \frac{q^2}{4\pi\epsilon_0 a} \right)^{1/2}}$

4.  $\sqrt{\frac{2}{m} \left( \frac{4}{15} \frac{q^2}{4\pi\epsilon_0 a} \right)^{1/2}}$

Question Number : 17 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

In the given circuit, an ideal voltmeter connected across the  $10\ \Omega$  resistance reads  $2\text{ V}$ . The internal resistance  $r$ , of each cell is :



Options :

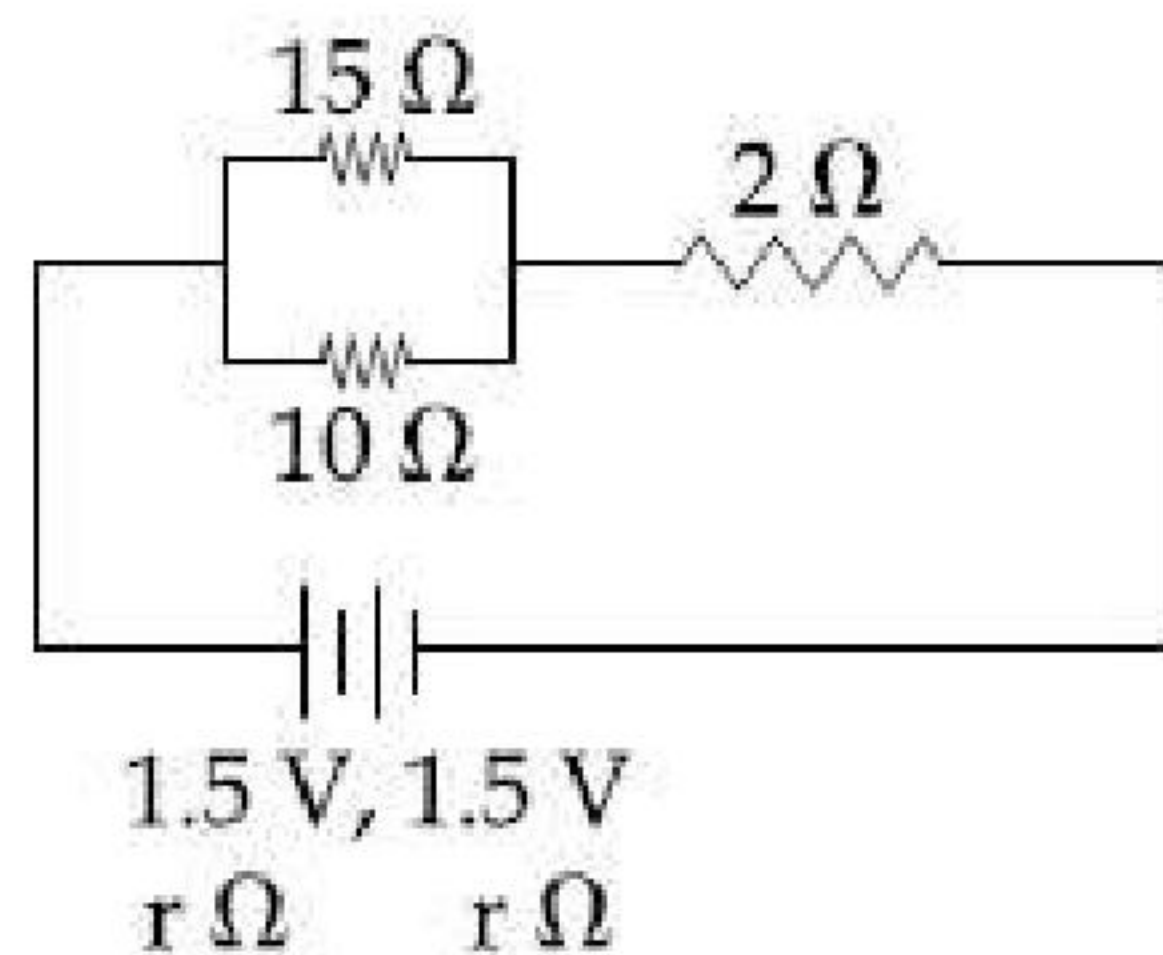
1.  $1\ \Omega$
2.  $1.5\ \Omega$
3.  $0.5\ \Omega$
4.  $0\ \Omega$

Question Number : 17 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1



दिये गये परिपथ में, एक आदर्श वोल्टमीटर को जब  $10\ \Omega$  प्रतिरोध के सिरो पर लगाते हैं तो वह  $2\text{ V}$  मापता है। प्रत्येक सेल का आंतरिक प्रतिरोध  $r$  होगा :



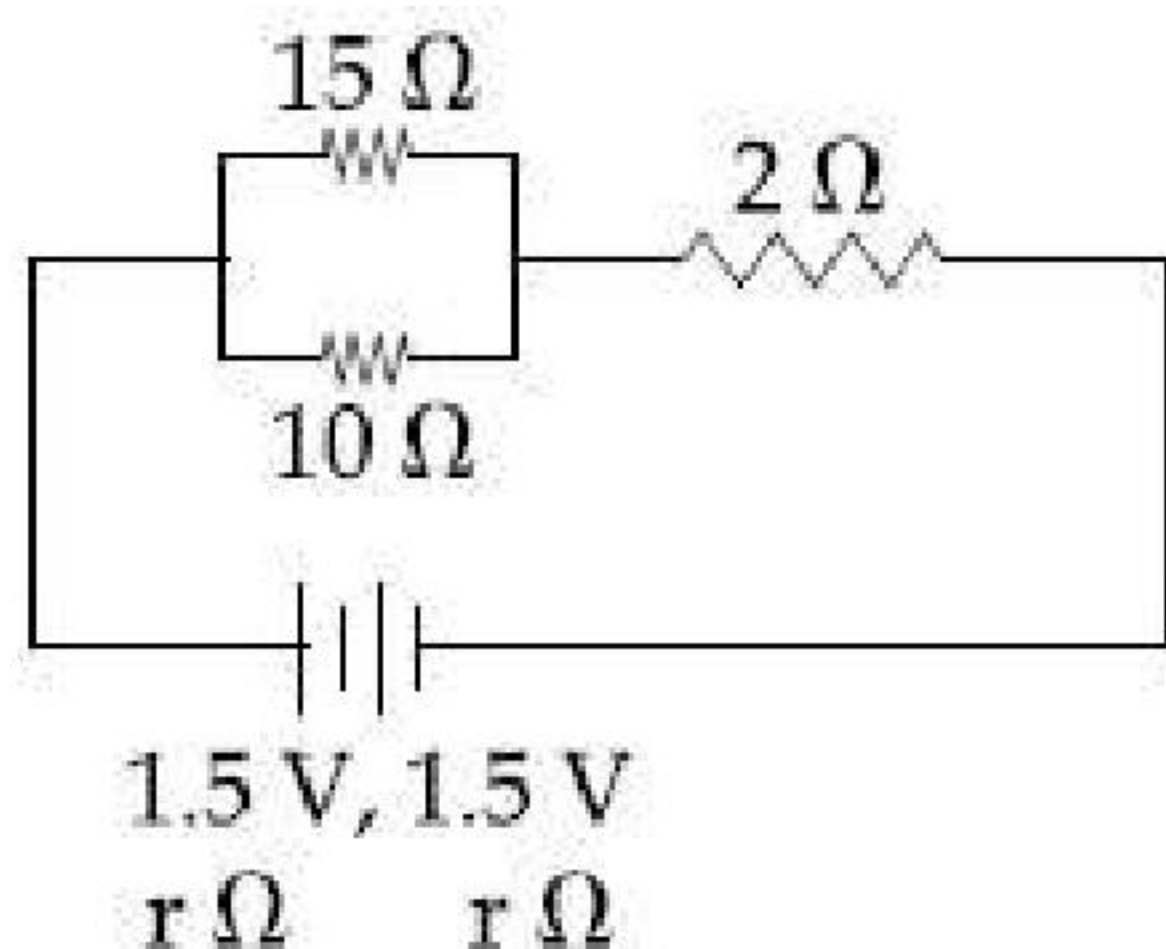
Options :

1.  $1\ \Omega$
2.  $1.5\ \Omega$
3.  $0.5\ \Omega$
4.  $0\ \Omega$

Question Number : 17 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

આપેલ પરિપથમાં, એક આદર્શ વોલ્ટમીટર કે જે  $10\ \Omega$  ના અવરોધને સમાંતર જોડેલ છે તે  $2\text{ V}$  અવલોકન નોંધે છે. દરેક વિદ્યુતકોષ (cell) નો આંતરિક અવરોધ  $r$  \_\_\_\_\_.



Options :

1.  $1\ \Omega$
2.  $1.5\ \Omega$
3.  $0.5\ \Omega$



4.  $0\ \Omega$

Question Number : 18 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A current of 5 A passes through a copper conductor (resistivity  $= 1.7 \times 10^{-8}\ \Omega\text{m}$ ) of radius of cross-section 5 mm. Find the mobility of the charges if their drift velocity is  $1.1 \times 10^{-3}\ \text{m/s}$ .

Options :

1.  $1.5\ \text{m}^2/\text{Vs}$
2.  $1.8\ \text{m}^2/\text{Vs}$
3.  $1.0\ \text{m}^2/\text{Vs}$
4.  $1.3\ \text{m}^2/\text{Vs}$

Question Number : 18 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

अनुप्रस्थ काट की त्रिज्या 5 mm वाले तौबे (प्रतिरोधकता  $= 1.7 \times 10^{-8}\ \Omega\text{m}$ ) के एक चालक से 5 A की धारा प्रवाहित होती है। यदि आवेशों का अपवाह वेग  $1.1 \times 10^{-3}\ \text{m/s}$  है तो उनकी गतिशीलता होगी :

Options :

1.  $1.5\ \text{m}^2/\text{Vs}$
2.  $1.8\ \text{m}^2/\text{Vs}$
3.  $1.0\ \text{m}^2/\text{Vs}$
4.  $1.3\ \text{m}^2/\text{Vs}$

Question Number : 18 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1



5 mm ત્રિજ્યા ધરાવતા કોપર વાહક  
(અવરોધકતા =  $1.7 \times 10^{-8} \Omega\text{m}$ ) માંથી 5 A પ્રવાહ  
પસાર થાય છે. જો તેમનો ડ્રિફ્ટ વેગ  $1.1 \times 10^{-3} \text{ m/s}$   
હોય તો વિદ્યુતભારોની મોબીલિટી શોધો.

Options :

1.  $1.5 \text{ m}^2/\text{Vs}$
2.  $1.8 \text{ m}^2/\text{Vs}$
3.  $1.0 \text{ m}^2/\text{Vs}$
4.  $1.3 \text{ m}^2/\text{Vs}$

Question Number : 19 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A proton, an electron, and a Helium nucleus, have the same energy. They are in circular orbits in a plane due to magnetic field perpendicular to the plane. Let  $r_p$ ,  $r_e$  and  $r_{\text{He}}$  be their respective radii, then,

Options :

1.  $r_e < r_p < r_{\text{He}}$
2.  $r_e > r_p > r_{\text{He}}$
3.  $r_e > r_p = r_{\text{He}}$
4.  $r_e < r_p = r_{\text{He}}$

Question Number : 19 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक प्रोटॉन, एक इलैक्ट्रॉन और एक हीलियम नाभिक,  
की ऊर्जाएँ बराबर हैं। वे एक समतल में उसके लम्बवत्  
चुम्बकीय क्षेत्र के कारण वृत्ताकार कक्षा में गतिशील  
हैं। यदि  $r_p$ ,  $r_e$  और  $r_{\text{He}}$  प्रोटॉन, इलैक्ट्रॉन तथा हीलियम  
नाभिक के वृत्ताकार पथ की त्रिज्याएँ हैं, तो :



2.  $r_e > r_p > r_{He}$

3.  $r_e > r_p = r_{He}$

4.  $r_e < r_p = r_{He}$

Question Number : 19 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

સમાન ઊર્જા ધરાવતા એક પ્રોટોન, એક ઇલેક્ટ્રોન અને એક હાઇડ્રોજન આયન ચુંબકીય ક્ષેત્રમાં દાખલ થાય છે. જો પ્રોટોન, ઇલેક્ટ્રોન અને હાઇડ્રોજન આયનના વર્તુળાકાર પથોની ત્રિજ્યાઓ  $r_p$ ,  $r_e$  અને  $r_{He}$  હોય તો \_\_\_\_\_

Options :

1.  $r_e < r_p < r_{He}$

2.  $r_e > r_p > r_{He}$

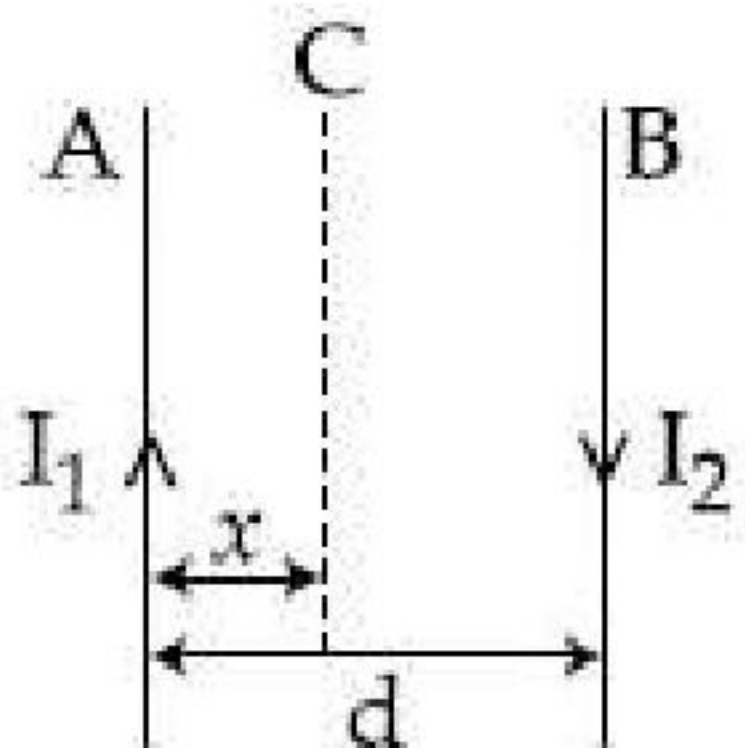
3.  $r_e > r_p = r_{He}$

4.  $r_e < r_p = r_{He}$

Question Number : 20 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Two wires A & B are carrying currents  $I_1$  &  $I_2$  as shown in the figure. The separation between them is  $d$ . A third wire C carrying a current  $I$  is to be kept parallel to them at a distance  $x$  from A such that the net force acting on it is zero. The possible values of  $x$  are :





1.  $x = \pm \frac{I_1 d}{(I_1 - I_2)}$

2.  $x = \left( \frac{I_1}{I_1 + I_2} \right) d$  and  $x = \frac{I_2}{(I_1 - I_2)} d$

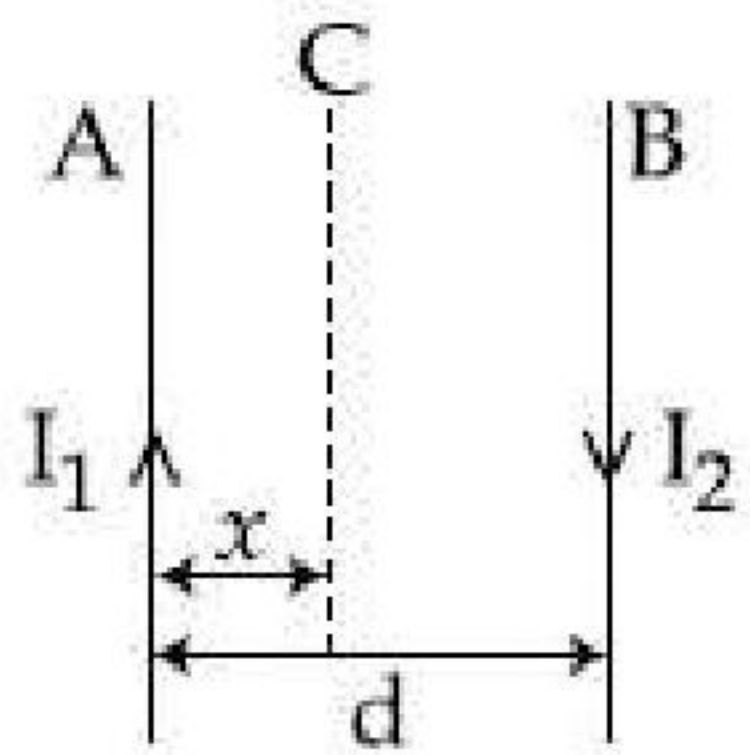
3.  $x = \left( \frac{I_1}{I_1 - I_2} \right) d$  and  $x = \frac{I_2}{(I_1 + I_2)} d$

4.  $x = \left( \frac{I_2}{I_1 + I_2} \right) d$  and  $x = \left( \frac{I_2}{I_1 - I_2} \right) d$

Question Number : 20 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

दिखाये गये चित्र में दो तार A तथा B में प्रवाहित धारायें  $I_1$  तथा  $I_2$  हैं। उनके बीच की दूरी  $d$  है। I धारा वाला एक तीसरे तार C को इनके समान्तर A से  $x$  दूरी पर इस प्रकार रखते हैं कि इस पर कुल बल शून्य है।  $x$  के सम्भव मान होंगे :



Options :

1.  $x = \pm \frac{I_1 d}{(I_1 - I_2)}$

2.  $x = \left( \frac{I_1}{I_1 + I_2} \right) d$  तथा  $x = \frac{I_2}{(I_1 - I_2)} d$

3.  $x = \left( \frac{I_1}{I_1 - I_2} \right) d$  तथा  $x = \frac{I_2}{(I_1 + I_2)} d$

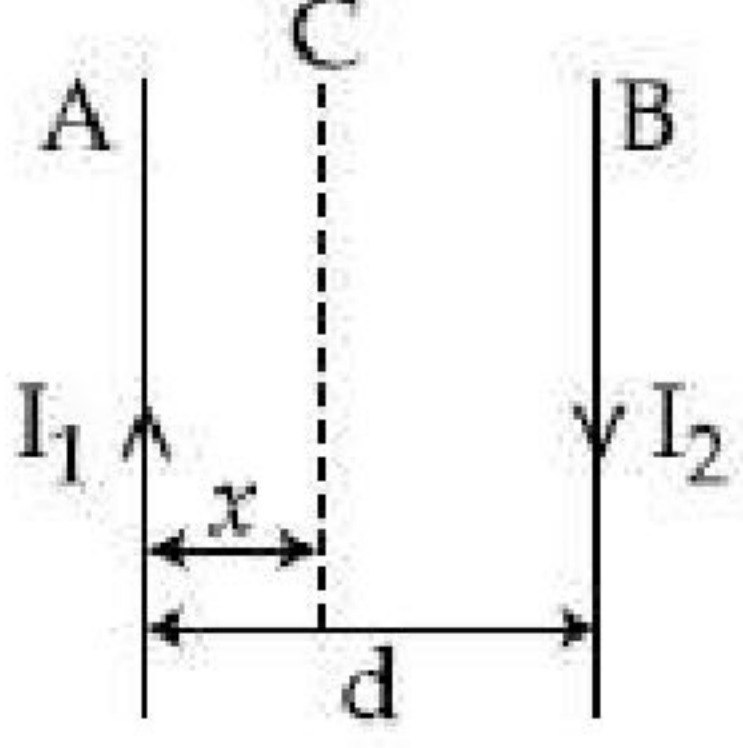
4.  $x = \left( \frac{I_2}{I_1 + I_2} \right) d$  तथा  $x = \left( \frac{I_2}{I_1 - I_2} \right) d$



Question Number : 20 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

આકૃતિમાં દર્શાવ્યા મુજબ વે તારો A અને B માંથી  $I_1$  અને  $I_2$  જેટલો વિદ્યુતપ્રવાહ વહે છે. તેઓની વચ્ચેનું અંતર  $d$  છે. તેઓને સમાંતર કોઈક એક ત્રીજો I પ્રવાહ ધરાવતા તાર C ને A થી  $x$  અંતરે એવી રીતે શખવામાં આવે છે કે જેથી તેના પર લાગતું સમાસ બલ શૂન્ય થાય.  $x$  ની શક્ય કિંમતો છે :



Options :

1.  $x = \pm \frac{I_1 d}{(I_1 - I_2)}$

2.  $x = \left( \frac{I_1}{I_1 + I_2} \right) d$  અને  $x = \frac{I_2}{(I_1 - I_2)} d$

3.  $x = \left( \frac{I_1}{I_1 - I_2} \right) d$  અને  $x = \frac{I_2}{(I_1 + I_2)} d$

4.  $x = \left( \frac{I_2}{I_1 + I_2} \right) d$  અને  $x = \left( \frac{I_2}{I_1 - I_2} \right) d$

Question Number : 21 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A transformer consisting of 300 turns in the primary and 150 turns in the secondary gives output power of 2.2 kW. If the current in the secondary coil is 10 A, then the input voltage and current in the primary coil are :

Options :

1. 440 V and 20 A



3. 440 V and 5 A
4. 220 V and 20 A

Question Number : 21 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

300 ફેરોં વાલી પ્રાથમિક કુણ્ડલી તથા 150 ફેરોં વાલી દ્વિતીયક કુણ્ડલી વાલે ઁક ટ્રાંસફાર્મર કી નિર્ગત શક્તિ 2.2 kW હૈ। યદિ દ્વિતીયક કુણ્ડલી મેં ધારા કા માન 10 A હૈ તો નિવેશી વોલ્ટેજ ઔર પ્રાથમિક કુણ્ડલી મેં ધારા કે માન હૈ :

Options :

1. 440 V તથા 20 A
2. 220 V તથા 10 A
3. 440 V તથા 5 A
4. 220 V તથા 20 A

Question Number : 21 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

ઁક ટ્રાન્સફોર્મર પ્રાથમરીમાં 300 ઁંટા ઁને 150 ઁંટા સેકન્ડરીમાં ધરાવે ઁ. જેનો ઁઉટપુટ પાવર 2.2 kW બતાવે ઁ. જો સેકન્ડરી ગુંચળામાંથી પસાર થતો પ્રવાહ 10 A હોય તો પ્રાથમરી ગુંચળામાં પસાર થતો ઁનપુટ વોલ્ટેજ ઁને પ્રવાહ \_\_\_\_\_ ઁ.

Options :

1. 440 V ઁને 20 A
2. 220 V ઁને 10 A
3. 440 V ઁને 5 A
4. 220 V ઁને 20 A



The electric field of a plane electromagnetic wave is given by

$$\vec{E} = E_0 \hat{i} \cos(kz) \cos(\omega t)$$

The corresponding magnetic field  $\vec{B}$  is then given by :

Options :

1.  $\vec{B} = \frac{E_0}{C} \hat{j} \sin(kz) \sin(\omega t)$

2.  $\vec{B} = \frac{E_0}{C} \hat{j} \sin(kz) \cos(\omega t)$

3.  $\vec{B} = \frac{E_0}{C} \hat{j} \cos(kz) \sin(\omega t)$

4.  $\vec{B} = \frac{E_0}{C} \hat{k} \sin(kz) \cos(\omega t)$

Question Number : 22 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक समतल विद्युत-चुम्बकीय तरंग का विद्युत क्षेत्र निम्न है,

$$\vec{E} = E_0 \hat{i} \cos(kz) \cos(\omega t)$$

तब संगत चुम्बकीय क्षेत्र  $\vec{B}$  होगा :

Options :

1.  $\vec{B} = \frac{E_0}{C} \hat{j} \sin(kz) \sin(\omega t)$

2.  $\vec{B} = \frac{E_0}{C} \hat{j} \sin(kz) \cos(\omega t)$

3.  $\vec{B} = \frac{E_0}{C} \hat{j} \cos(kz) \sin(\omega t)$

4.  $\vec{B} = \frac{E_0}{C} \hat{k} \sin(kz) \cos(\omega t)$



Question Number : 22 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

એક સમતલ વિદ્યુતચુંબકીય તરંગનું વિદ્યુત ક્ષેત્ર નીચે મુજબ આપી શકાય છે.

$$\vec{E} = E_0 \hat{i} \cos(kz) \cos(\omega t)$$

તો ચુંબકીય ક્ષેત્ર  $\vec{B}$  હશે :

Options :

1.  $\vec{B} = \frac{E_0}{C} \hat{j} \sin(kz) \sin(\omega t)$

2.  $\vec{B} = \frac{E_0}{C} \hat{j} \sin(kz) \cos(\omega t)$

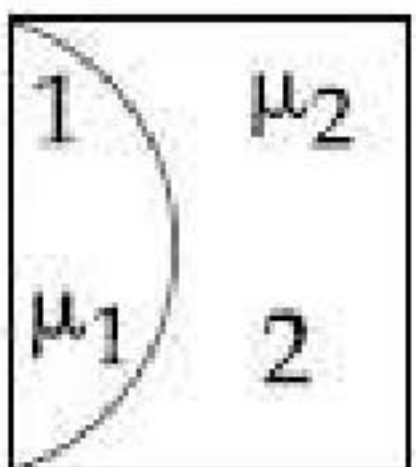
3.  $\vec{B} = \frac{E_0}{C} \hat{j} \cos(kz) \sin(\omega t)$

4.  $\vec{B} = \frac{E_0}{C} \hat{k} \sin(kz) \cos(\omega t)$

Question Number : 23 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

One plano-convex and one plano-concave lens of same radius of curvature 'R' but of different materials are joined side by side as shown in the figure. If the refractive index of the material of 1 is  $\mu_1$  and that of 2 is  $\mu_2$ , then the focal length of the combination is :



Options :

1.  $\frac{R}{\mu_1 - \mu_2}$



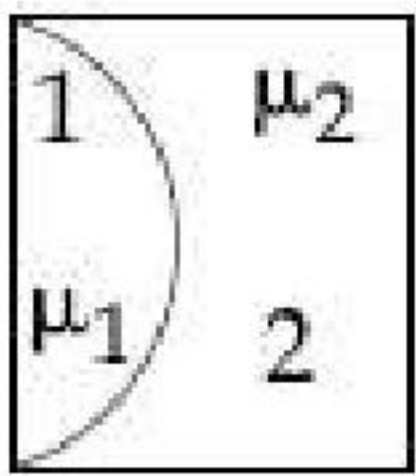
3.  $\frac{R}{2(\mu_1 - \mu_2)}$

4.  $\frac{R}{2 - (\mu_1 - \mu_2)}$

Question Number : 23 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक समतल-उत्तल और एक समतल-अवतल लेंस, जिनकी वक्रता त्रिज्या 'R' है वो अलग पदार्थों के बने हैं। इन दोनों को चित्रानुसार चिपका दिया जाता है। यदि लेंस-1 के पदार्थ का अपवर्तनांक  $\mu_1$  तथा लेंस-2 के पदार्थ का अपवर्तनांक  $\mu_2$  है तो इस संयोजन की फोकस दूरी होगी :



Options :

1.  $\frac{R}{\mu_1 - \mu_2}$

2.  $\frac{2R}{\mu_1 - \mu_2}$

3.  $\frac{R}{2(\mu_1 - \mu_2)}$

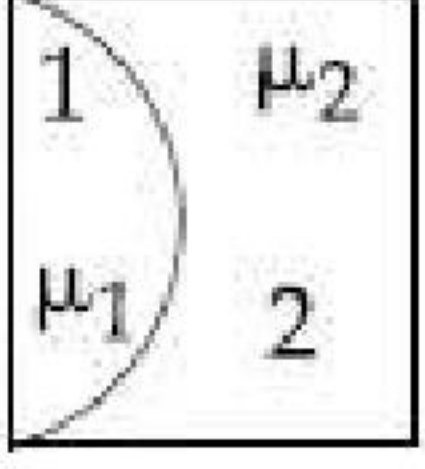
4.  $\frac{R}{2 - (\mu_1 - \mu_2)}$

Question Number : 23 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1



સમાન વક્રતા ત્રિજ્યા 'R' પરંતુ જુદા-જુદા દ્રવ્યના બનેલા એક સમતલીય-બહિર્ગોળ (plano-convex) અને સમતલીય અંતર્ગોળ (plano-concave) ને એકબીજા સાથે આકૃતિમાં દર્શાવ્યા મુજબ ચોંટાડવામાં આવ્યા છે. જો દ્રવ્ય 1 નો વક્રીભવનાંક  $\mu_1$  અને બીજા 2 નો  $\mu_2$  હોય તો આ સંયોજનની કેન્દ્રલંબાઈ છે :



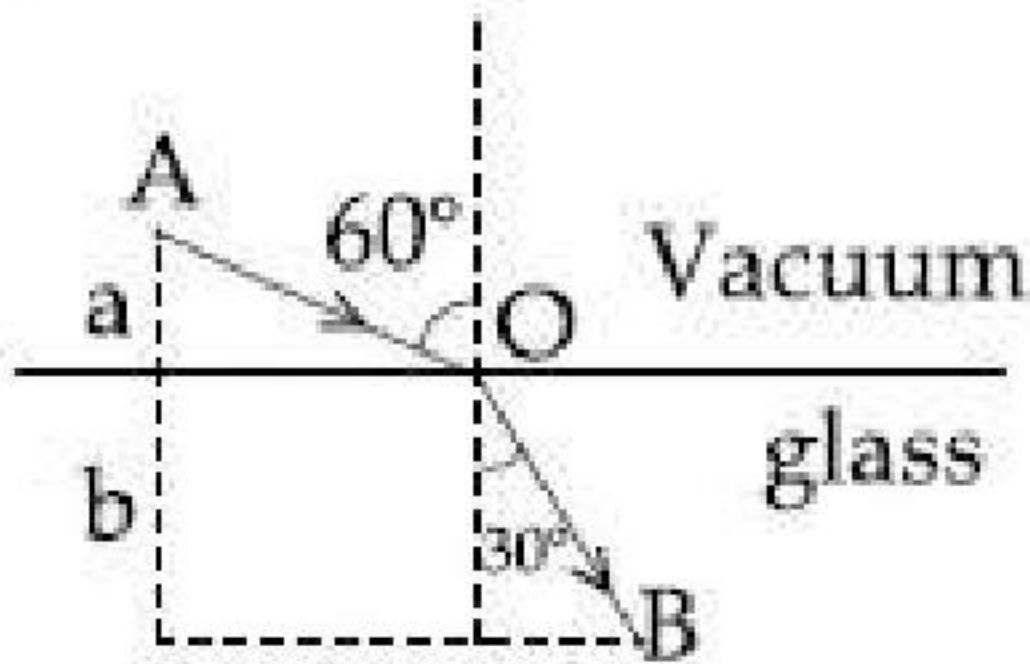
Options :

1.  $\frac{R}{\mu_1 - \mu_2}$
2.  $\frac{2R}{\mu_1 - \mu_2}$
3.  $\frac{R}{2(\mu_1 - \mu_2)}$
4.  $\frac{R}{2 - (\mu_1 - \mu_2)}$

Question Number : 24 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A ray of light AO in vacuum is incident on a glass slab at angle  $60^\circ$  and refracted at angle  $30^\circ$  along OB as shown in the figure. The optical path length of light ray from A to B is :



Options :

1.  $2a + \frac{2b}{\sqrt{3}}$



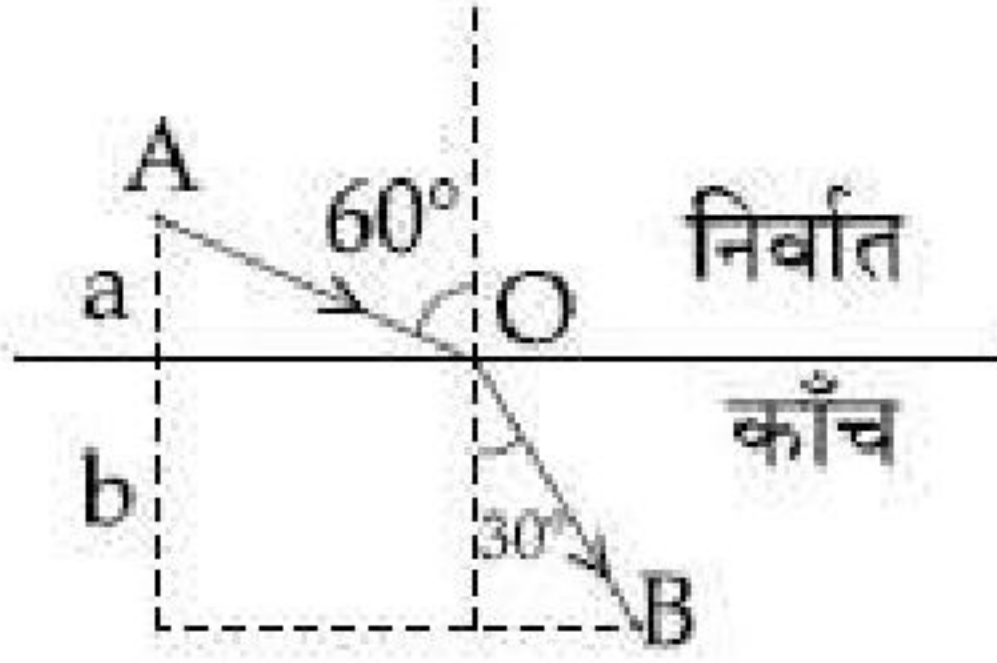
3.  $2a + 2b$

4.  $2a + \frac{2b}{3}$

Question Number : 24 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक प्रकाश की किरण AO निर्वात से काँच में  $60^\circ$  के कोण पर आपतित है तथा इसका अपवर्तन  $30^\circ$  के कोण पर OB के समदिश चित्रानुसार होता है। इस किरण की A से B तक प्रकाशिक पथ लम्बाई (optical path length) होगी :



Options :

1.  $2a + \frac{2b}{\sqrt{3}}$

2.  $\frac{2\sqrt{3}}{a} + 2b$

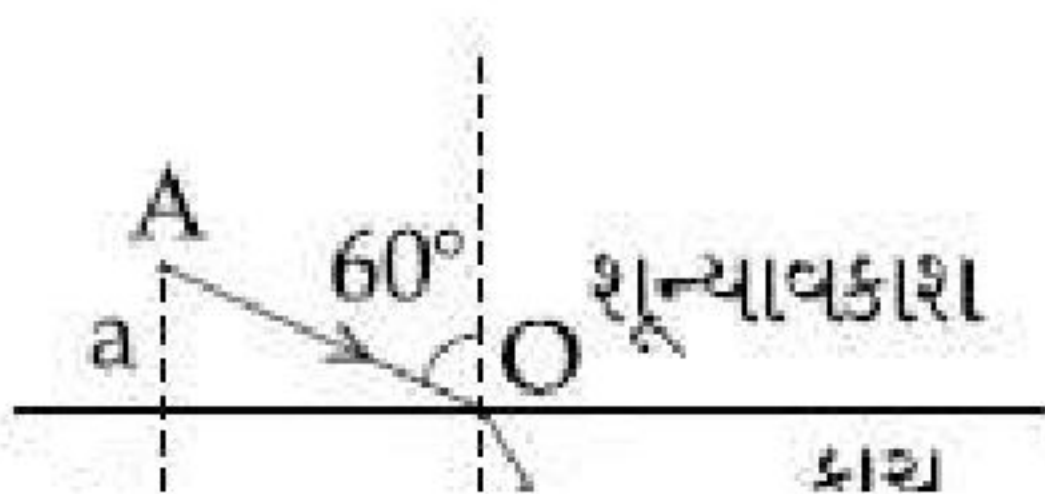
3.  $2a + 2b$

4.  $2a + \frac{2b}{3}$

Question Number : 24 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

શૂન્યાવકાશમાં એક પ્રકાશ કિરણ AO એક કાચ (ગ્લાસ) પર  $60^\circ$  કોણે આપાત થાય છે અને  $30^\circ$  ના કોણે OB ની દિશામાં વક્રીભૂત થાય છે. પ્રકાશ કિરણની A થી B ની પ્રકાશીય પથ લંબાઈ \_\_\_\_\_ થશે.





1.  $2a + \frac{2b}{\sqrt{3}}$
2.  $\frac{2\sqrt{3}}{a} + 2b$
3.  $2a + 2b$
4.  $2a + \frac{2b}{3}$

Question Number : 25 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

In a photoelectric effect experiment the threshold wavelength of light is 380 nm. If the wavelength of incident light is 260 nm, the maximum kinetic energy of emitted electrons will be :

$$\text{Given } E \text{ (in eV)} = \frac{1237}{\lambda \text{ (in nm)}}$$

Options :

1. 3.0 eV
2. 4.5 eV
3. 15.1 eV
4. 1.5 eV

Question Number : 25 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक प्रकाश विद्युत प्रवाह प्रयोग में प्रकाश की देहली तरंगदैर्घ्य 380 nm है। यदि आपतित किरण की तरंगदैर्घ्य 260 nm हो तो उत्सर्जित इलेक्ट्रॉनों की अधिकतम गतिज ऊर्जा होगी :

$$\text{दिया है : } E \text{ (in eV)} = \frac{1237}{\lambda \text{ (in nm)}}$$



1. 3.0 eV
2. 4.5 eV
3. 15.1 eV
4. 1.5 eV

Question Number : 25 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

એક ફોટોઇલેક્ટ્રીક અસરના પ્રયોગમાં આપાત પ્રકાશની થ્રેશોલ્ડ તરંગલંબાઈ 380 nm છે. જો આપાત પ્રકાશ ની તરંગલંબાઈ 260 nm હોય તો ઉત્સર્જિત ઇલેક્ટ્રોનોની મહત્તમ ગતિઊર્જા \_\_\_\_\_ થશે.

$$\text{અર્થ } E \text{ (eV માં)} = \frac{1237}{\lambda \text{ (nm)}}$$

Options :

1. 3.0 eV
2. 4.5 eV
3. 15.1 eV
4. 1.5 eV

Question Number : 26 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Two radioactive materials A and B have decay constants  $10\lambda$  and  $\lambda$ , respectively. If initially they have the same number of nuclei, then the ratio of the number of nuclei of A to that of B will be  $1/e$  after a time :

Options :

1.  $\frac{1}{10\lambda}$



2.  $\frac{1}{11 \lambda}$

3.  $\frac{11}{10 \lambda}$

4.  $\frac{1}{9 \lambda}$

Question Number : 26 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

દો રેડિયોધર્મી પદાર્થો A તથા B કે ક્ષય નિયતાંક, ક્રમશઃ,  $10\lambda$  તથા  $\lambda$  હૈં. યદિ આરમ્ભ મૈં ઝનકે નાભિકોં કી સંખ્યા બરાબર હો તો કિતને સમય બાદ A તથા B કે નાભિકોં કી સંખ્યા કા અનુપાત  $1/e$  હોગા :

Options :

1.  $\frac{1}{10 \lambda}$

2.  $\frac{1}{11 \lambda}$

3.  $\frac{11}{10 \lambda}$

4.  $\frac{1}{9 \lambda}$

Question Number : 26 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

બે રેડિયોએક્ટિવ પદાર્થો A અને B નાં ક્ષયનિયતાંક અનુક્રમે  $10\lambda$  અને  $\lambda$  છે. જો પ્રારંભમાં તેઓમાં સમાન સંખ્યાના ન્યુક્લિયસો હોય તો A અને B ના ન્યુક્લિયસોની સંખ્યાનો ગુણોત્તર  $1/e$  થાય તે માટેનો સમય \_\_\_\_\_ થશે.

Options :

1.  $\frac{1}{10 \lambda}$



2.  $\frac{1}{11 \lambda}$

3.  $\frac{11}{10 \lambda}$

4.  $\frac{1}{9 \lambda}$

Question Number : 27 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

An npn transistor operates as a common emitter amplifier, with a power gain of 60 dB. The input circuit resistance is  $100 \Omega$  and the output load resistance is  $10 \text{ k}\Omega$ . The common emitter current gain  $\beta$  is :

Options :

1.  $6 \times 10^2$

2. 60

3.  $10^2$

4.  $10^4$

Question Number : 27 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक npn ट्रांजिस्टर 60 dB शक्ति लब्धि वाले उभयनिष्ठ उत्सर्जक प्रवर्धक के रूप में काम करता है। इस परिपथ का निवेशी प्रतिरोध  $100 \Omega$  तथा निर्गत लोड प्रतिरोध  $10 \text{ k}\Omega$  है। उभयनिष्ठ उत्सर्जक धारा लब्धि  $\beta$  है :

Options :

1.  $6 \times 10^2$

2. 60



4.  $10^4$

Question Number : 27 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

એક npn ટ્રાન્ઝીસ્ટર 60 dB જેટલા પાવર ગેઇન સાથે કોમન એમીટર એપ્લીફાયર તરીકે વર્તે છે. પરિપથનો ઇનપુટ અવરોધ  $100\ \Omega$  અને આઉટપુટ લોડ (ભાર) અવરોધ  $10\text{ k}\Omega$  છે. કોમન એમીટરની પ્રવાહ લબ્ધિ  $\beta$  \_\_\_\_\_ છે.

Options :

1.  $6 \times 10^2$

2. 60

3.  $10^2$

4.  $10^4$

Question Number : 28 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A message signal of frequency 100 MHz and peak voltage 100 V is used to execute amplitude modulation on a carrier wave of frequency 300 GHz and peak voltage 400 V. The modulation index and difference between the two side band frequencies are :

Options :

1. 0.25 ;  $1 \times 10^8\text{ Hz}$

2. 4 ;  $2 \times 10^8\text{ Hz}$

3. 0.25 ;  $2 \times 10^8\text{ Hz}$

4. 4 ;  $1 \times 10^8\text{ Hz}$



100 MHz આવૃત્તિ તથા શિખર વોલ્ટતા 100 V કે  
એક સૂચના સિગ્નલ કા ઉપયોગ 300 GHz આવૃત્તિ  
તથા શિખર વોલ્ટતા 400 V કી એક વાહક તરંગ કા  
આયામ મોડુલન કરને કે લિયે કરતે હૈ। મોડુલન  
સૂચકાંક તથા દોનોં પાર્શ્વ બૈન્ડ કી આવૃત્તિયોં કા અન્તર  
હોગા :

Options :

1.  $0.25 ; 1 \times 10^8 \text{ Hz}$
2.  $4 ; 2 \times 10^8 \text{ Hz}$
3.  $0.25 ; 2 \times 10^8 \text{ Hz}$
4.  $4 ; 1 \times 10^8 \text{ Hz}$

Question Number : 28 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option :  
No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

100 MHz આવૃત્તિ અને 100 V પીક (મહત્તમ) વોલ્ટેજ  
વાળા એક સંદેશા સંકેત (message signal) ને  
300 GHz આવૃત્તિ અને 400 V પીક વોલ્ટેજ વાળા  
કેરિયર તરંગ (carrier wave) પર એમ્પ્લીટ્યુડ મોડ્યુલેશન  
તરીકે વાપરવામા આવે છે. મોડ્યુલેશન ઇન્ડેક્સ અને બે  
સાઇડ બેન્ડ ની આવૃત્તિ વચ્ચેનો તફાવત \_\_\_\_\_ છે.

Options :

1.  $0.25 ; 1 \times 10^8 \text{ Hz}$
2.  $4 ; 2 \times 10^8 \text{ Hz}$
3.  $0.25 ; 2 \times 10^8 \text{ Hz}$
4.  $4 ; 1 \times 10^8 \text{ Hz}$

Question Number : 29 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option :  
No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1



A moving coil galvanometer allows a full scale current of  $10^{-4}$  A. A series resistance of  $2\text{ M}\Omega$  is required to convert the above galvanometer into a voltmeter of range  $0 - 5\text{ V}$ . Therefore the value of shunt resistance required to convert the above galvanometer into an ammeter of range  $0-10\text{ mA}$  is :

Note: For this question, discrepancy is found in question/answer. Full Marks is being awarded to all candidates.

Options :

1.  $200\ \Omega$
2.  $100\ \Omega$
3.  $500\ \Omega$
4.  $10\ \Omega$

Question Number : 29 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक चल कुंडली गैल्वेनोमीटर, की पूर्ण विक्षेप धारा का मान  $10^{-4}\text{ A}$  है। इसको एक  $0 - 5\text{ V}$  परास के वोल्टमीटर में बदलने के लिये  $2\text{ M}\Omega$  के प्रतिरोध की आवश्यकता होती है। तो इसे एक  $0-10\text{ mA}$  परास के अमीटर में बदलने के लिये किस शंट प्रतिरोध की आवश्यकता होगी :

Note: For this question, discrepancy is found in question/answer. Full Marks is being awarded to all candidates.

Options :

1.  $200\ \Omega$
2.  $100\ \Omega$
3.  $500\ \Omega$
4.  $10\ \Omega$



એક ચલિત ગૂંચળા ધરાવતા ગેલ્વેનોમીટરમાંથી  $10^{-4}$  A જેટલો મહત્તમ પ્રવાહ પસાર થઈ શકે છે. આ ગેલ્વેનોમીટરને 0 - 5 V રેન્જ ધરાવતા વોલ્ટમીટરમાં રૂપાંતરીત કરવા માટે એક  $2\text{ M}\Omega$  નાં શ્રેણી અવરોધની જરૂર પડે છે. તેથી ઉપરોક્ત ગેલ્વેનોમીટર ને 0-10 mA રેન્જ ધરાવતા એમીટરમાં રૂપાંતર કરવા જરૂરી શંક છે :

**Note:** For this question, discrepancy is found in question/answer. Full Marks is being awarded to all candidates.

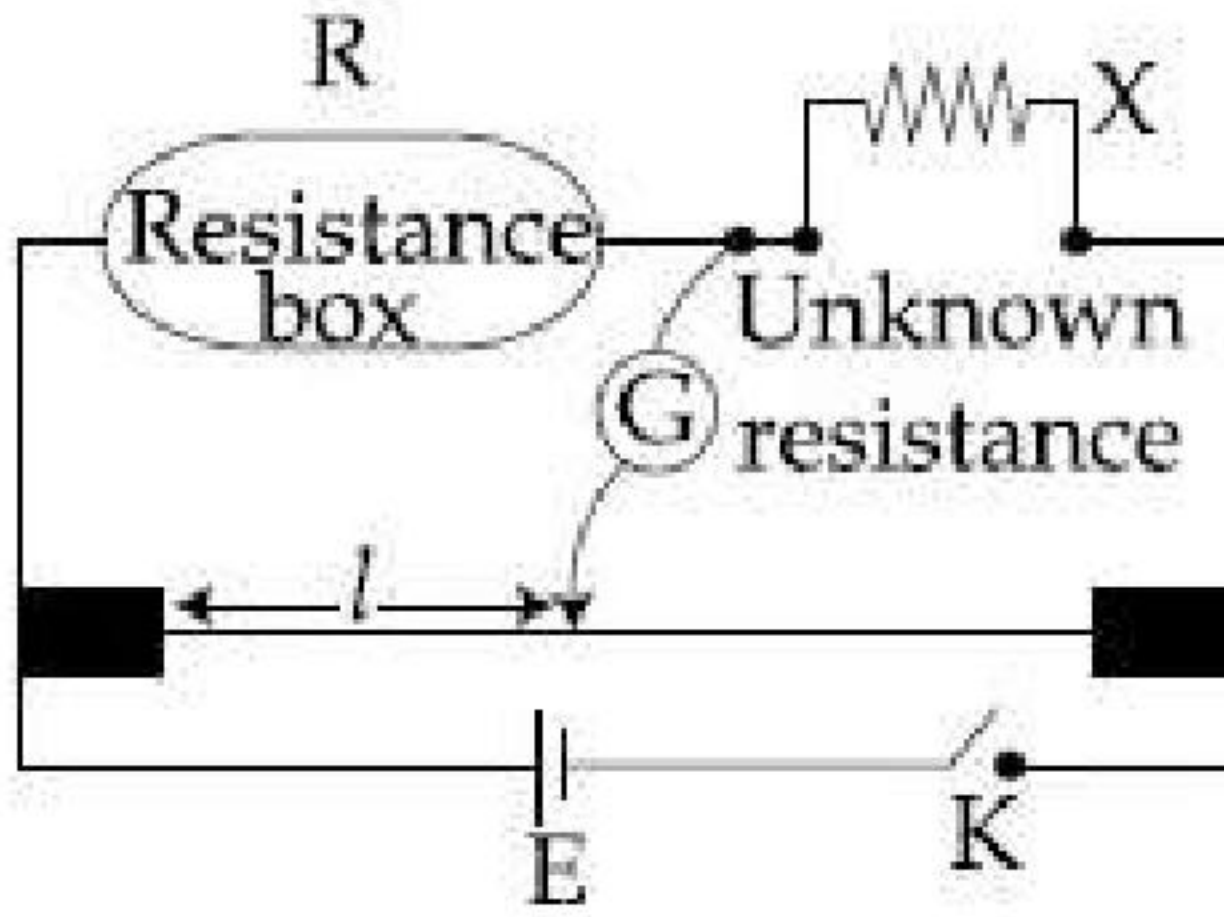
**Options :**

1.  $200\ \Omega$
2.  $100\ \Omega$
3.  $500\ \Omega$
4.  $10\ \Omega$

**Question Number : 30 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 4 Wrong Marks : 1**

In a meter bridge experiment, the circuit diagram and the corresponding observation table are shown in figure.



| Sl. No. | R ( $\Omega$ ) | l (cm) |
|---------|----------------|--------|
| 1.      | 1000           | 60     |
| 2.      | 100            | 13     |
| 3.      | 10             | 1.5    |
| 4.      | 1              | 1.0    |

Which of the readings is inconsistent ?

**Options :**

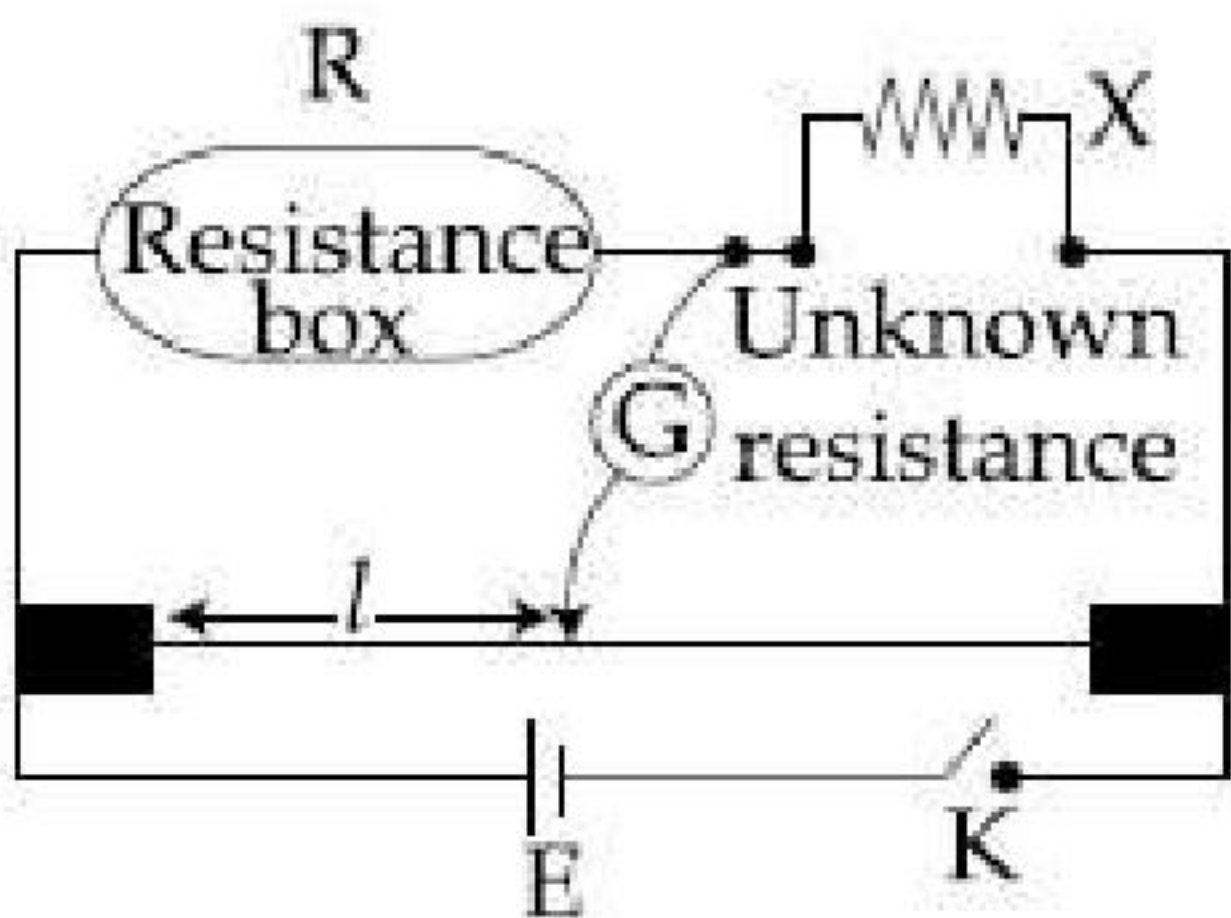
- 1.



2. 2
3. 3
4. 4

Question Number : 30 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical  
 Correct Marks : 4 Wrong Marks : 1

एक मीटर सेतू प्रयोग के लिये, परिपथ तथा संगत परीक्षण सारणी चित्र में दिये गये हैं।



| Sl. No. | R ( $\Omega$ ) | l (cm) |
|---------|----------------|--------|
| 1.      | 1000           | 60     |
| 2.      | 100            | 13     |
| 3.      | 10             | 1.5    |
| 4.      | 1              | 1.0    |

इनमें कौन सा पाठ्यांक असंगत है?

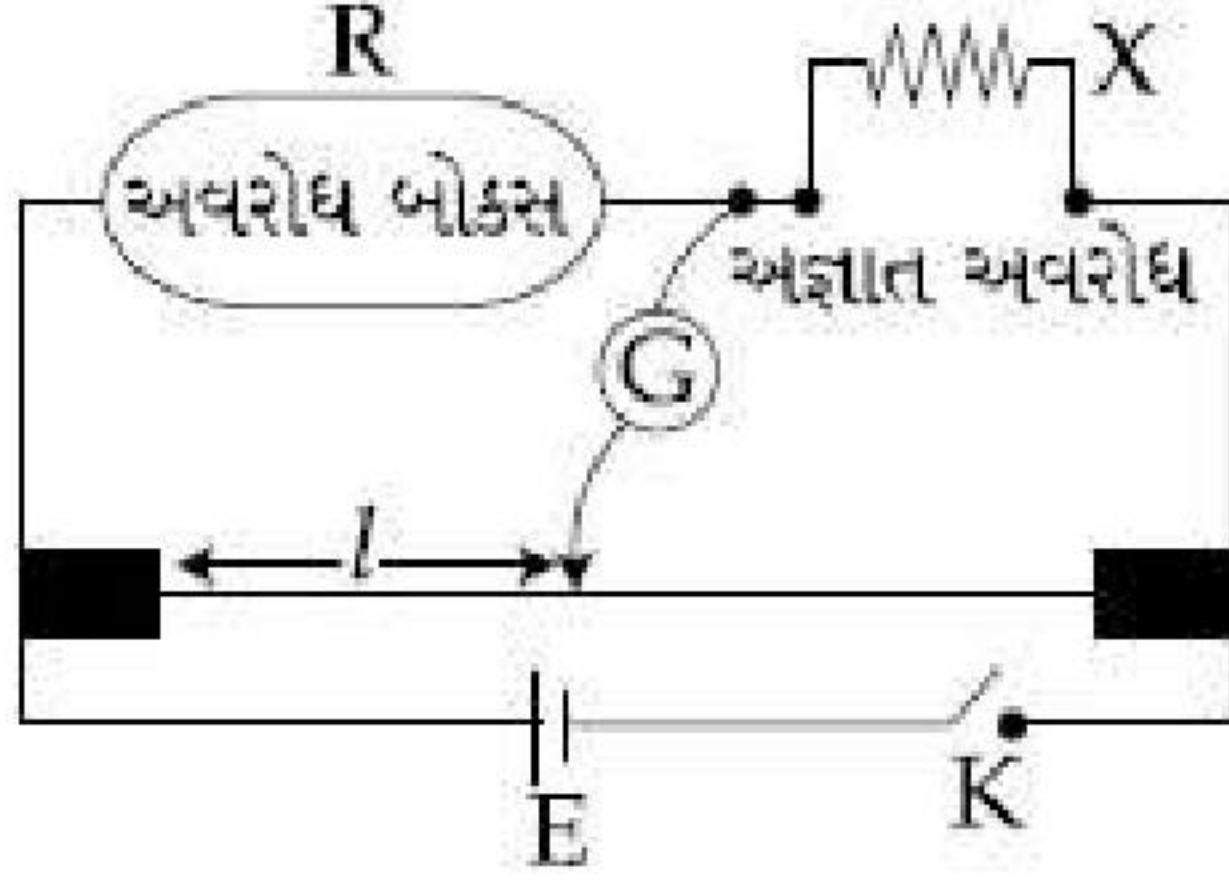
Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 30 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical  
 Correct Marks : 4 Wrong Marks : 1



એક મીટર બ્રીજ પ્રયોગનાં અવલોકન અને પરિપથ આકૃતિમાં બતાવ્યા છે.



| ક્રમ | R ( $\Omega$ ) | l (cm) |
|------|----------------|--------|
| 1.   | 1000           | 60     |
| 2.   | 100            | 13     |
| 3.   | 10             | 1.5    |
| 4.   | 1              | 1.0    |

નીચેનું કયું અવલોકન યોગ્ય રીતે લઈ શકાય નહીં?

Options :

- 1
- 2
- 3
- 4

Section Id :

Section Number :

Section type :

Mandatory or Optional:

Number of Questions:

Number of Questions to be attempted:

Section Marks:

Display Number Panel:

Group All Questions:

Chemistry

416529266

2

Online

Mandatory

30

30

120

Yes

No

Sub-Section Number:

Sub-Section Id:

Question Shuffling Allowed :

1

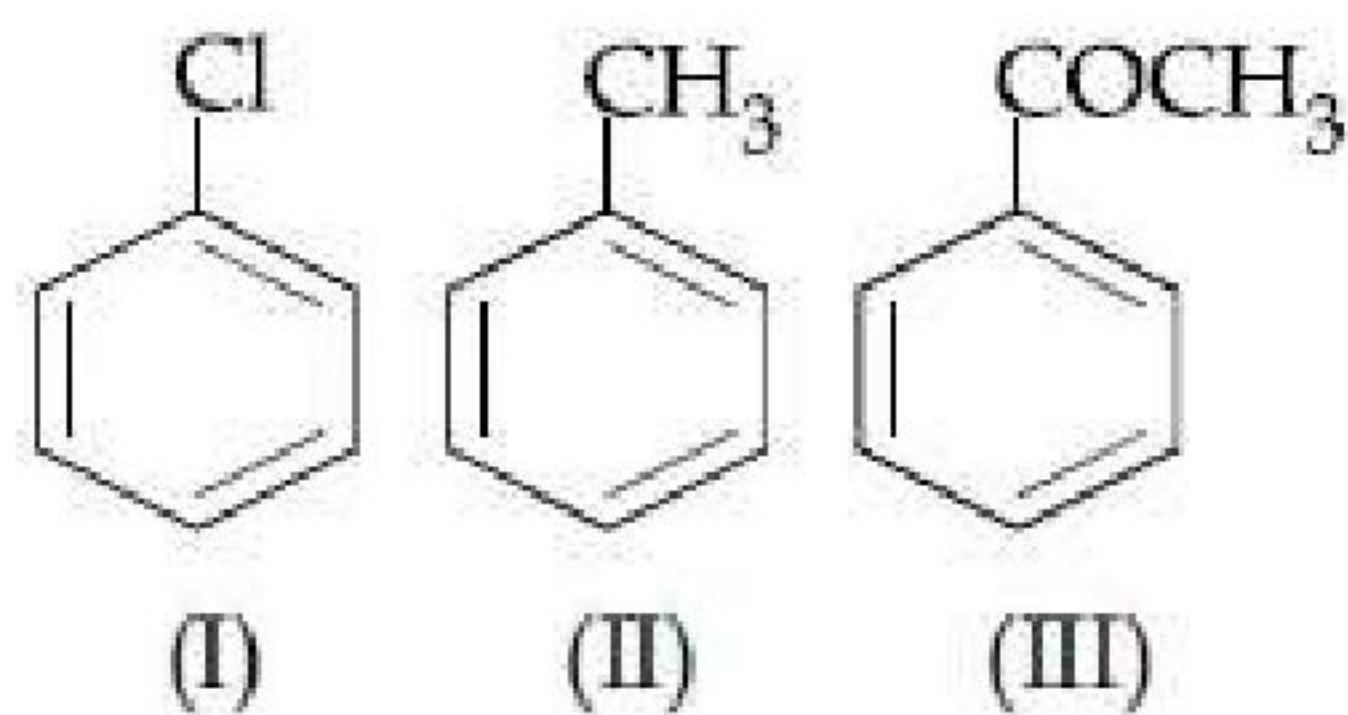
416529406

Yes



Correct Marks : 4 Wrong Marks : 1

The increasing order of the reactivity of the following compounds towards electrophilic aromatic substitution reactions is :



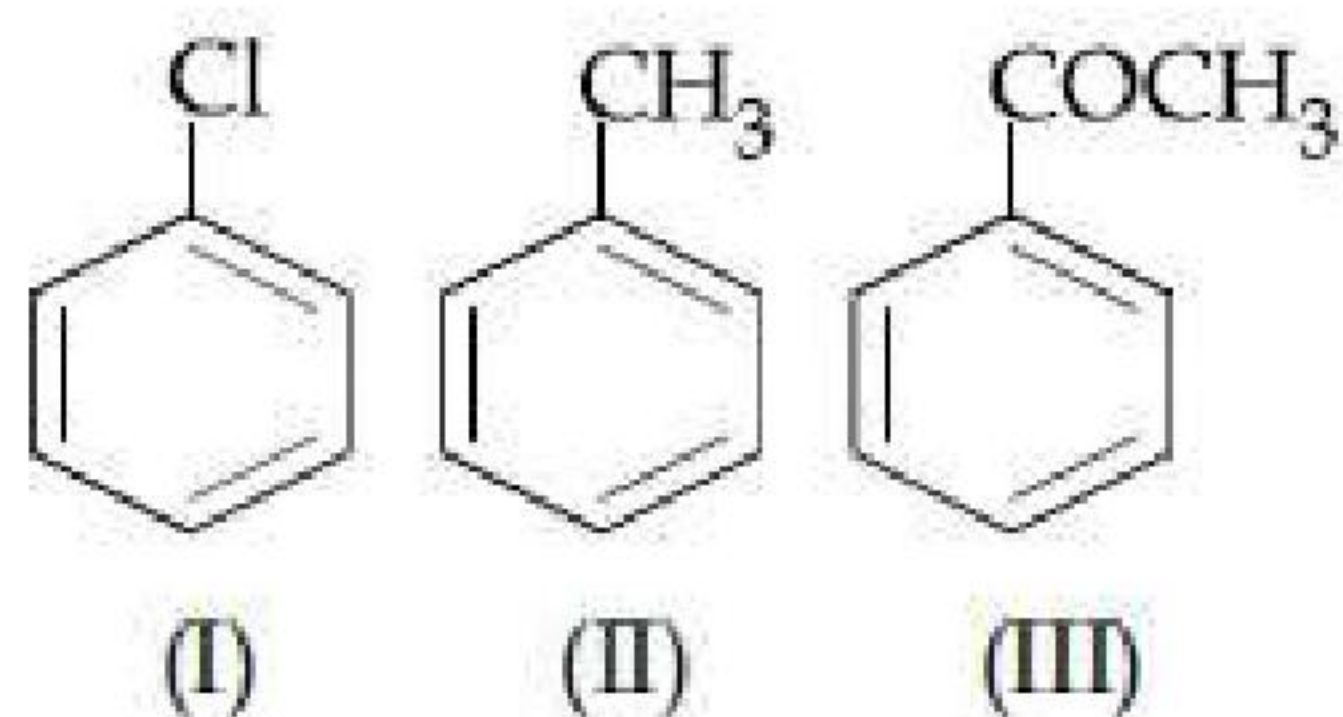
Options :

1.  $\text{II} < \text{I} < \text{III}$
2.  $\text{I} < \text{III} < \text{II}$
3.  $\text{III} < \text{I} < \text{II}$
4.  $\text{III} < \text{II} < \text{I}$

Question Number : 31 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एरोमैटिक इलेक्ट्रॉन स्नेही प्रतिस्थापन अभिक्रियाओं में निम्नलिखित यौगिकों की बढ़ती अभिक्रियात्मकता का सही क्रम है :

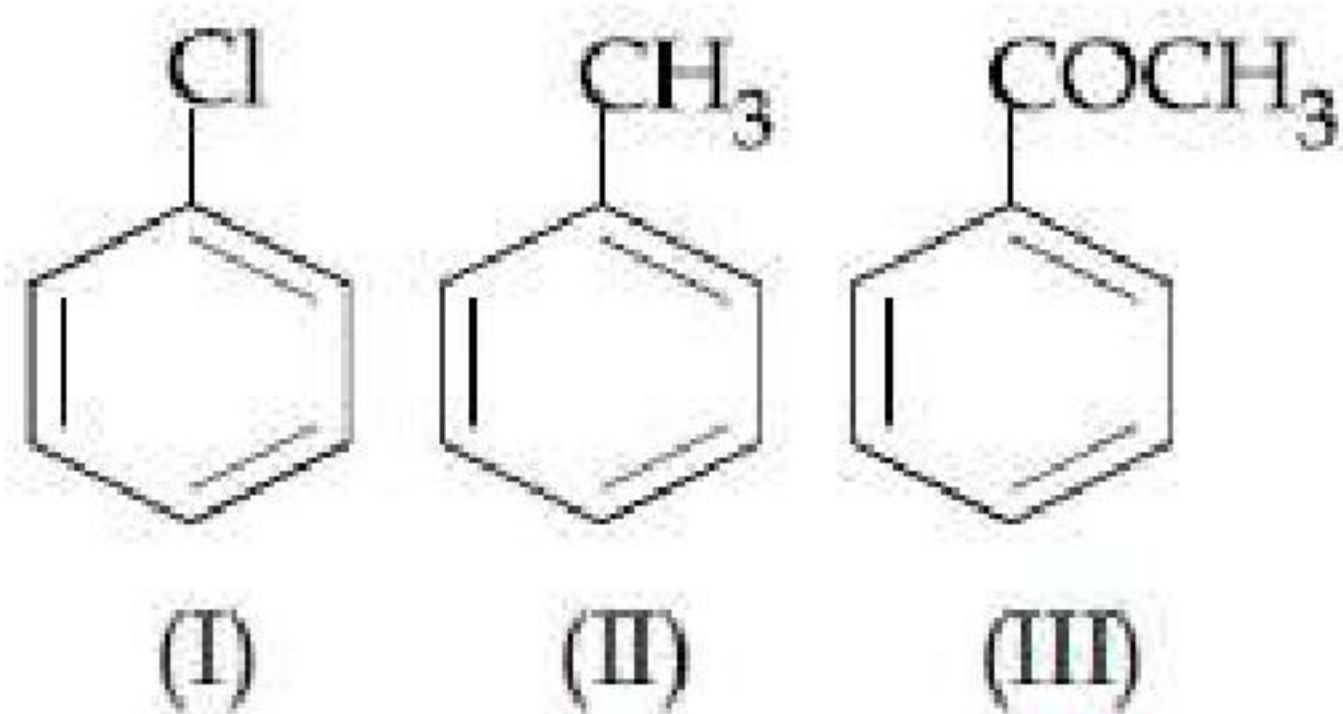


Options :

1.  $\text{II} < \text{I} < \text{III}$
2.  $\text{I} < \text{III} < \text{II}$
3.  $\text{III} < \text{I} < \text{II}$
4.  $\text{III} < \text{II} < \text{I}$



નીચે આપેલા સંયોજનો નો ઈલેક્ટ્રોન અનુરાગી એરોમેટિક વિસ્થાપન પ્રક્રિયા માટેની સક્રિયતા નો ચઢતો ક્રમ શોધો.



Options :

1.  $II < I < III$
2.  $I < III < II$
3.  $III < I < II$
4.  $III < II < I$

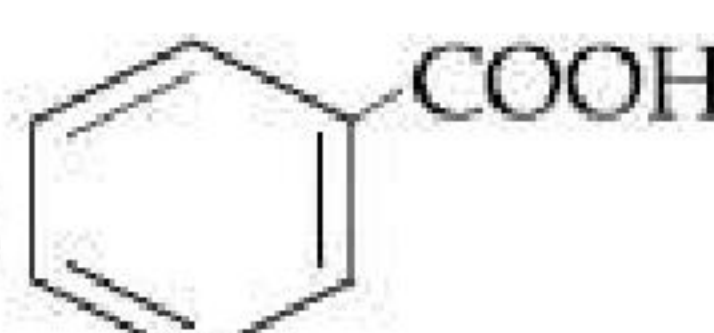
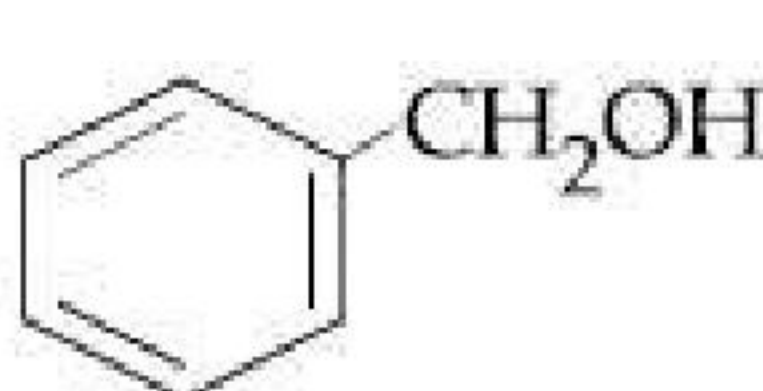
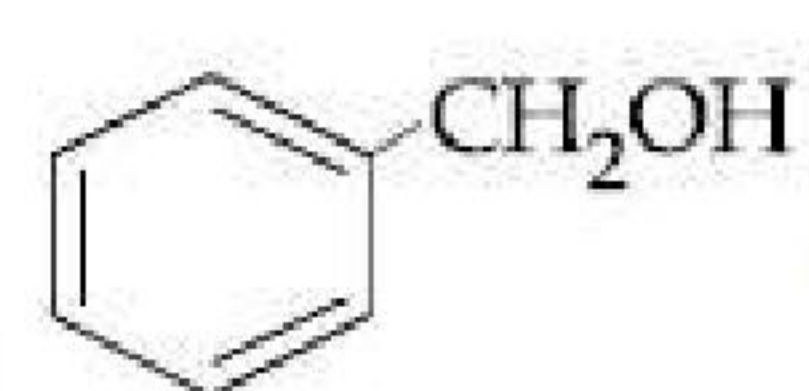
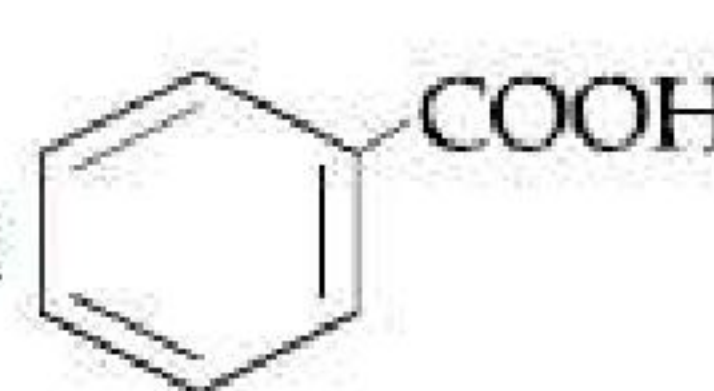
Question Number : 32 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Major products of the following reaction are :



Options :

1.  $CH_3OH$  and 
2.  $HCOOH$  and 
3.  and 
4.  $CH_3OH$  and  $HCO_2H$

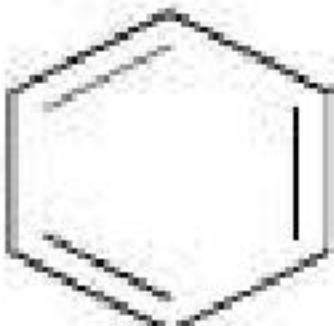
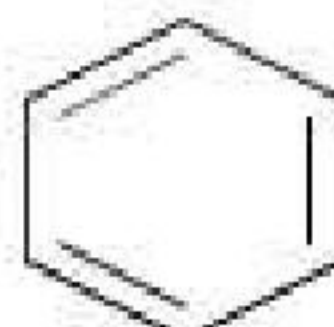
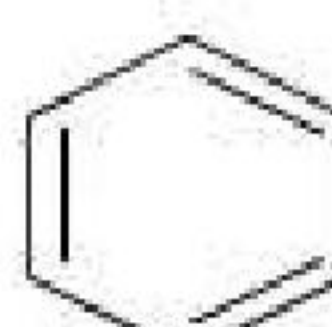
Question Number : 32 Question Type : MCQ Option Shuffling : Yes Display Question Number



निम्न अभिक्रिया के मुख्य उत्पाद हैं :



Options :

1.  $\text{CH}_3\text{OH}$  तथा 
2.  $\text{HCOOH}$  तथा 
3.  तथा 
4.  $\text{CH}_3\text{OH}$  तथा  $\text{HCO}_2\text{H}$

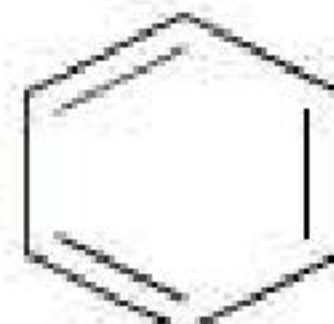
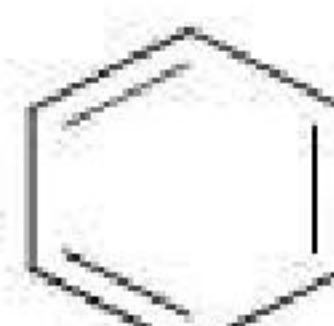
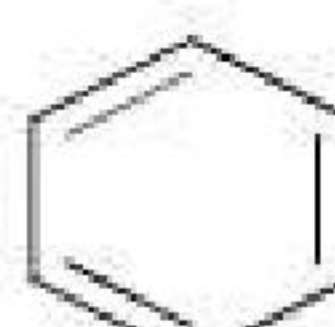
Question Number : 32 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

નીચે આપેલી પ્રક્રિયાની મુખ્ય નીપજ શોધો -



Options :

1.  $\text{CH}_3\text{OH}$  અને 
2.  $\text{HCOOH}$  અને 
3.  અને 
4.  $\text{CH}_3\text{OH}$  અને  $\text{HCO}_2\text{H}$



Amylopectin is composed of :

Options :

1.  $\alpha$ -D-glucose,  $C_1 - C_4$  and  $C_2 - C_6$  linkages
2.  $\beta$ -D-glucose,  $C_1 - C_4$  and  $C_1 - C_6$  linkages
3.  $\alpha$ -D-glucose,  $C_1 - C_4$  and  $C_1 - C_6$  linkages
4.  $\beta$ -D-glucose,  $C_1 - C_4$  and  $C_2 - C_6$  linkages

Question Number : 33 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एमिलोपेक्टिन इनसे निर्मित है :

Options :

1.  $\alpha$ -D-ग्लुकोज,  $C_1 - C_4$  तथा  $C_2 - C_6$  बंध
2.  $\beta$ -D-ग्लुकोज,  $C_1 - C_4$  तथा  $C_1 - C_6$  बंध
3.  $\alpha$ -D-ग्लुकोज,  $C_1 - C_4$  तथा  $C_1 - C_6$  बंध
4.  $\beta$ -D-ग्लुकोज,  $C_1 - C_4$  तथा  $C_2 - C_6$  बंध

Question Number : 33 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

એમાયલો પેક્ટિન શાનો બનેલો છે.

Options :

1.  $\alpha$ -D-ગ્લુકોઝ,  $C_1 - C_4$  અને  $C_2 - C_6$  જોડાણો
2.  $\beta$ -D-ગ્લુકોઝ,  $C_1 - C_4$  અને  $C_1 - C_6$  જોડાણો
3.  $\alpha$ -D-ગ્લુકોઝ,  $C_1 - C_4$  અને  $C_1 - C_6$  જોડાણો



Question Number : 34 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The principle of column chromatography is :

Options :

1. Differential adsorption of the substances on the solid phase.
2. Differential absorption of the substances on the solid phase.
3. Capillary action.
4. Gravitational force.

Question Number : 34 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

स्तम्भ वर्णलेखिकी का सिद्धान्त है :

Options :

1. ठोस प्रावस्था पर पदार्थों के अंतरात्मक अधिशोषण
2. ठोस प्रावस्था पर पदार्थों के अंतरात्मक अवशोषण
3. कोशिका क्रिया
4. गुरुत्वीय बल

Question Number : 34 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

स्तंभ क्रोमेटोग्राफी नो सिध्दांत :

Options :

1. घन अवस्था उपर पदार्थोंनुं तद्रावतीय अधिशोषण
2. घन अवस्था उपर पदार्थोंनुं तद्रावतीय अवशोषण

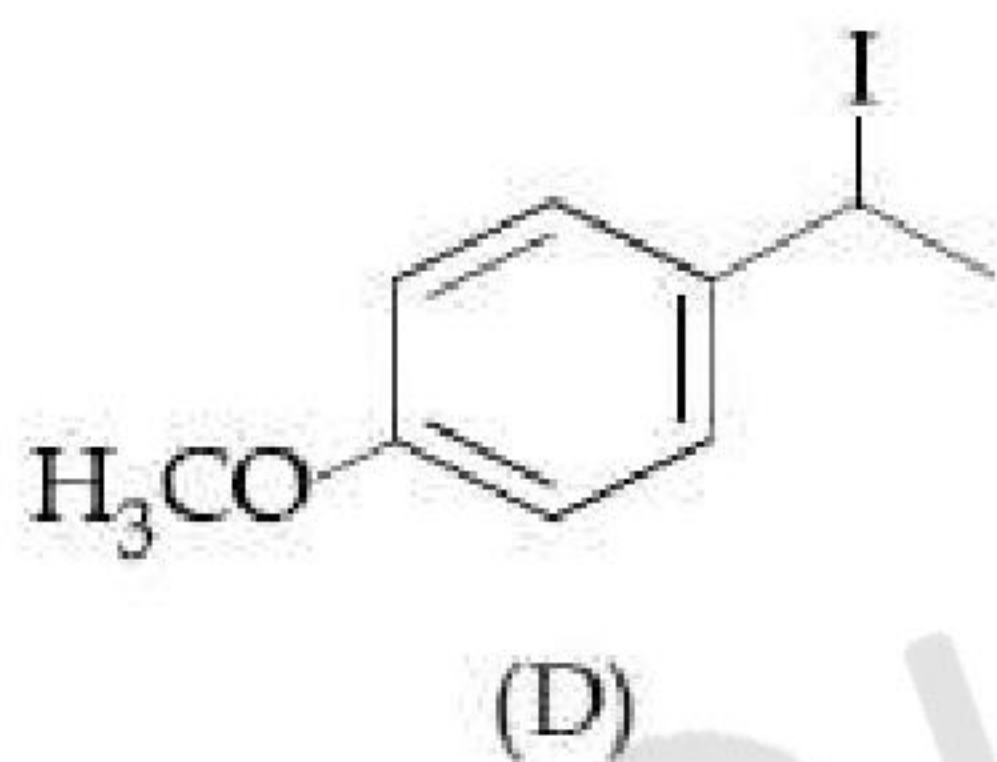
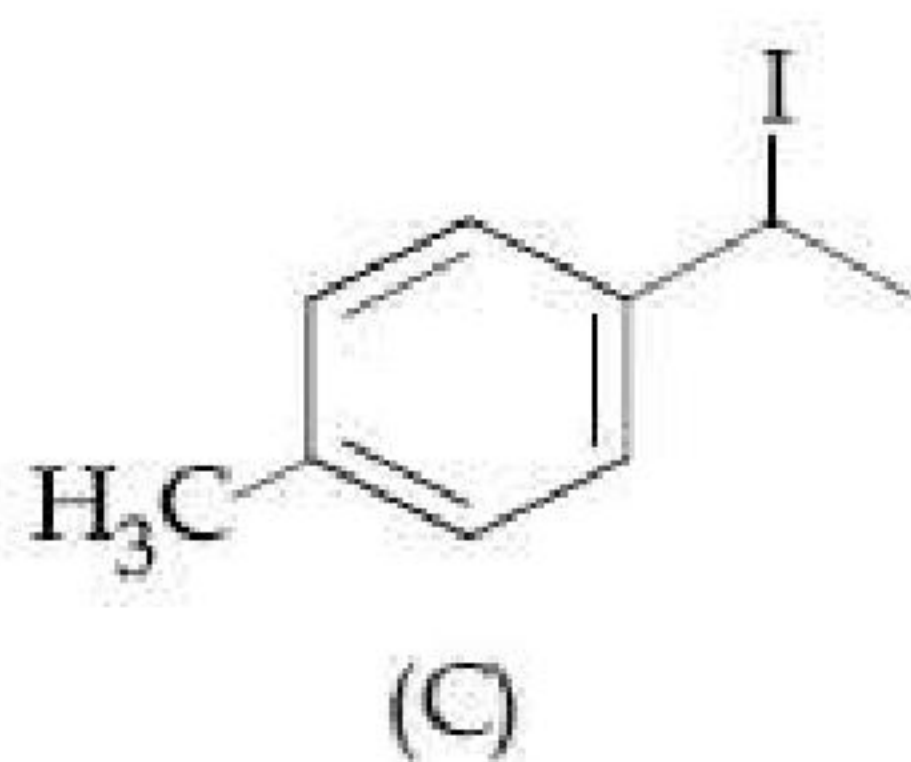
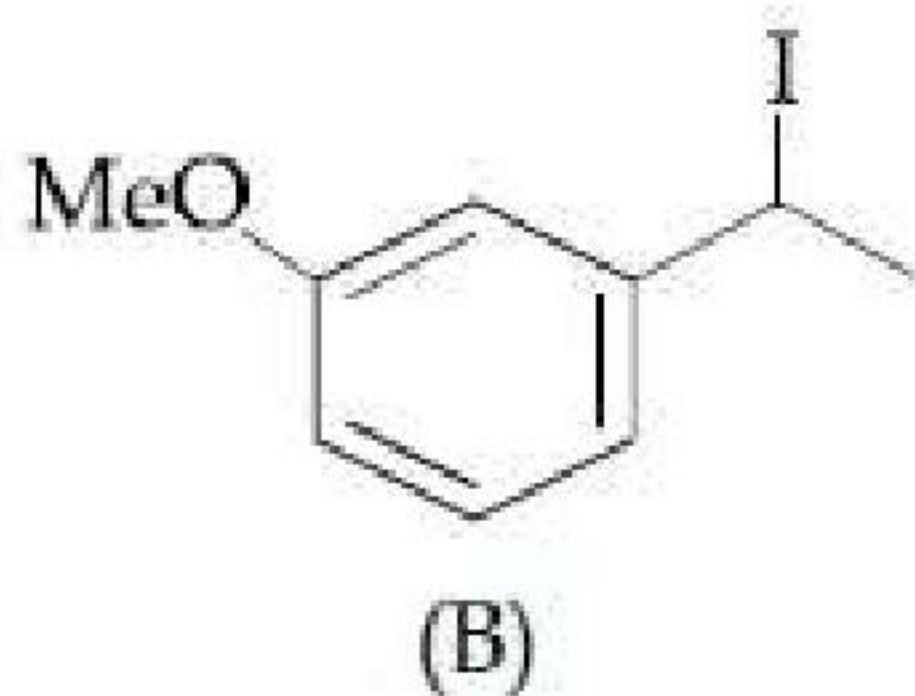
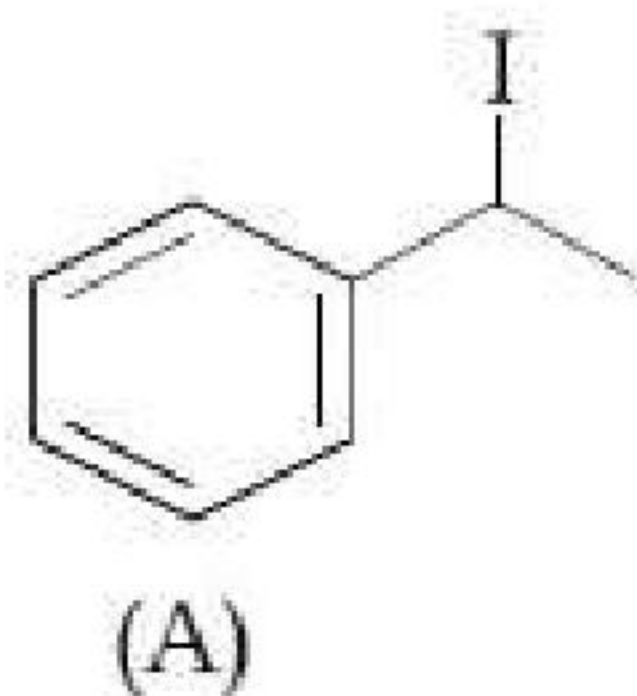


4. ଗୁରୁତ୍ୱାର୍ଥକତା ଭଜ

Question Number : 35 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Increasing rate of  $S_N1$  reaction in the following compounds is :



Options :

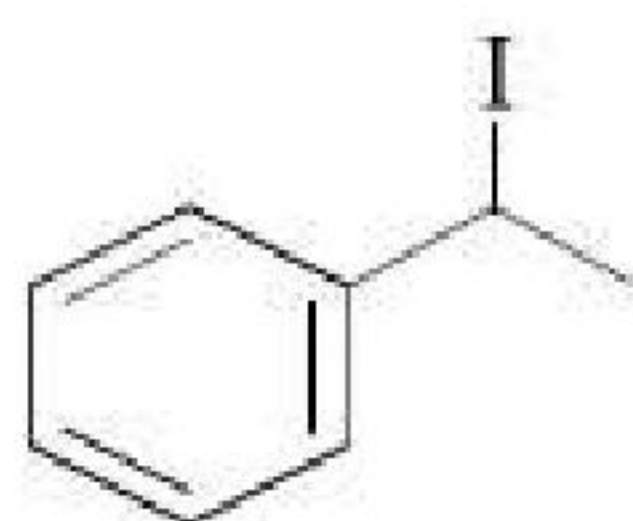
1. (B) < (A) < (D) < (C)
2. (B) < (A) < (C) < (D)
3. (A) < (B) < (C) < (D)
4. (A) < (B) < (D) < (C)

Question Number : 35 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

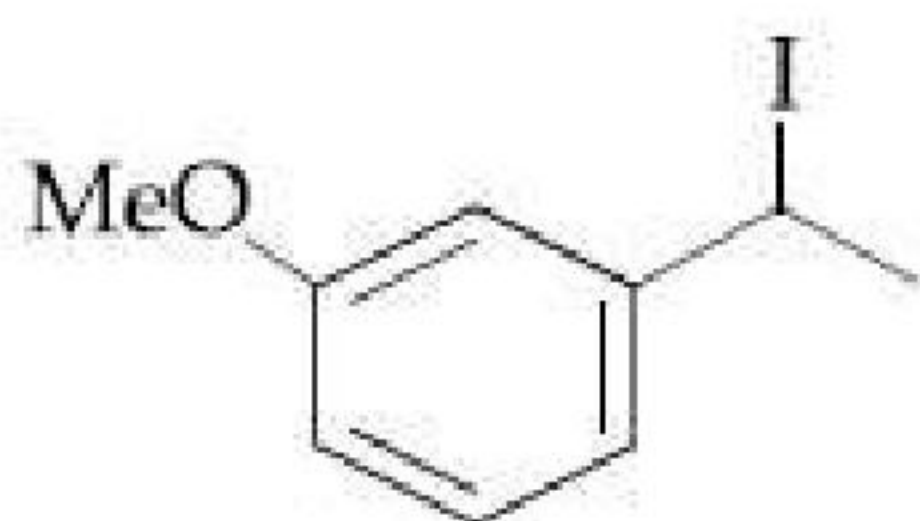
Correct Marks : 4 Wrong Marks : 1



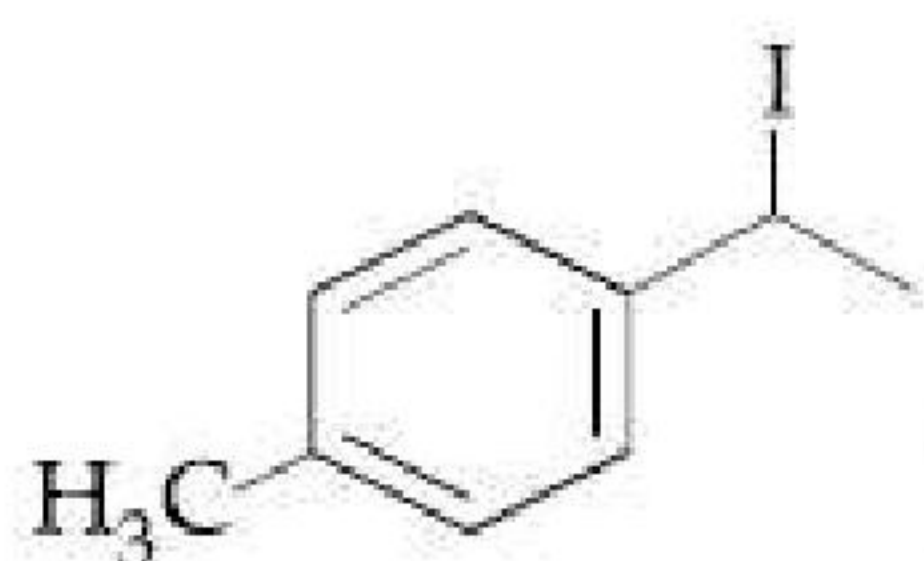
निम्न यौगिकों में  $S_N1$  अभिक्रिया की बढ़ती दर होगी :



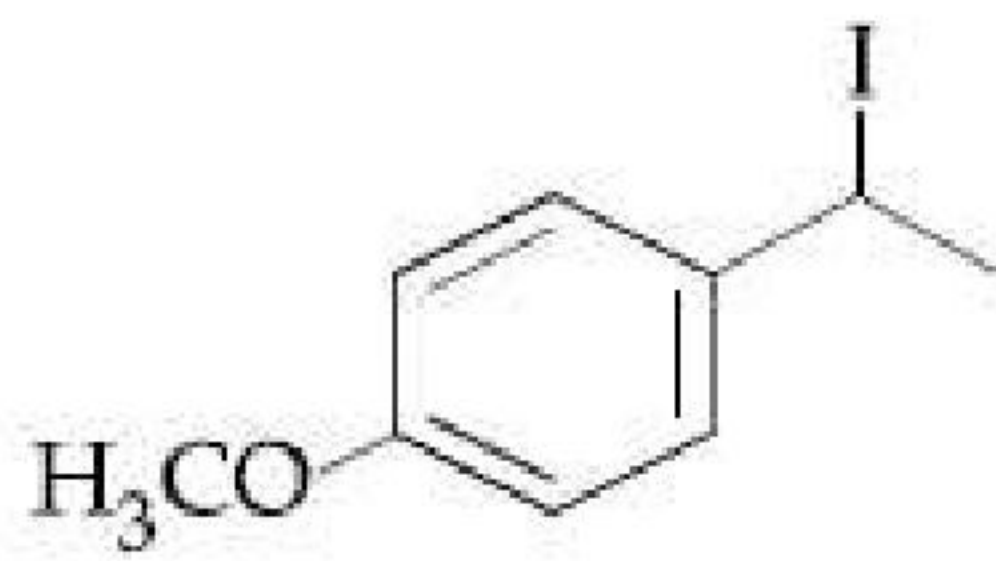
(A)



(B)



(C)



(D)

Options :

1. (B) < (A) < (D) < (C)

2. (B) < (A) < (C) < (D)

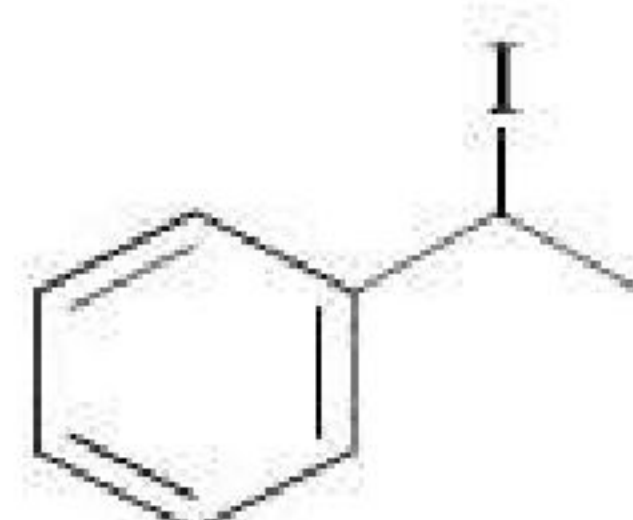
3. (A) < (B) < (C) < (D)

4. (A) < (B) < (D) < (C)

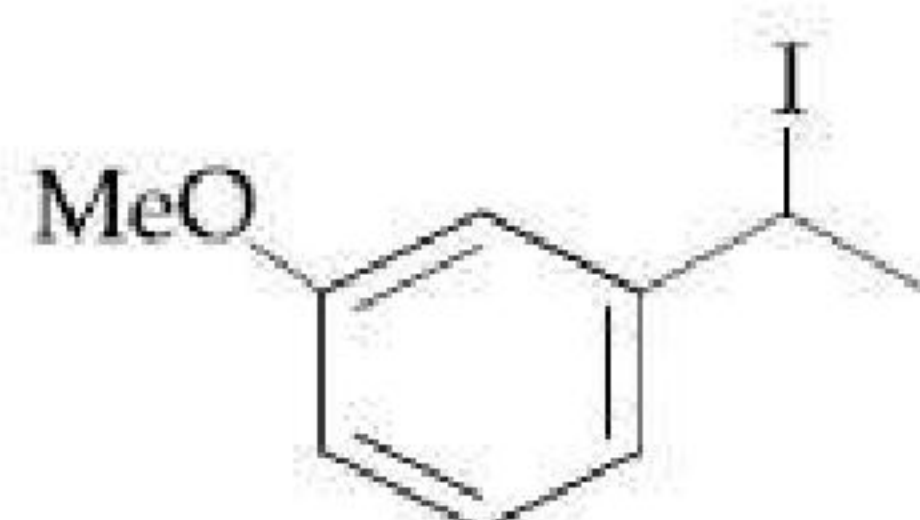
Question Number : 35 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

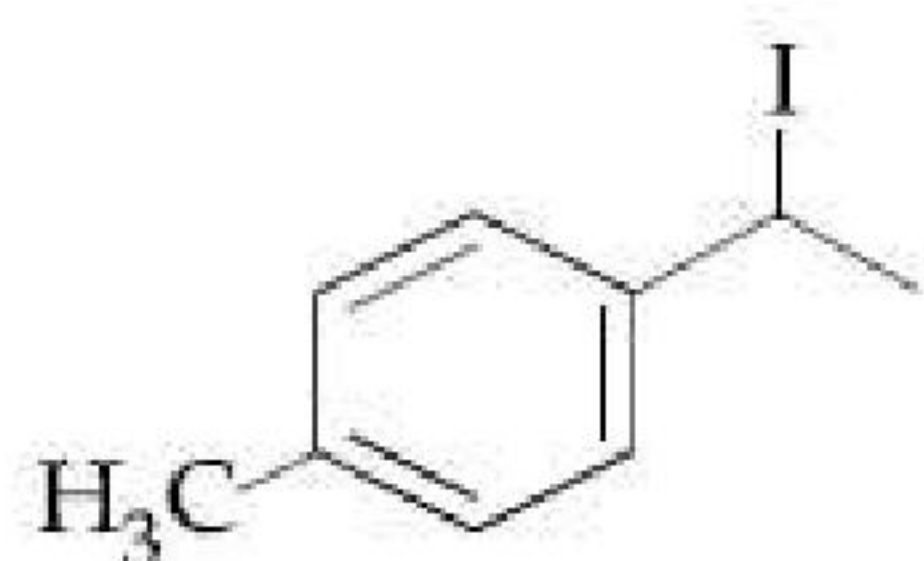
નીચે આપેલા સંયોજનો માટે  $S_N1$  પ્રક્રિયાનો ચઢતો ક્રમ શોધો



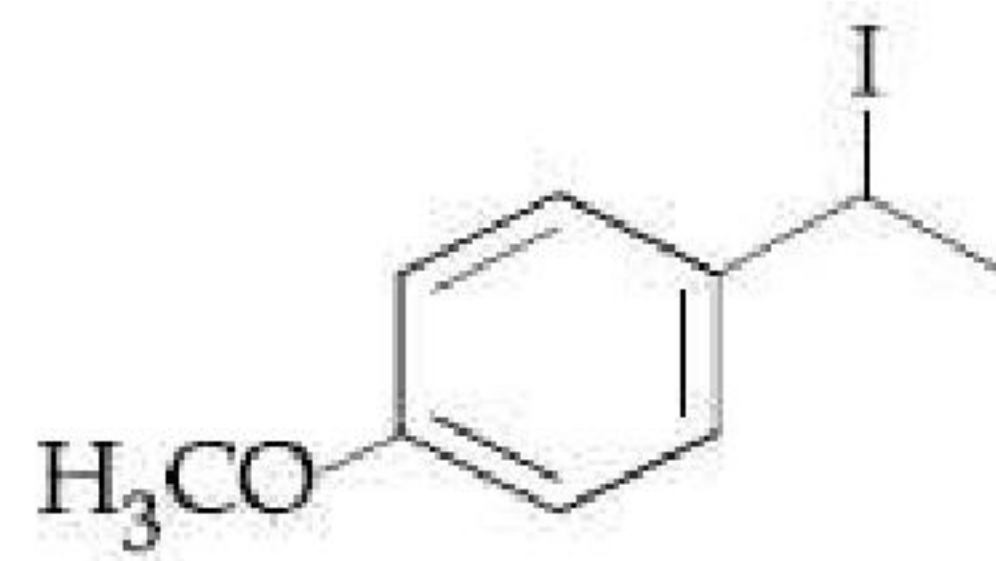
(A)



(B)



(C)



(D)

Options :



2.  $(B) < (A) < (C) < (D)$
3.  $(A) < (B) < (C) < (D)$
4.  $(A) < (B) < (D) < (C)$

Question Number : 36 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Ethylamine ( $C_2H_5NH_2$ ) can be obtained from N-ethylphthalimide on treatment with :

Options :

1.  $CaH_2$
2.  $NaBH_4$
3.  $H_2O$
4.  $NH_2NH_2$

Question Number : 36 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

निम्न में से किसके साथ अभिकृत किये जाने पर N - एथिलथैलीमाइड से एथिलऐमीन ( $C_2H_5NH_2$ ) प्राप्त किया जा सकता है ?

Options :

1.  $CaH_2$
2.  $NaBH_4$
3.  $H_2O$
4.  $NH_2NH_2$

Question Number : 36 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical



N-ઇથાઈલપ્થેલિમાઈડ ને નીચે આપેલા કયા સંયોજન સાથે પ્રક્રિયા કરી ઈથાઈલ એમાઈન ( $C_2H_5NH_2$ ) મેળવી શકાય?

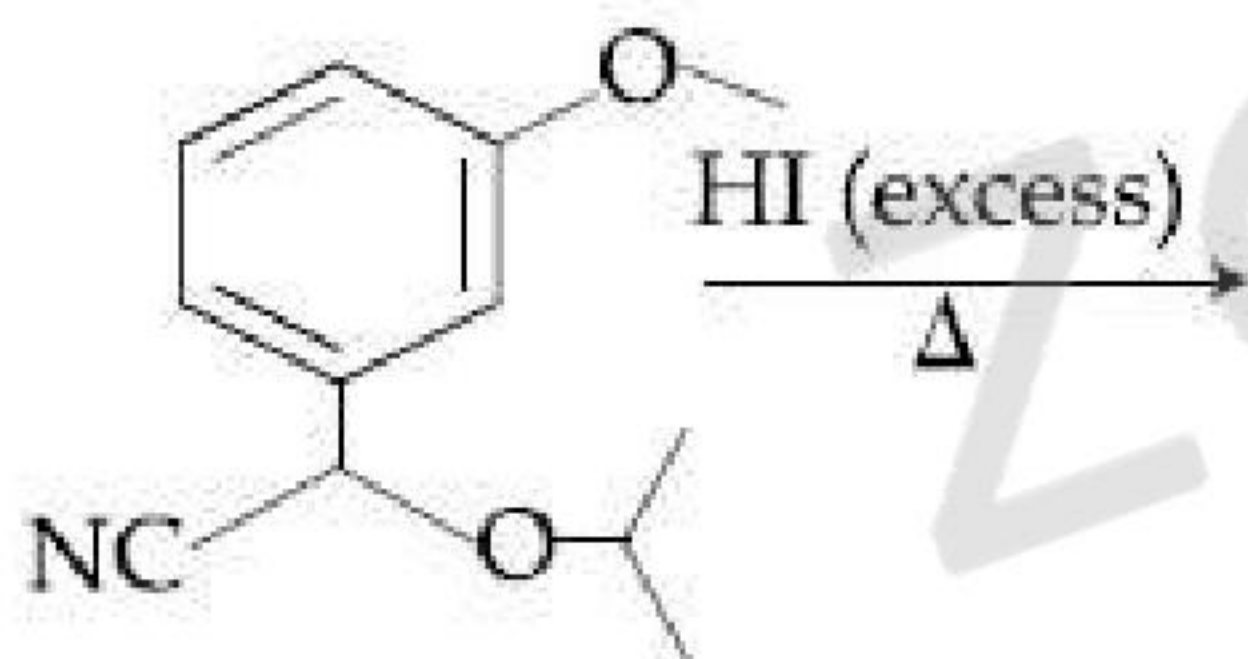
Options :

1.  $CaH_2$
2.  $NaBH_4$
3.  $H_2O$
4.  $NH_2NH_2$

Question Number : 37 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

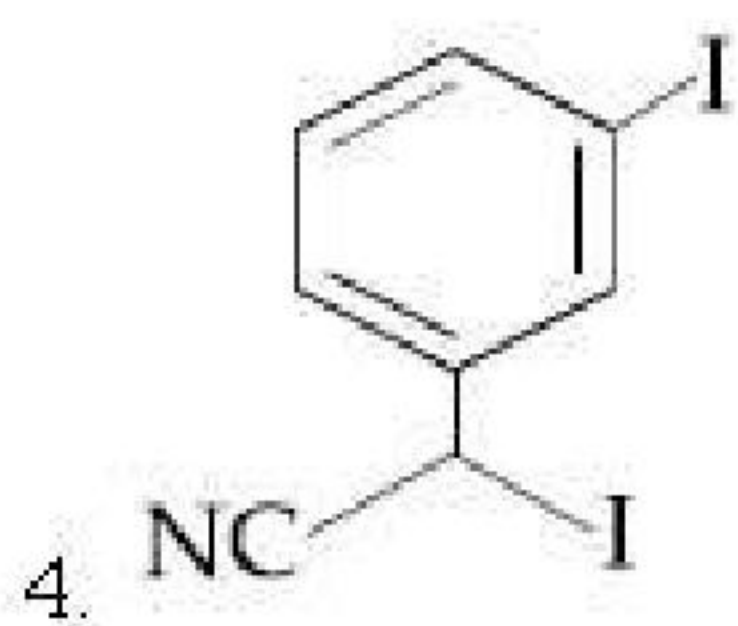
The major product of the following reaction is :



Options :

- 1.
- 2.
- 3.

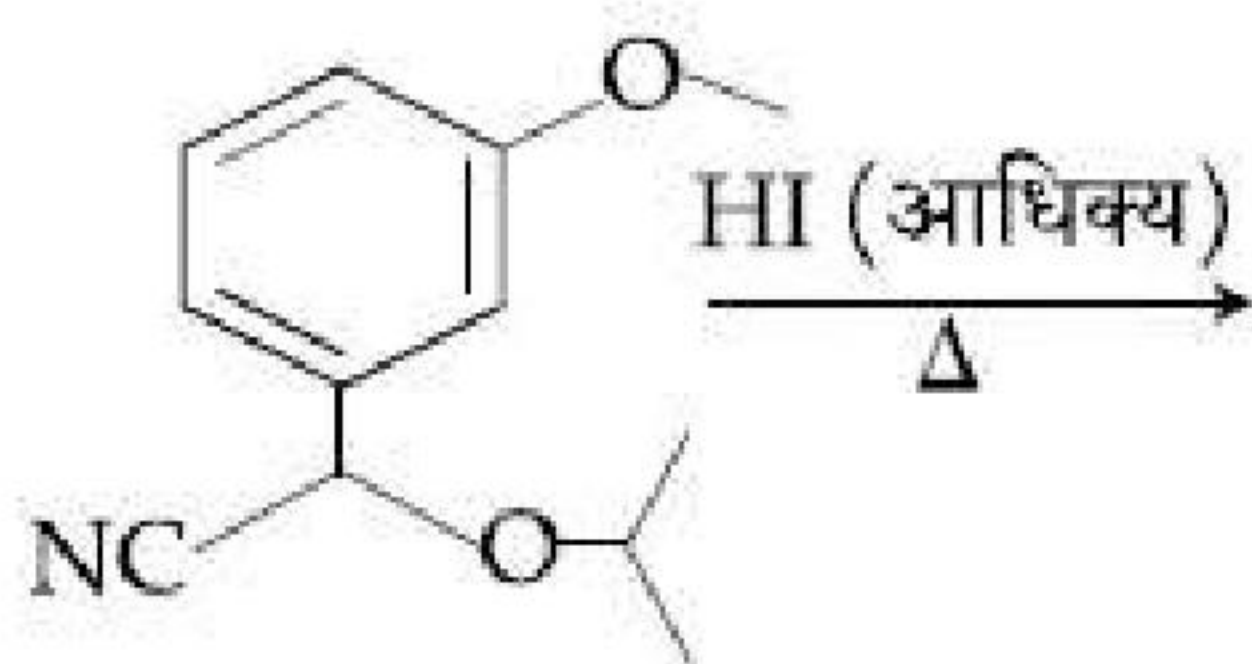




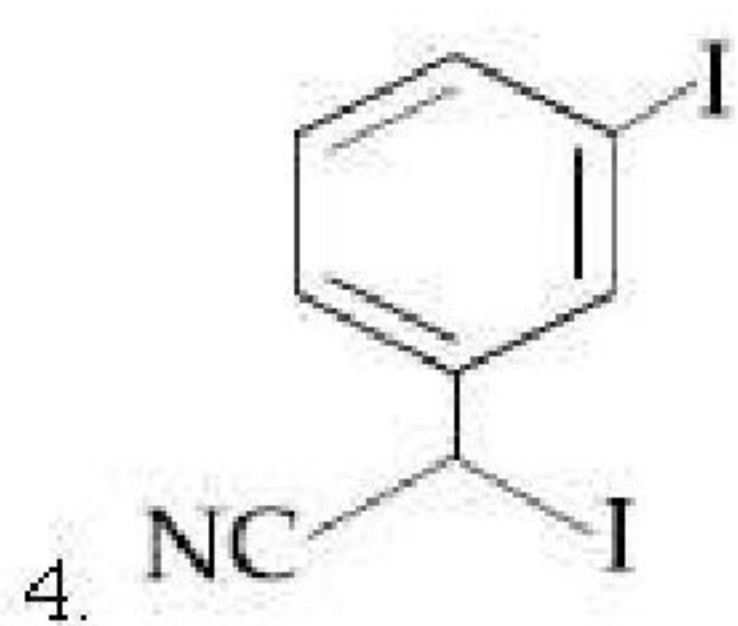
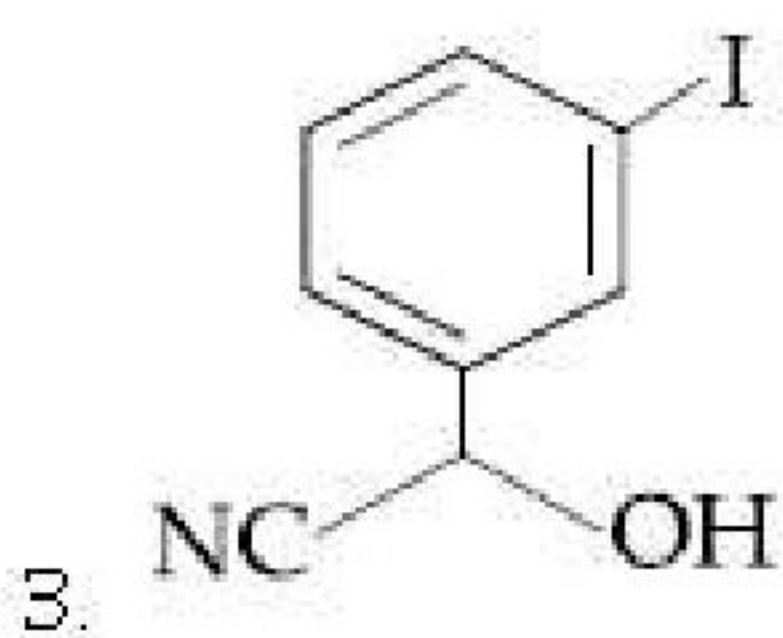
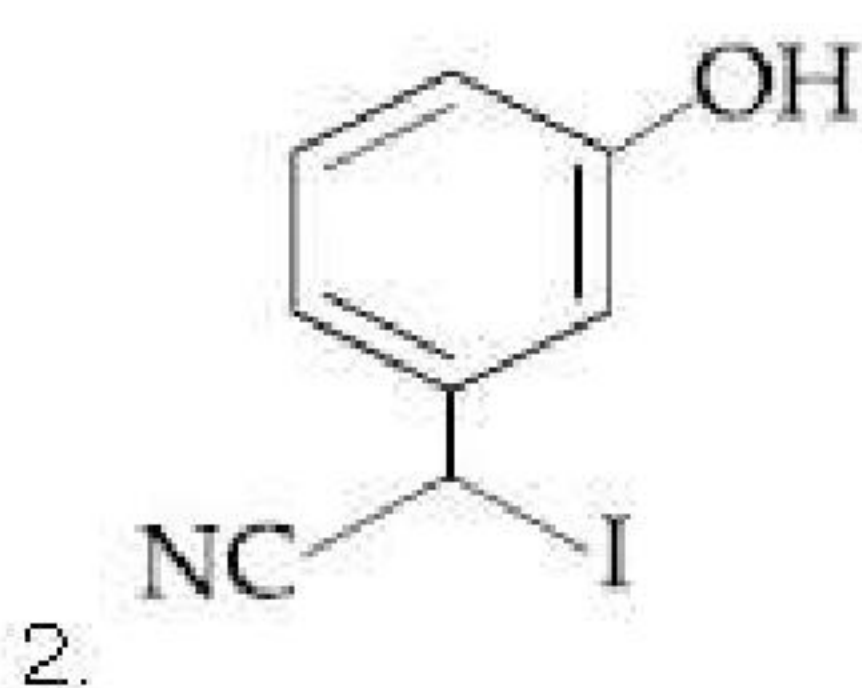
Question Number : 37 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

निम्न अभिक्रिया का मुख्य उत्पाद है :



Options :

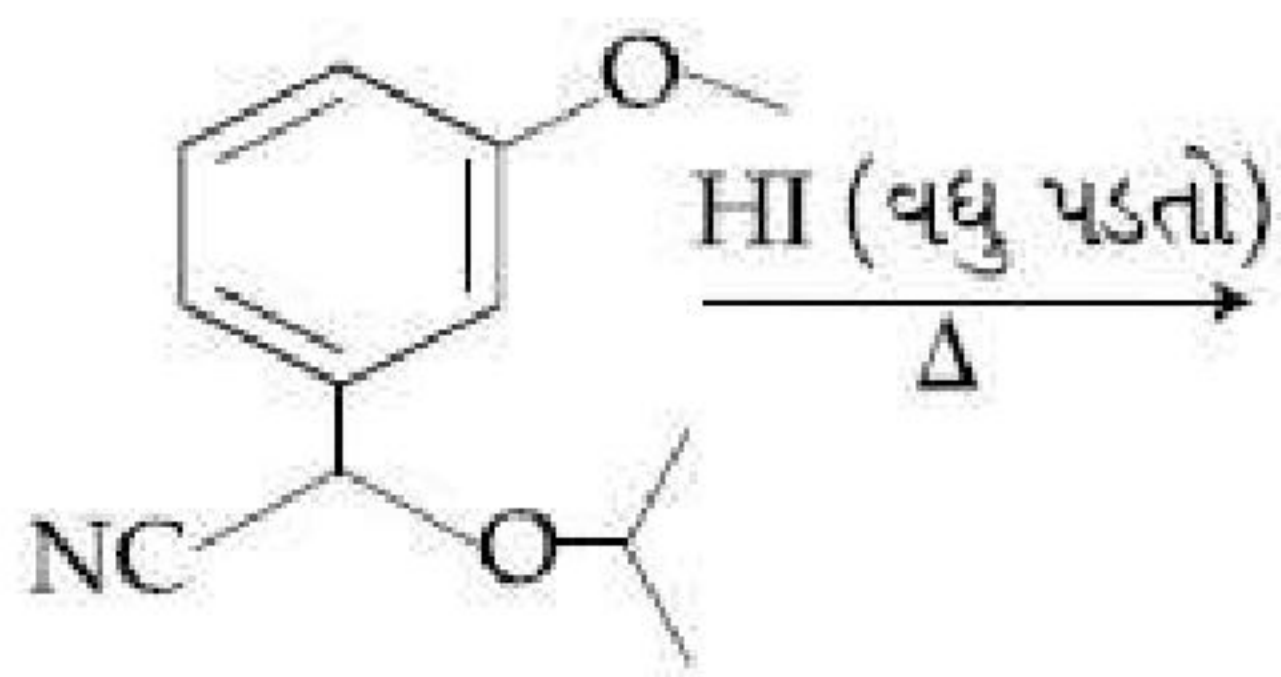


Question Number : 37 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

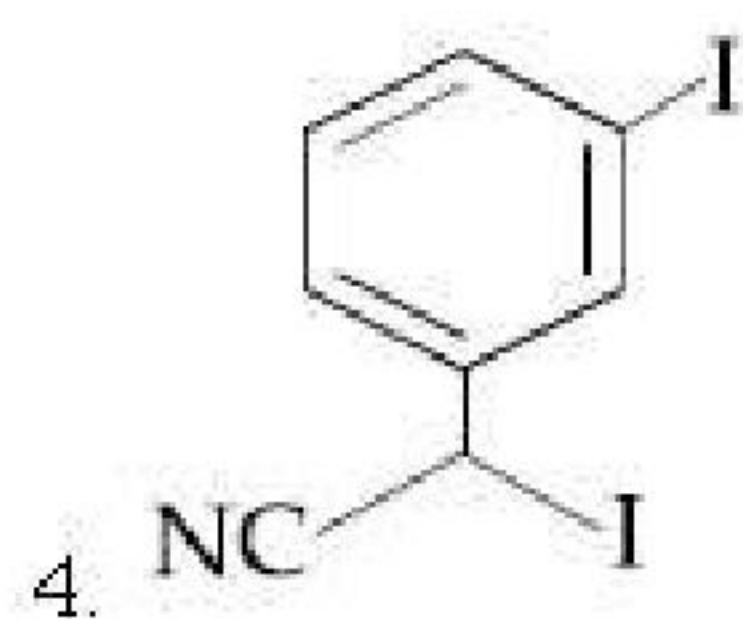
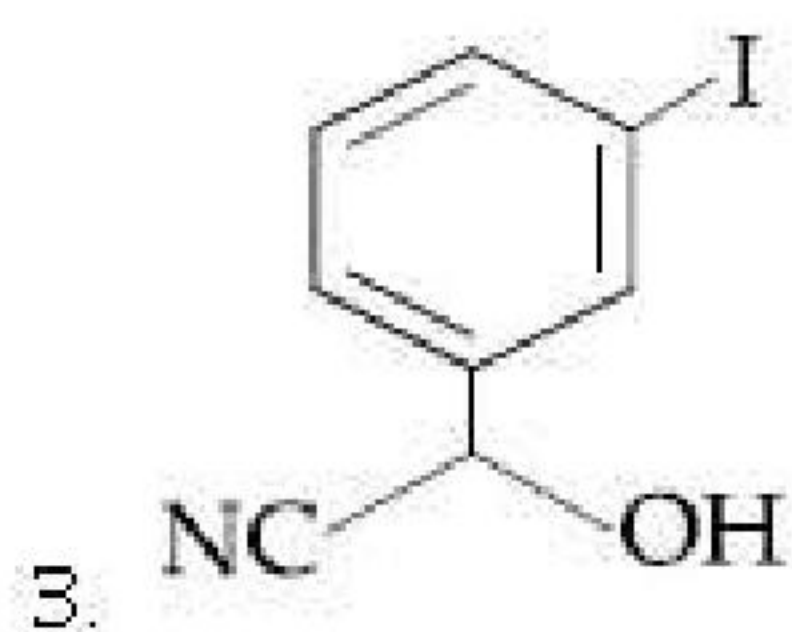
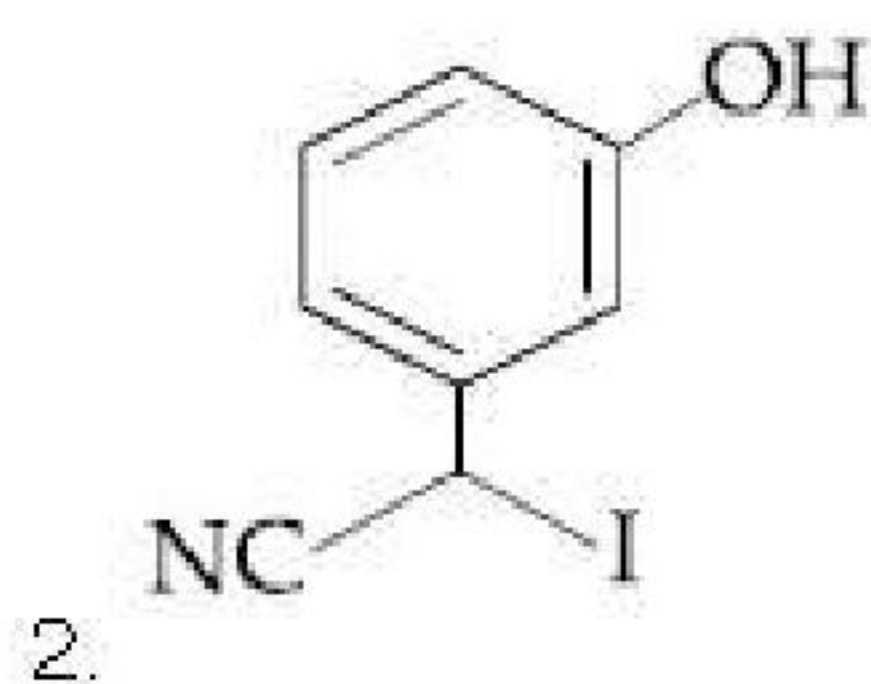
Correct Marks : 4 Wrong Marks : 1



નીચે આપેલી પ્રક્રિયાની મુખ્ય નીપજ શોધો ?



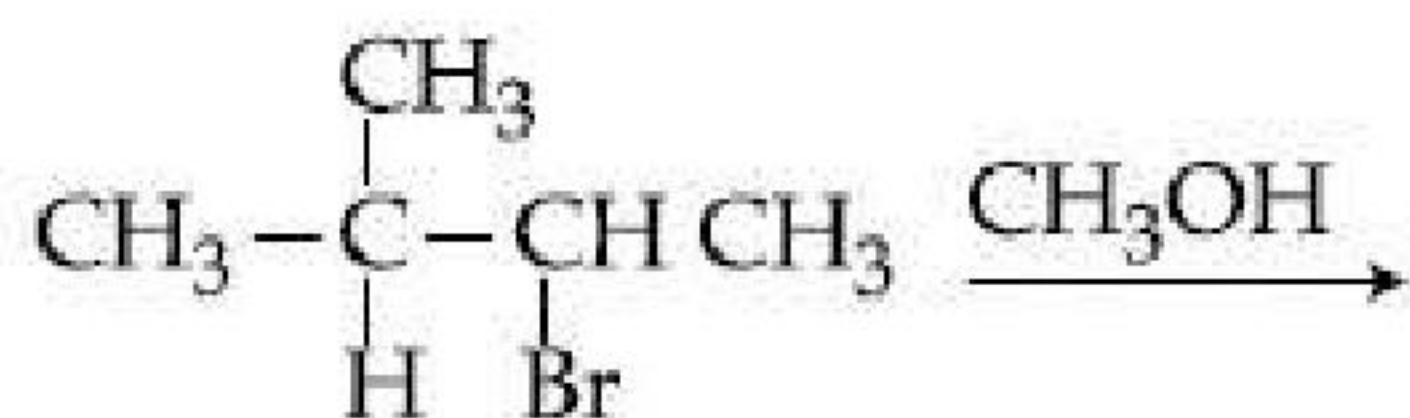
Options :



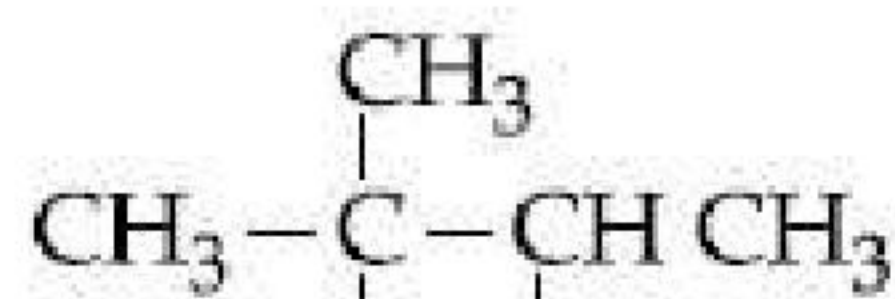
Question Number : 38 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

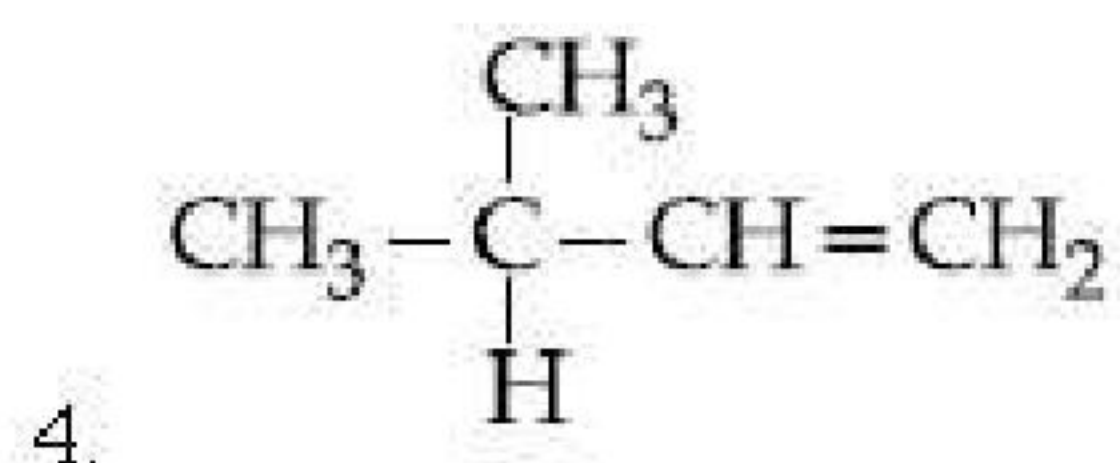
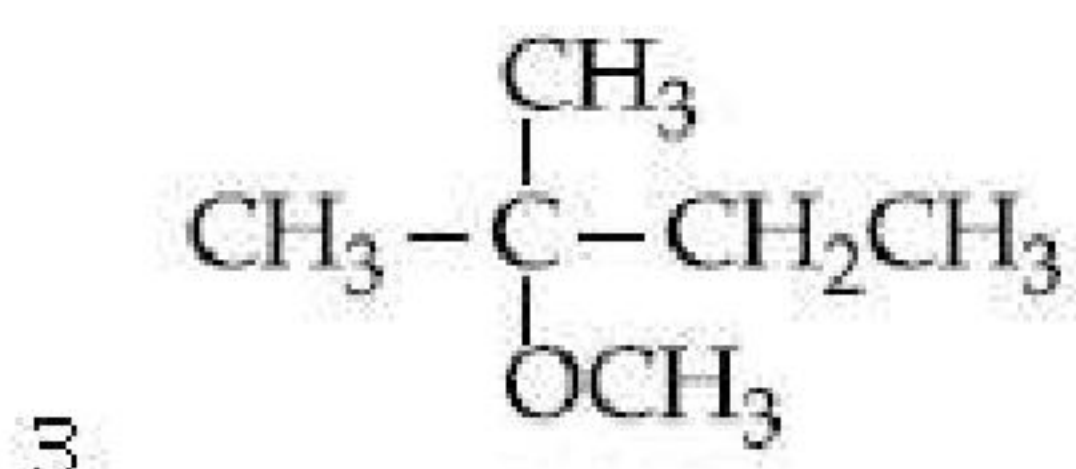
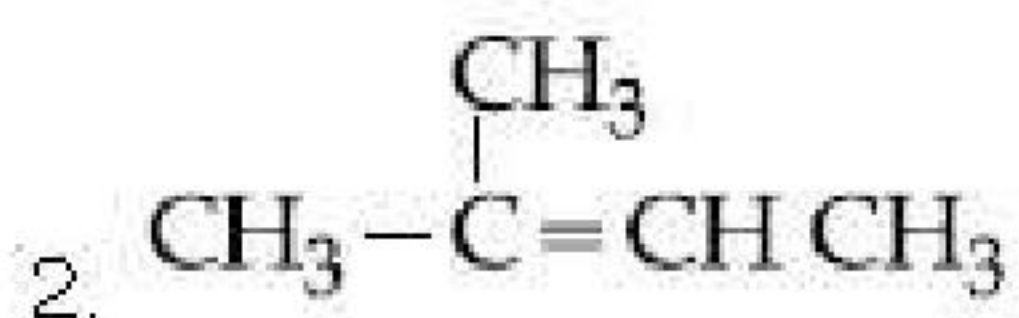
The major product of the following reaction is :



Options :



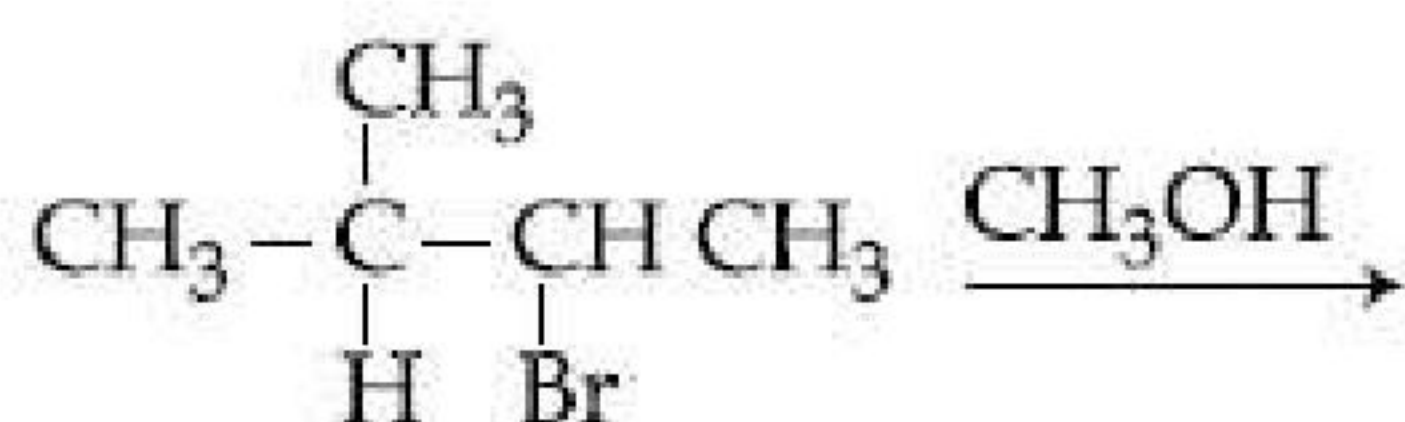




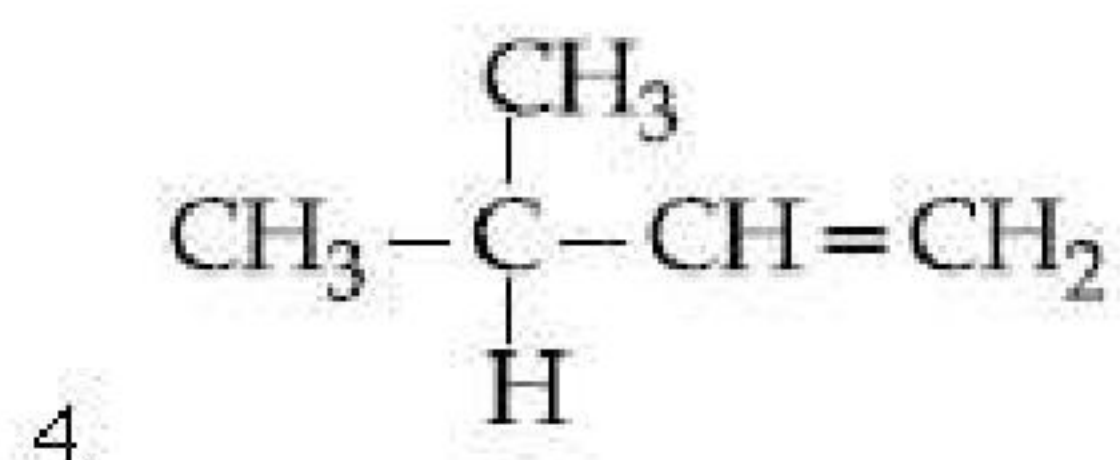
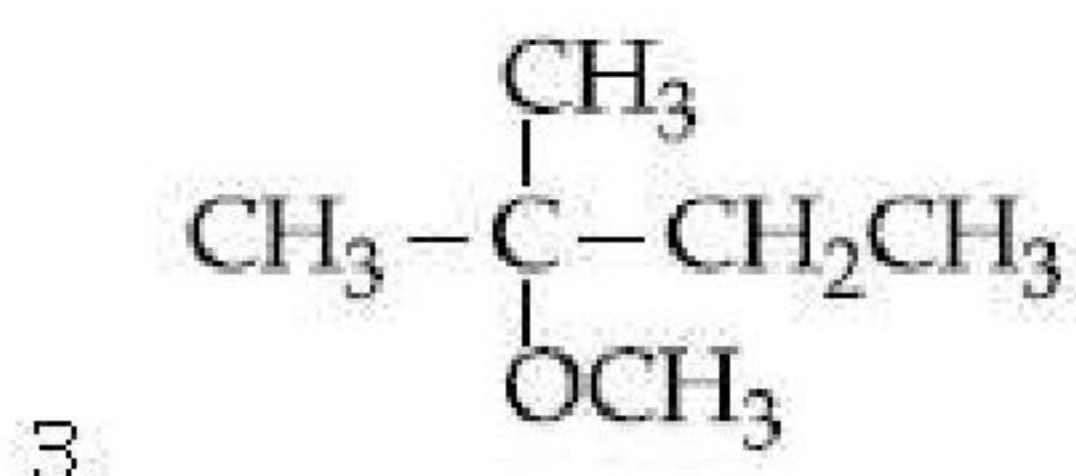
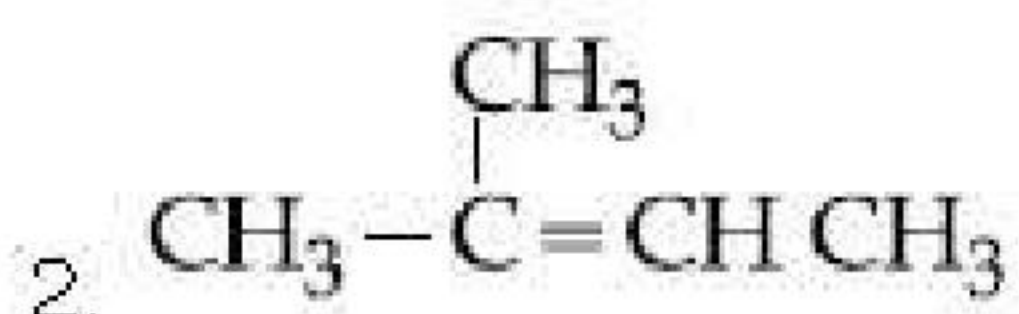
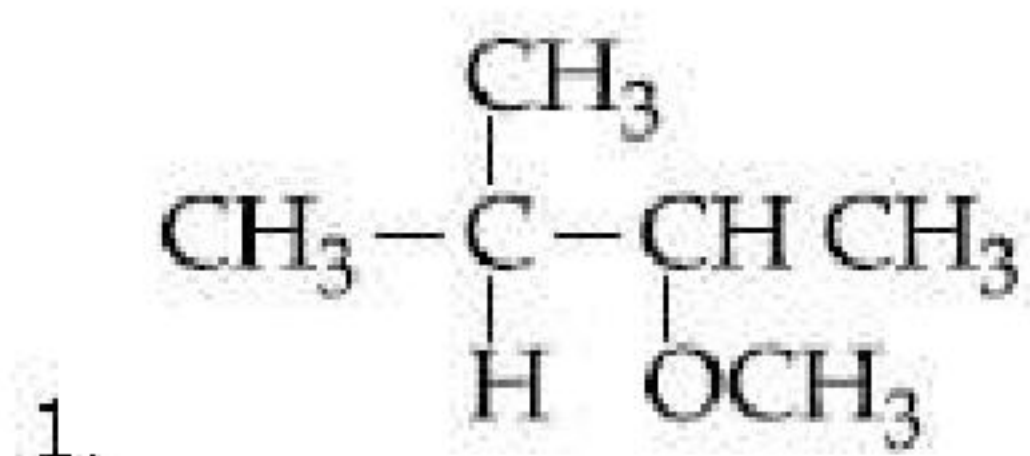
Question Number : 38 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

निम्न अभिक्रिया का मुख्य उत्पाद है :



Options :

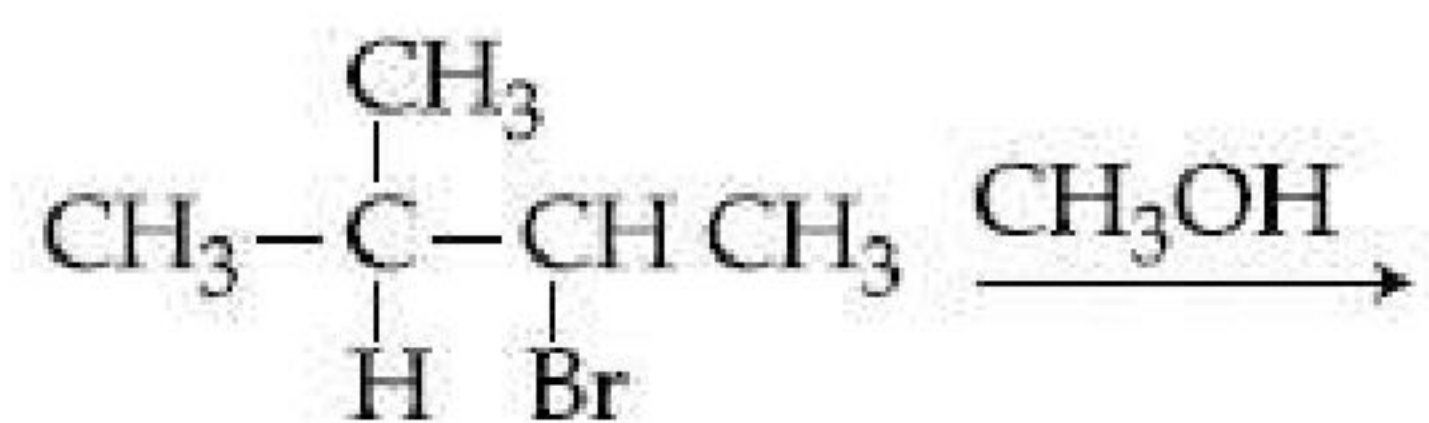


Question Number : 38 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

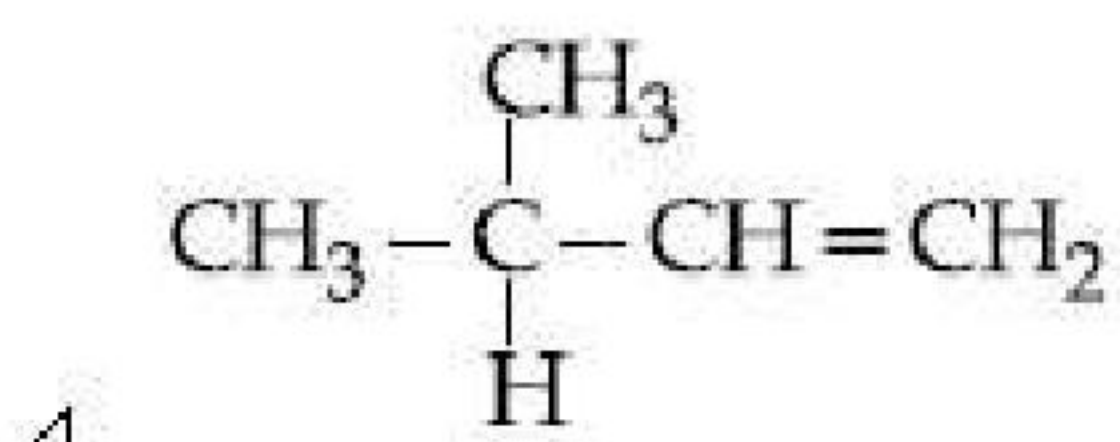
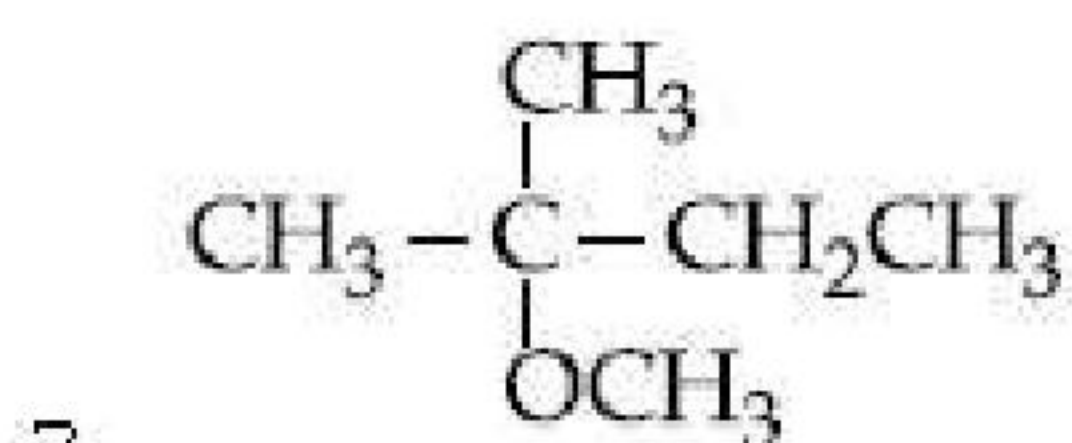
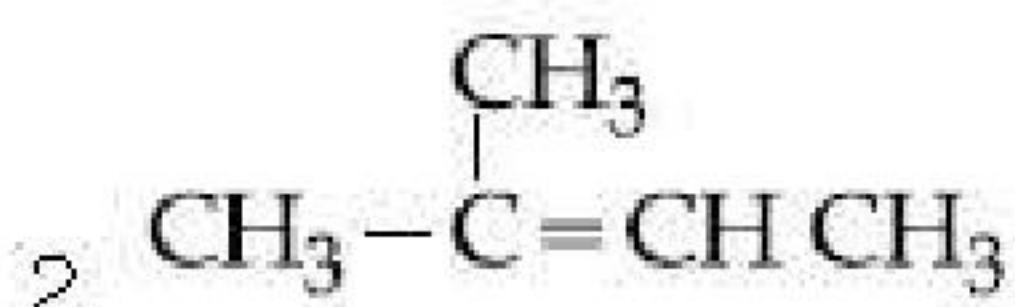
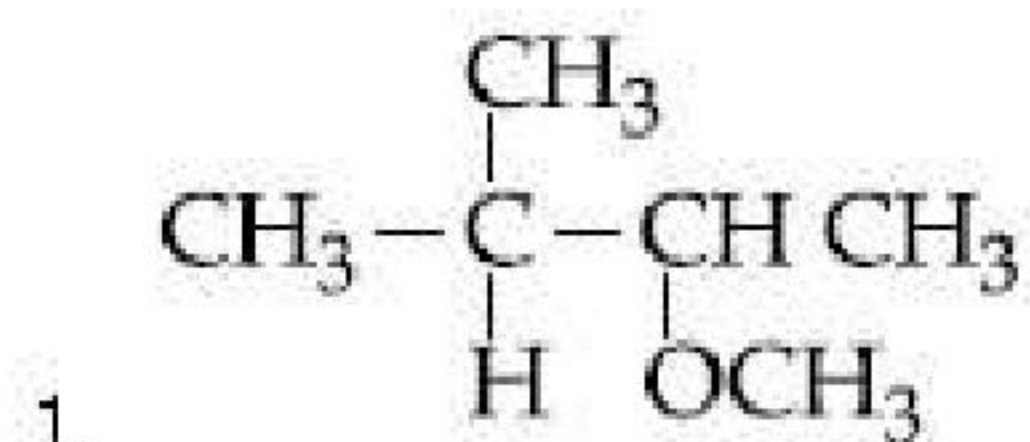
Correct Marks : 4 Wrong Marks : 1



નીચે આપેલી પ્રક્રિયાની મુખ્ય નીપજ શોધો ?



Options :



Question Number : 39 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Which of the following is a condensation polymer ?

Options :

1. Buna - S

2. Nylon 6, 6

3. Teflon

4. Neoprene

Question Number : 39 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

निम्न में से कौन संघनन बहुलक है?



2. નાયલોન 6, 6
3. ટેફલોન
4. નિઓપ્રીન

Question Number : 39 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

નીચે આપેલામાંથી કયો સંઘનન બહુલક છે?

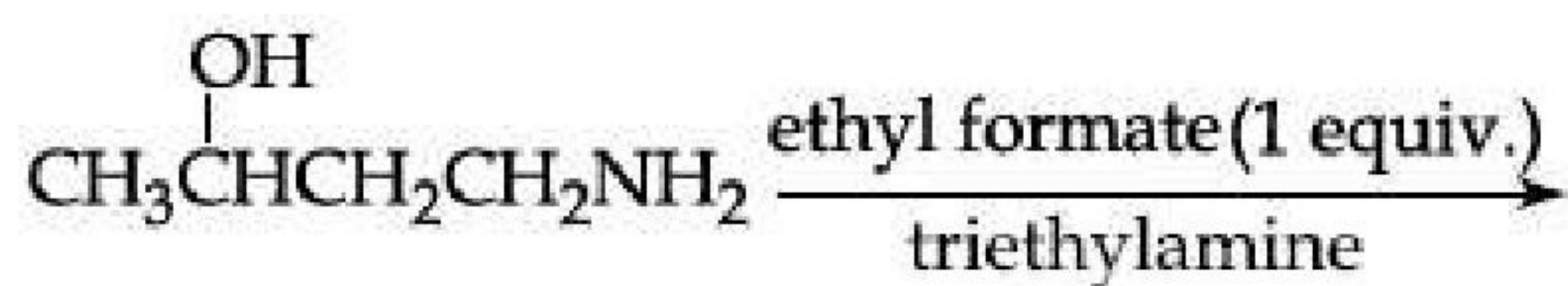
Options :

1. બ્યુના-S
2. નાયલોન 6, 6
3. ટેફલોન
4. નિઓપ્રીન

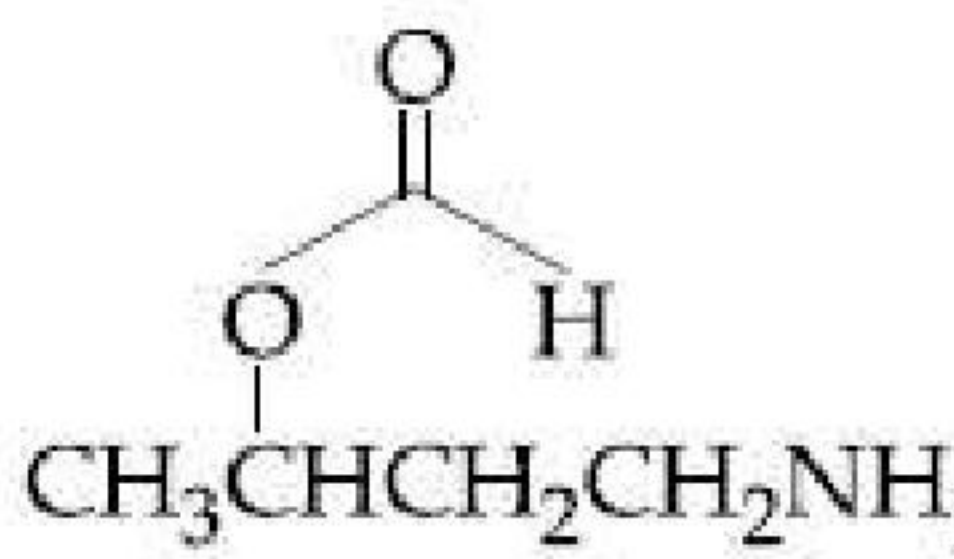
Question Number : 40 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The major product of the following reaction is :



Options :

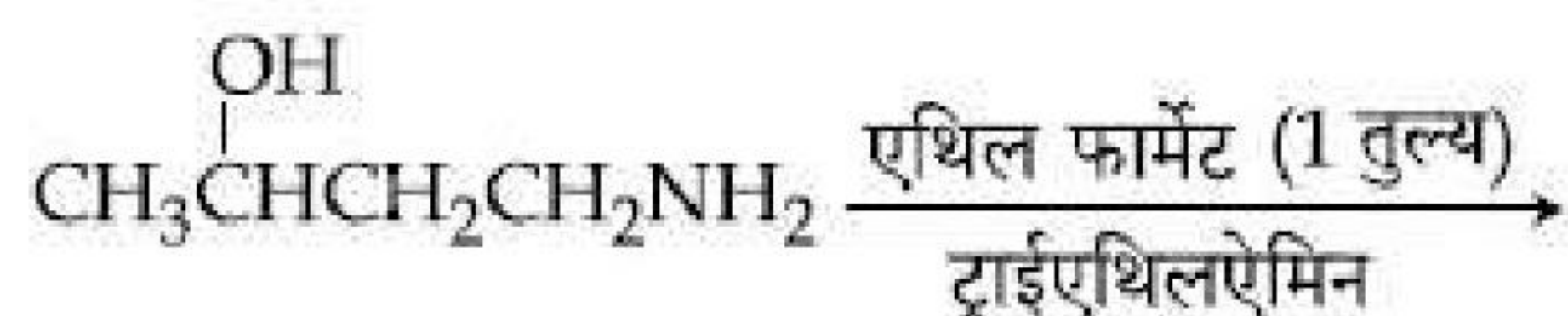
1. 
2.  $\text{CH}_3\overset{\text{OH}}{\underset{|}{\text{CH}}}\text{CH}_2\text{CH}_2\text{NHCHO}$
3.  $\text{CH}_3\text{CH}=\text{CH}-\text{CH}_2\text{NH}_2$



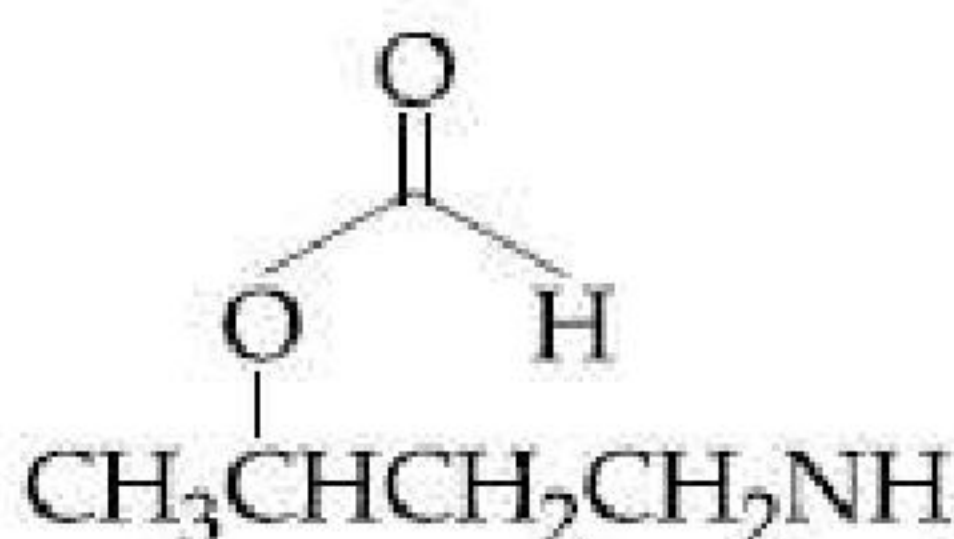
Question Number : 40 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

निम्नलिखित अभिक्रिया का मुख्य उत्पाद है :



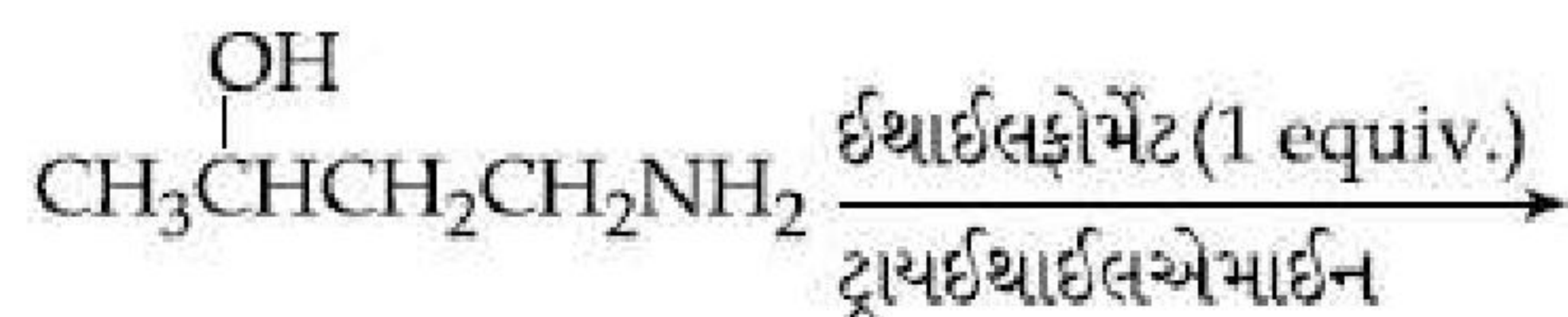
Options :

1. 
2.  $\text{CH}_3\overset{\text{OH}}{\underset{|}{\text{CH}}}\text{CH}_2\text{CH}_2\text{NHCHO}$
3.  $\text{CH}_3\text{CH}=\text{CH}-\text{CH}_2\text{NH}_2$
4.  $\text{CH}_3-\overset{\text{OH}}{\underset{|}{\text{CH}}}-\text{CH}=\text{CH}_2$

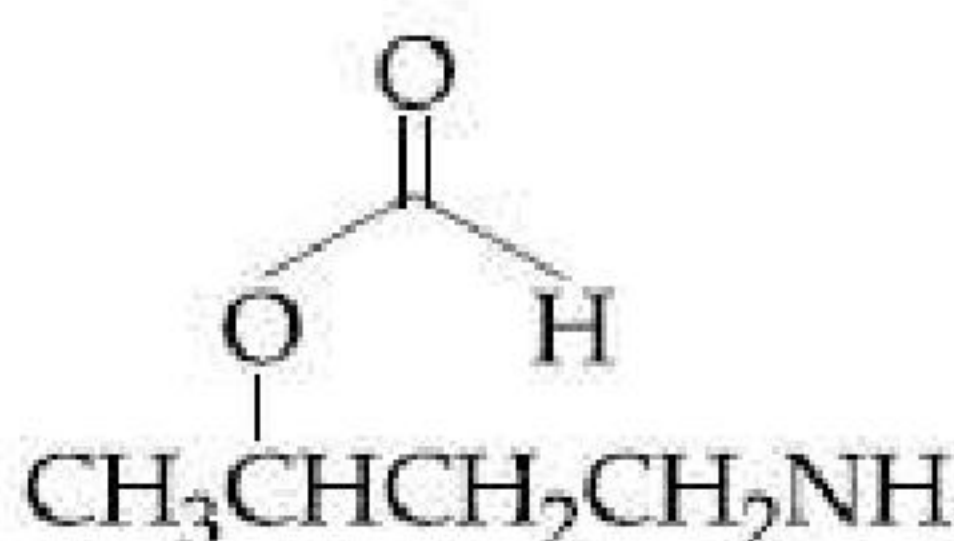
Question Number : 40 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

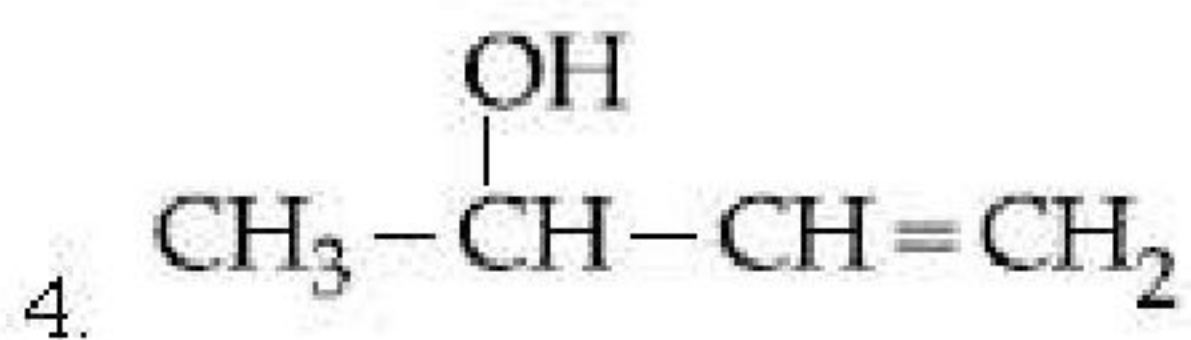
નીચેની પ્રક્રિયાની મુખ્ય નીપજ છે :



Options :

1. 
2.  $\text{CH}_3\overset{\text{OH}}{\underset{|}{\text{CH}}}\text{CH}_2\text{CH}_2\text{NHCHO}$
3.  $\text{CH}_3\text{CH}=\text{CH}-\text{CH}_2\text{NH}_2$





Question Number : 41 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The isoelectronic set of ions is :

Options :

1.  $\text{N}^{3-}, \text{O}^{2-}, \text{F}^-$  and  $\text{Na}^+$
2.  $\text{Li}^+, \text{Na}^+, \text{O}^{2-}$  and  $\text{F}^-$
3.  $\text{N}^{3-}, \text{Li}^+, \text{Mg}^{2+}$  and  $\text{O}^{2-}$
4.  $\text{F}^-, \text{Li}^+, \text{Na}^+$  and  $\text{Mg}^{2+}$

Question Number : 41 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

आयनों का समइलेक्ट्रॉनिकी सेट है :

Options :

1.  $\text{N}^{3-}, \text{O}^{2-}, \text{F}^-$  तथा  $\text{Na}^+$
2.  $\text{Li}^+, \text{Na}^+, \text{O}^{2-}$  तथा  $\text{F}^-$
3.  $\text{N}^{3-}, \text{Li}^+, \text{Mg}^{2+}$  तथा  $\text{O}^{2-}$
4.  $\text{F}^-, \text{Li}^+, \text{Na}^+$  तथा  $\text{Mg}^{2+}$

Question Number : 41 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

આયનોની સમઈલેક્ટ્રોનીય જોડ કઈ?

Options :

1.  $\text{N}^{3-}, \text{O}^{2-}, \text{F}^-$  અને  $\text{Na}^+$
2.  $\text{Li}^+, \text{Na}^+, \text{O}^{2-}$  અને  $\text{F}^-$



4.  $F^{-}$ ,  $Li^{+}$ ,  $Na^{+}$  અને  $Mg^{2+}$

Question Number : 42 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Match the refining methods (Column I) with metals (Column II).

| Column I<br>(Refining methods) | Column II<br>(Metals) |
|--------------------------------|-----------------------|
| (I) Liquation                  | (a) Zr                |
| (II) Zone Refining             | (b) Ni                |
| (III) Mond Process             | (c) Sn                |
| (IV) Van Arkel Method          | (d) Ga                |

Options :

- (I) - (c); (II) - (a); (III) - (b); (IV) - (d)
- (I) - (c); (II) - (d); (III) - (b); (IV) - (a)
- (I) - (b); (II) - (c); (III) - (d); (IV) - (a)
- (I) - (b); (II) - (d); (III) - (a); (IV) - (c)

Question Number : 42 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

परिष्करण विधियों ( कालम I ) का धातुओं ( कालम II ) के साथ सुमेल कीजिए।

| कालम I<br>( परिष्करण विधि ) | कालम II<br>( धातुयें ) |
|-----------------------------|------------------------|
| (I) गलनिक पृथक्करण          | (a) Zr                 |
| (II) जोन रिफाइनिंग          | (b) Ni                 |
| (III) मान्ड प्रक्रम         | (c) Sn                 |
| (IV) वान आर्कल विधि         | (d) Ga                 |

Options :

- (I) - (c); (II) - (a); (III) - (b); (IV) - (d)
- (I) - (c); (II) - (d); (III) - (b); (IV) - (a)



4. (I) - (b); (II) - (d); (III) - (a); (IV) - (c)

Question Number : 42 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

શુદ્ધિકરણની પદ્ધતીઓ (સ્તંભ I) ને ધાતુઓ (સ્તંભ II) સાથે જોડો

| સ્તંભ I               | સ્તંભ II |
|-----------------------|----------|
| (શુદ્ધિકરણની પદ્ધતીઓ) | (ધાતુઓ)  |
| (I) દ્રવગલન           | (a) Zr   |
| (II) ઓન શુદ્ધિકરણ     | (b) Ni   |
| (III) મોન્ડ પ્રક્રમ   | (c) Sn   |
| (IV) વેન આર્કલ પદ્ધતિ | (d) Ga   |

Options :

1. (I) - (c); (II) - (a); (III) - (b); (IV) - (d)
2. (I) - (c); (II) - (d); (III) - (b); (IV) - (a)
3. (I) - (b); (II) - (c); (III) - (d); (IV) - (a)
4. (I) - (b); (II) - (d); (III) - (a); (IV) - (c)

Question Number : 43 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The synonym for water gas when used in the production of methanol is :

Options :

1. fuel gas
2. natural gas
3. laughing gas
4. syn gas

Question Number : 43 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1



Options :

1. ફ્યૂઅલ ગૈસ
2. નેચુરલ ગૈસ
3. લાફિંગ ગૈસ
4. સિન ગૈસ

Question Number : 43 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

જળવાયુ (વોટર ગેસ) જ્યારે મિથેનોલની બનાવટમાં વપરાય છે ત્યારે તેનો સમાનાર્થી કયો?

Options :

1. બળતણ વાયુ
2. કુદરતી વાયુ
3. લાફિંગ ગેસ
4. સીન ગેસ

Question Number : 44 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The alloy used in the construction of aircrafts is :

Options :

1. Mg - Al
2. Mg - Sn
3. Mg - Zn
4. Mg - Mn

Question Number : 44 Question Type : MCQ Option Shuffling : Yes Display Question Number : No Option Orientation : Vertical



एयरक्राफ्टों( विमानों) के निर्माण में प्रयुक्त होनेवाला  
ऐलॉय (मिश्रधातु) है :

Options :

1. Mg - Al
2. Mg - Sn
3. Mg - Zn
4. Mg - Mn

Question Number : 44 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

विमानोनी रथनामा वपराती मिश्रधातु कर्छ?

Options :

1. Mg - Al
2. Mg - Sn
3. Mg - Zn
4. Mg - Mn

Question Number : 45 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The oxoacid of sulphur that does not  
contain bond between sulphur atoms is :

Options :

1.  $\text{H}_2\text{S}_2\text{O}_4$
2.  $\text{H}_2\text{S}_4\text{O}_6$
3.  $\text{H}_2\text{S}_2\text{O}_3$
4.  $\text{H}_2\text{S}_2\text{O}_7$



सल्फर का वह आक्सोएसिड जिसमें सल्फर के परमाणुओं के बीच आबन्ध नहीं होता, है :

Options :

1.  $\text{H}_2\text{S}_2\text{O}_4$
2.  $\text{H}_2\text{S}_4\text{O}_6$
3.  $\text{H}_2\text{S}_2\text{O}_3$
4.  $\text{H}_2\text{S}_2\text{O}_7$

Question Number : 45 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

સલ્ફરનો ઓક્સોએસિડ, જે સલ્ફરના પરમાણુઓ વચ્ચે બંધ ધરાવતો નથી તે :

Options :

1.  $\text{H}_2\text{S}_2\text{O}_4$
2.  $\text{H}_2\text{S}_4\text{O}_6$
3.  $\text{H}_2\text{S}_2\text{O}_3$
4.  $\text{H}_2\text{S}_2\text{O}_7$

Question Number : 46 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The correct order of catenation is :

Options :

1.  $\text{Si} > \text{Sn} > \text{C} > \text{Ge}$
2.  $\text{Ge} > \text{Sn} > \text{Si} > \text{C}$
3.  $\text{C} > \text{Si} > \text{Ge} \approx \text{Sn}$
4.  $\text{C} > \text{Sn} > \text{Si} \approx \text{Ge}$



शृंखलन का सही क्रम है :

Options :

1.  $\text{Si} > \text{Sn} > \text{C} > \text{Ge}$
2.  $\text{Ge} > \text{Sn} > \text{Si} > \text{C}$
3.  $\text{C} > \text{Si} > \text{Ge} \approx \text{Sn}$
4.  $\text{C} > \text{Sn} > \text{Si} \approx \text{Ge}$

Question Number : 46 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

કેટેનેશનનો સાચો ક્રમાંક છે :

Options :

1.  $\text{Si} > \text{Sn} > \text{C} > \text{Ge}$
2.  $\text{Ge} > \text{Sn} > \text{Si} > \text{C}$
3.  $\text{C} > \text{Si} > \text{Ge} \approx \text{Sn}$
4.  $\text{C} > \text{Sn} > \text{Si} \approx \text{Ge}$

Question Number : 47 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Consider the hydrated ions of  $\text{Ti}^{2+}$ ,  $\text{V}^{2+}$ ,  $\text{Ti}^{3+}$ , and  $\text{Sc}^{3+}$ . The correct order of their spin-only magnetic moments is :

Options :

1.  $\text{Sc}^{3+} < \text{Ti}^{3+} < \text{Ti}^{2+} < \text{V}^{2+}$
2.  $\text{Ti}^{3+} < \text{Ti}^{2+} < \text{Sc}^{3+} < \text{V}^{2+}$
3.  $\text{Sc}^{3+} < \text{Ti}^{3+} < \text{V}^{2+} < \text{Ti}^{2+}$
4.  $\text{V}^{2+} < \text{Ti}^{2+} < \text{Ti}^{3+} < \text{Sc}^{3+}$



$Ti^{2+}$ ,  $V^{2+}$ ,  $Ti^{3+}$  तथा  $Sc^{3+}$  के जलयोजित आयनों पर विचार कीजिये। उनके स्पिन-मात्र चुम्बकीय आघूर्णों का सही क्रम है :

Options :

1.  $Sc^{3+} < Ti^{3+} < Ti^{2+} < V^{2+}$
2.  $Ti^{3+} < Ti^{2+} < Sc^{3+} < V^{2+}$
3.  $Sc^{3+} < Ti^{3+} < V^{2+} < Ti^{2+}$
4.  $V^{2+} < Ti^{2+} < Ti^{3+} < Sc^{3+}$

Question Number : 47 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

$Ti^{2+}$ ,  $V^{2+}$ ,  $Ti^{3+}$  અને  $Sc^{3+}$  જલયોજિત આયનો ધ્યાનમાં લો. તેમની ફક્ત સ્પીન ચુંબકીય ચાકમાત્રાનો સાચો ક્રમ કયો?

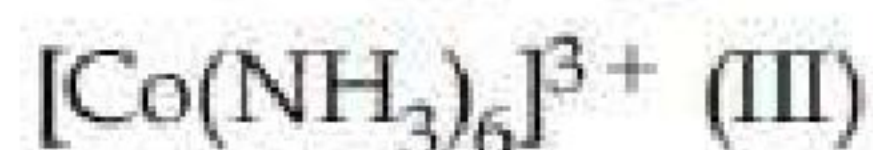
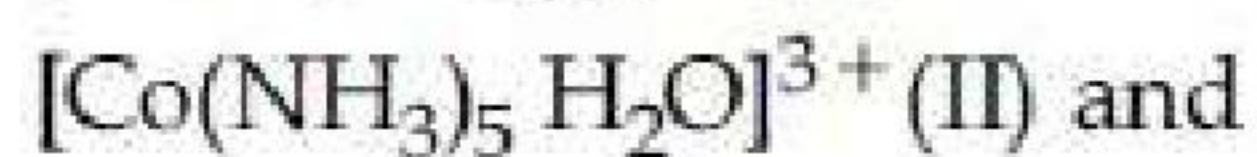
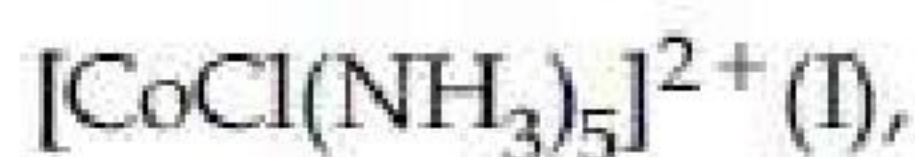
Options :

1.  $Sc^{3+} < Ti^{3+} < Ti^{2+} < V^{2+}$
2.  $Ti^{3+} < Ti^{2+} < Sc^{3+} < V^{2+}$
3.  $Sc^{3+} < Ti^{3+} < V^{2+} < Ti^{2+}$
4.  $V^{2+} < Ti^{2+} < Ti^{3+} < Sc^{3+}$

Question Number : 48 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Three complexes,



absorb light in the visible region. The correct order of the wavelength of light absorbed by them is :

Options :



2. (I) > (II) > (III)

3. (III) > (I) > (II)

4. (III) > (II) > (I)

Question Number : 48 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

ત્રીન સંકર,

$[\text{CoCl}(\text{NH}_3)_5]^{2+}$  (I),

$[\text{Co}(\text{NH}_3)_5\text{H}_2\text{O}]^{3+}$  (II) તથા

$[\text{Co}(\text{NH}_3)_6]^{3+}$  (III)

દૃશ્ય ક્ષેત્ર મેં પ્રકાશ અવશોષિત કરતે હેં. ઇનકે દ્વારા અવશોષિત પ્રકાશ કે તરંગદૈર્ઘ્ય કા સહી ક્રમ હોગા :

Options :

1. (II) > (I) > (III)

2. (I) > (II) > (III)

3. (III) > (I) > (II)

4. (III) > (II) > (I)

Question Number : 48 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

ત્રણ સંકીર્ણો

$[\text{CoCl}(\text{NH}_3)_5]^{2+}$  (I)

$[\text{Co}(\text{NH}_3)_5\text{H}_2\text{O}]^{3+}$  (II) અને

$[\text{Co}(\text{NH}_3)_6]^{3+}$  (III)

દૃશ્યમાન વિસ્તારમાં પ્રકાશનું શોષણ કરે છે. તેઓ દ્વારા શોષાતા પ્રકાશની તરંગલંબાઈનો સાચો ક્રમ છે :

Options :

1. (II) > (I) > (III)

(I) > (II) > (III)



3.  $(III) > (I) > (II)$

4.  $(III) > (II) > (I)$

Question Number : 49 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The species that can have a *trans*-isomer is :

(en = ethane-1, 2-diamine, ox = oxalate)

Options :

1.  $[Pt(en)Cl_2]$

2.  $[Zn(en)Cl_2]$

3.  $[Cr(en)_2(ox)]^+$

4.  $[Pt(en)_2Cl_2]^{2+}$

Question Number : 49 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

वह स्पीशीज जिसका एक *ट्रांस*-आइसोमर हो सकता है, है :

(en = इथेन-1, 2-डाइएमीन, ox = आक्जलेट)

Options :

1.  $[Pt(en)Cl_2]$

2.  $[Zn(en)Cl_2]$

3.  $[Cr(en)_2(ox)]^+$

4.  $[Pt(en)_2Cl_2]^{2+}$

Question Number : 49 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

સ્પીશીઝ કે જે ટ્રાન્સ સમઘટક ધરાવે છે :



1.  $[\text{Pt}(\text{en})\text{Cl}_2]$
2.  $[\text{Zn}(\text{en})\text{Cl}_2]$
3.  $[\text{Cr}(\text{en})_2(\text{ox})]^+$
4.  $[\text{Pt}(\text{en})_2\text{Cl}_2]^{2+}$

Question Number : 50 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The regions of the atmosphere, where clouds form and where we live, respectively, are :

Options :

1. Troposphere and Troposphere
2. Troposphere and Stratosphere
3. Stratosphere and Troposphere
4. Stratosphere and Stratosphere

Question Number : 50 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

वायुमंडल का वह भाग जहाँ बादल बनते हैं तथा जिसमें हम रहते हैं, उसे क्रमशः कहते हैं :

Options :

1. ट्रोपोस्फीयर (क्षोभमंडल) तथा ट्रोपोस्फीयर
2. ट्रोपोस्फीयर तथा स्ट्रेटोस्फीयर (समतापमंडल)
3. स्ट्रेटोस्फीयर तथा ट्रोपोस्फीयर
4. स्ट्रेटोस्फीयर तथा स्ट्रेटोस्फीयर



વાતાવરણના એ વિસ્તારો કે જ્યાં વાદળો બને છે અને આપણો રહીએ છીએ તે અનુક્રમે છે :

Options :

1. ક્ષોભ આવરણ અને ક્ષોભ આવરણ
2. ક્ષોભ આવરણ અને સમતાપ આવરણ
3. સમતાપ આવરણ અને ક્ષોભ આવરણ
4. સમતાપ આવરણ અને સમતાપ આવરણ

Question Number : 51 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

At 300 K and 1 atmospheric pressure, 10 mL of a hydrocarbon required 55 mL of  $O_2$  for complete combustion, and 40 mL of  $CO_2$  is formed. The formula of the hydrocarbon is :

Options :

1.  $C_4H_6$
2.  $C_4H_8$
3.  $C_4H_{10}$
4.  $C_4H_7Cl$

Question Number : 51 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

300 K तथा 1 वायुमंडलीय दाब पर, एक हाइड्रोकार्बन के 10 mL के पूर्ण दहन के लिए 55 mL  $O_2$  की आवश्यकता होती है तथा 40 mL  $CO_2$  उत्पन्न होती है। हाइड्रोकार्बन का सूत्र है :

Options :

1.  $C_4H_6$



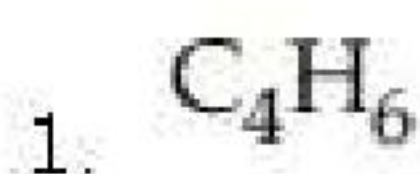


Question Number : 51 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

300 K એ અને 1 વાતાઆવરણના દબાણે 10 mL એક હાઈડ્રોકાર્બન ને સંપૂર્ણ દહન કરવા માટે 55 mL  $O_2$  ની જરૂર પડે છે, જ્યારે 40 mL  $CO_2$  ઉત્પન્ન થાય છે. તો આ હાઈડ્રોકાર્બનનું સૂત્ર શોધો ?

Options :



Question Number : 52 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Consider the following table :

| Gas | a/(k Pa dm <sup>6</sup> mol <sup>-1</sup> ) | b/(dm <sup>3</sup> mol <sup>-1</sup> ) |
|-----|---------------------------------------------|----------------------------------------|
| A   | 642.32                                      | 0.05196                                |
| B   | 155.21                                      | 0.04136                                |
| C   | 431.91                                      | 0.05196                                |
| D   | 155.21                                      | 0.4382                                 |

a and b are van der Waals constants. The correct statement about the gases is :

Options :

Gas C will occupy lesser volume than gas A; gas B will be more compressible than gas D

1.

Gas C will occupy more volume than gas A; gas B will be lesser



3. Gas C will occupy more volume than gas A; gas B will be more compressible than gas D

4. Gas C will occupy lesser volume than gas A; gas B will be lesser compressible than gas D

Question Number : 52 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

निम्न तालिका पर विचार कीजिए :

गैस  $a/(k Pa dm^6 mol^{-1})$   $b/(dm^3 mol^{-1})$

A 642.32 0.05196

B 155.21 0.04136

C 431.91 0.05196

D 155.21 0.4382

a तथा b वान्डरवाल्स स्थिरांक हैं। गैसों के विषय में सही कथन है :

Options :

1. गैस C, गैस A की तुलना में कम आयतन घेरेगी; गैस B गैस D की तुलना में ज्यादा संपीड़्य होगी।

2. गैस C, गैस A की तुलना में ज्यादा आयतन घेरेगी; गैस B, गैस D की तुलना में कम संपीड़्य होगी।

3. गैस C, गैस A की तुलना में ज्यादा आयतन घेरेगी; गैस B, गैस D की तुलना में ज्यादा संपीड़्य होगी।

4. गैस C, गैस A की तुलना में कम आयतन घेरेगी; गैस B, गैस D की तुलना में कम संपीड़्य होगी।

Question Number : 52 Question Type : MCQ Option Shuffling : Yes Display Question Number : No Option Orientation : Vertical



નીચે આપેલા કોઠાને ધ્યાનમાં લો :

| વાયુ | $a/(\text{k Pa dm}^6 \text{ mol}^{-1})$ | $b/(\text{dm}^3 \text{ mol}^{-1})$ |
|------|-----------------------------------------|------------------------------------|
| A    | 642.32                                  | 0.05196                            |
| B    | 155.21                                  | 0.04136                            |
| C    | 431.91                                  | 0.05196                            |
| D    | 155.21                                  | 0.4382                             |

a અને b વાન્ડરવાલ અચળાંકો છે આ વાયુઓ માટે સાંચુ વિધાન શોધો :

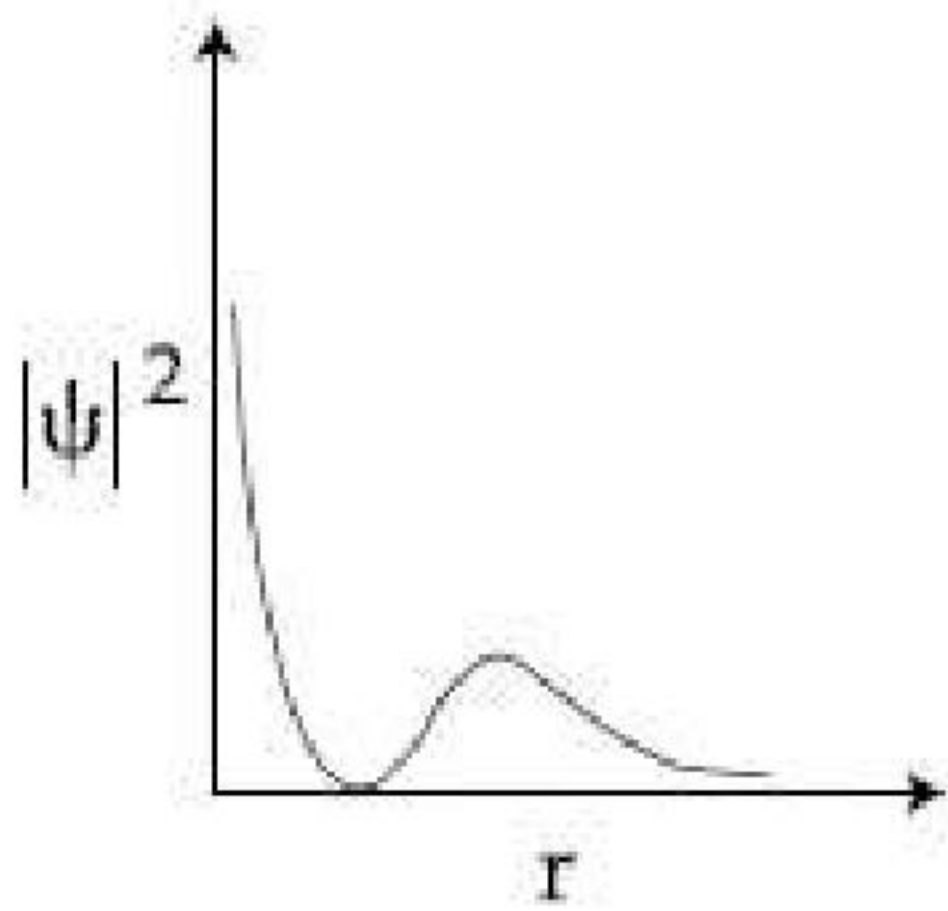
Options :

- વાયુ C એ વાયુ A કરતા ઓછું કદ રોકશે; વાયુ B એ વાયુ D કરતા વધુ દબનીય હશે.
- વાયુ C એ વાયુ A કરતા વધુ કદ રોકશે; વાયુ B એ D કરતા ઓછો દબનીય હશે.
- વાયુ C એ વાયુ A કરતા વધુ કદ રોકશે; વાયુ B એ વાયુ D કરતા વધુ દબનીય હશે.
- વાયુ C એ વાયુ A કરતા ઓછું કદ રોકશે; વાયુ B એ વાયુ D કરતા ઓછો દબનીય હશે.

Question Number : 53 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The graph between  $|\psi|^2$  and  $r$ (radial distance) is shown below. This represents :



Options :

- 1s orbital
- 2s orbital



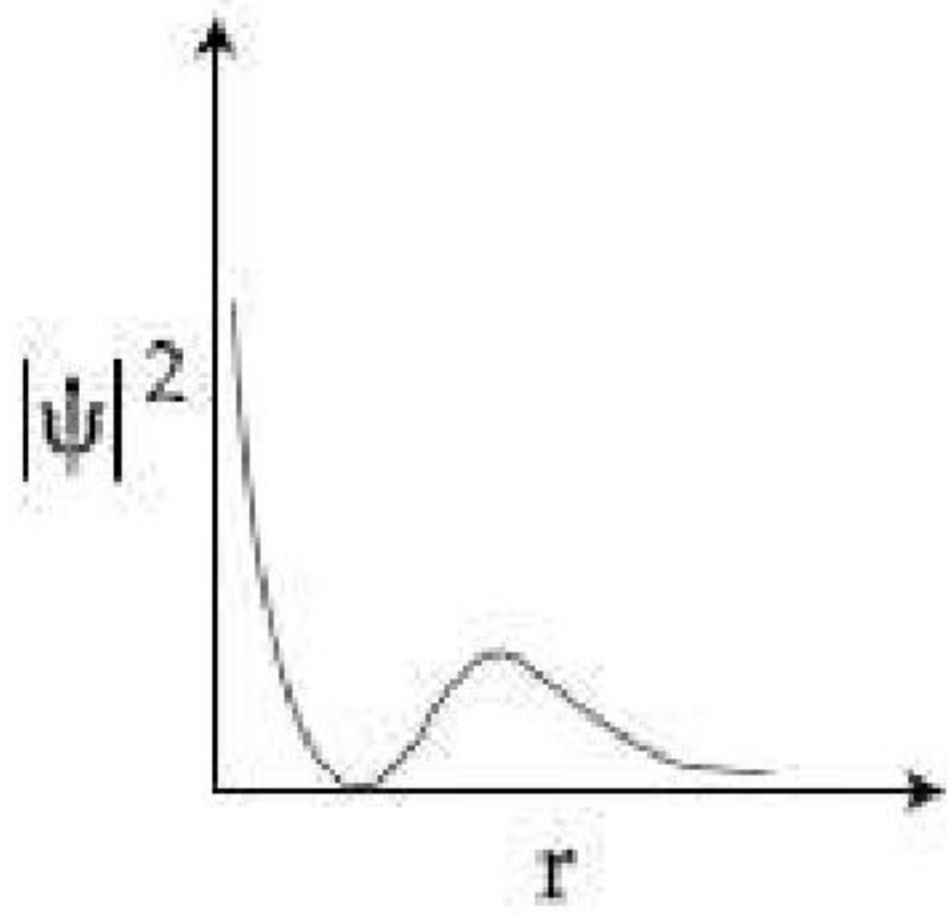
3. 3s orbital

4. 2p orbital

Question Number : 53 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

$|\psi|^2$  तथा  $r$  (रेडियल दूरी) के बीच ग्राफ नीचे प्रदर्शित है। यह दर्शाता है :



Options :

1. 1s कक्षक

2. 2s कक्षक

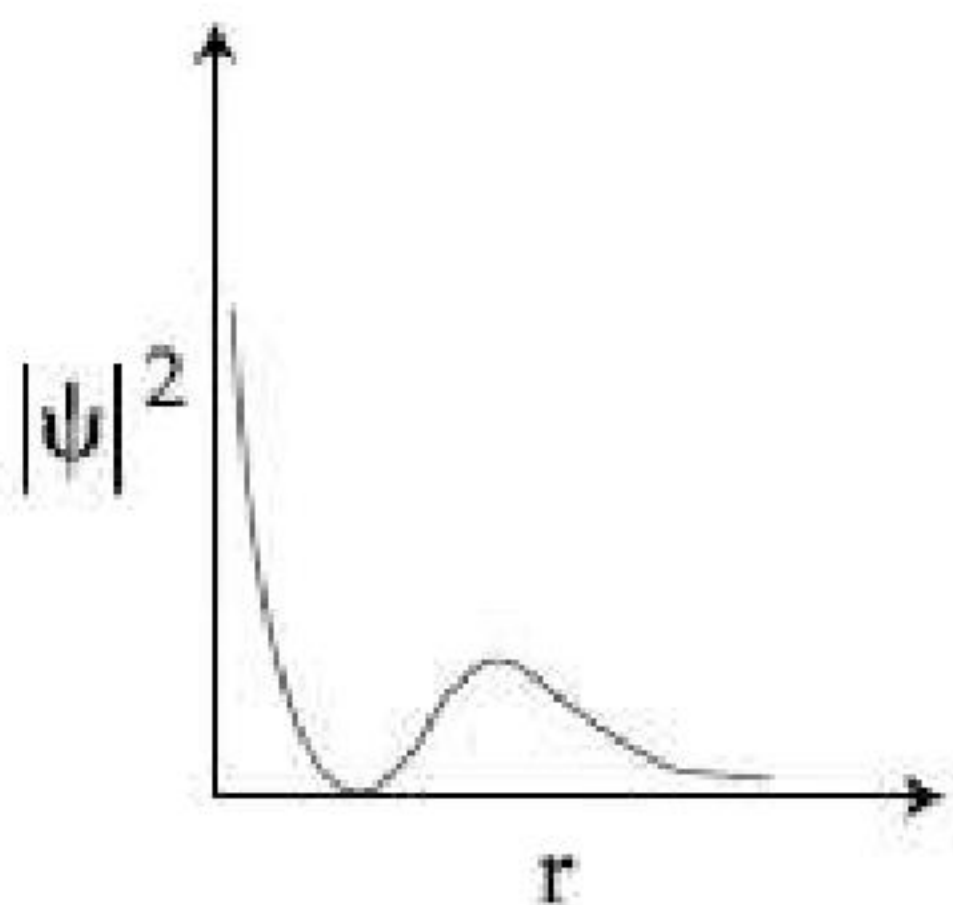
3. 3s कक्षक

4. 2p कक्षक

Question Number : 53 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

$|\psi|^2$  અને  $r$  (રેડિયલ અંતર) નો આલેખ આપેલ છે તે શેનું પ્રતિનિધિત્વ કરે છે તે શોધો ?



Options :

1. 1s કક્ષક



3.  $3s$  કક્ષક

4.  $2p$  કક્ષક

Question Number : 54 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

During the change of  $O_2$  to  $O_2^-$ , the incoming electron goes to the orbital :

Options :

1.  $\sigma^* 2p_z$

2.  $\pi^* 2p_x$

3.  $\pi 2p_x$

4.  $\pi 2p_y$

Question Number : 54 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

$O_2$  को  $O_2^-$  में परिवर्तन के समय आने वाला इलेक्ट्रॉन जिस कक्षक में जायेगा वह है :

Options :

1.  $\sigma^* 2p_z$

2.  $\pi^* 2p_x$

3.  $\pi 2p_x$

4.  $\pi 2p_y$

Question Number : 54 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

$O_2$  થી  $O_2^-$  ના રૂપાંતર દરમિયાન આવનારો ઇલેક્ટ્રોન કઈ કક્ષમાં જશે :

Options :



2.  $\pi^* 2p_x$

3.  $\pi 2p_x$

4.  $\pi 2p_y$

Question Number : 55 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A process will be spontaneous at all temperatures if :

Options :

1.  $\Delta H > 0$  and  $\Delta S > 0$

2.  $\Delta H < 0$  and  $\Delta S < 0$

3.  $\Delta H < 0$  and  $\Delta S > 0$

4.  $\Delta H > 0$  and  $\Delta S < 0$

Question Number : 55 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक प्रक्रम सभी तापों पर स्वतः होगा यदि :

Options :

1.  $\Delta H > 0$  तथा  $\Delta S > 0$

2.  $\Delta H < 0$  तथा  $\Delta S < 0$

3.  $\Delta H < 0$  तथा  $\Delta S > 0$

4.  $\Delta H > 0$  तथा  $\Delta S < 0$

Question Number : 55 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

પ્રક્રિયા દરેક તાપમાને સ્વયંભુ થશે જો :

Options :

1.  $\Delta H > 0$  અને  $\Delta S > 0$



2.  $\Delta H < 0$  અને  $\Delta S < 0$
3.  $\Delta H < 0$  અને  $\Delta S > 0$
4.  $\Delta H > 0$  અને  $\Delta S < 0$

Question Number : 56 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

At room temperature, a dilute solution of urea is prepared by dissolving 0.60 g of urea in 360 g of water. If the vapour pressure of pure water at this temperature is 35 mmHg, lowering of vapour pressure will be :  
(molar mass of urea =  $60 \text{ g mol}^{-1}$ )

Options :

1. 0.027 mmHg
2. 0.031 mmHg
3. 0.017 mmHg
4. 0.028 mmHg

Question Number : 56 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

કક્ષતાપ પર, યૂરિયા કા એક તનુ વિલયન 0.60 g યૂરિયા કો 360 g જલ મેં ઘોલકર બનાયા જાતા હૈ। ઇસ તાપ પર યદિ શુદ્ધ જલ કા વાષ્પ દાબ 35 mmHg હો તો વાષ્પ દાબ કા અવનમન હોગા :  
(યૂરિયા કા મોલર દ્રવ્યમાન =  $60 \text{ g mol}^{-1}$ )

Options :

1. 0.027 mmHg
2. 0.031 mmHg
3. 0.017 mmHg



4. 0.028 mmHg

Question Number : 56 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

ઓરડાના તાપમાને, યુરિયાનું મંદ દ્રાવણ 0.60 g યુરિયાને 360 g પાણીમાં ઓગાળીને બનવવામાં આવે છે જો આ તાપમાને શુદ્ધ પાણીનું બાષ્પ દબાણ 35 mmHg તો બાષ્પદબાણમાં ઘટાડો શોધો  
(યુરિયાનું મોલર દળ =  $60 \text{ g mol}^{-1}$ )

Options :

1. 0.027 mmHg

2. 0.031 mmHg

3. 0.017 mmHg

4. 0.028 mmHg

Question Number : 57 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Consider the following statements

- (a) The pH of a mixture containing 400 mL of 0.1 M  $\text{H}_2\text{SO}_4$  and 400 mL of 0.1 M NaOH will be approximately 1.3.
- (b) Ionic product of water is temperature dependent.
- (c) A monobasic acid with  $K_a = 10^{-5}$  has a pH = 5. The degree of dissociation of this acid is 50%.
- (d) The Le Chatelier's principle is not applicable to common-ion effect.

The correct statements are :

Options :

1. (a), (b) and (c)



3. (a) and (b)

4. (b) and (c)

Question Number : 57 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

निम्न कथनों पर विचार कीजिये,

- (a) उस मिश्रण का pH, जिसमें 400 mL 0.1 M  $\text{H}_2\text{SO}_4$  तथा 400 mL, 0.1 M NaOH है, लगभग 1.3 होगा।
- (b) जल का आयनी गुणनफल ताप पर आश्रित है।
- (c)  $K_a = 10^{-5}$  वाले एक एकक्षारकी अम्ल का  $\text{pH} = 5$  है, इस अम्ल की वियोजन मात्रा 50% है।
- (d) लि शतालिये सिद्धान्त सम आयन प्रभाव पर नहीं लागू होता है।

सही कथन हैं :

Options :

- 1. (a), (b) तथा (c)
- 2. (a), (b) तथा (d)
- 3. (a) तथा (b)
- 4. (b) तथा (c)

Question Number : 57 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1



નીચે આપેલા વિધાનો ધ્યાનમાં લો :

- (a) 400 mL 0.1 M  $H_2SO_4$  અને 400 mL, 0.1M NaOH ના મિશ્રણની pH લગભગ 1.3 થશે.
- (b) પાણીનું આયનિક ગુણાકાર તાપમાન આધારિત છે.
- (c) એક મોનો બેઝિક એસિડનો  $K_a = 10^{-5}$  અને તેની  $pH = 5$  છે, તો વિયોજન અંશ 50% હશે.
- (d) લશ્કેલિયરનો સિદ્ધાંત સામાન્ય આયન અસર (common-ion effect) ઘટના ને લાગુ પડતો નથી.

સાચા વિધાનો શોધો :

Options :

1. (a), (b) અને (c)
2. (a), (b) અને (d)
3. (a), (b)
4. (b), (c)

Question Number : 58 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Consider the statements S1 and S2 :

S1: Conductivity always increases with decrease in the concentration of electrolyte.

S2: Molar conductivity always increases with decrease in the concentration of electrolyte.

The correct option among the following is :

Options :

1. Both S1 and S2 are correct
2. Both S1 and S2 are wrong



4. S1 is correct and S2 is wrong

Question Number : 58 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

S1 तथा S2 कथनों पर विचार कीजिए :

S1 : विद्युत अपघट्य की सान्द्रता में कमी के साथ चालकता सदैव बढ़ती है।

S2 : विद्युत अपघट्य की सान्द्रता में कमी आने के साथ मोलर चालकता हमेशा बढ़ती है।

निम्न में सही विकल्प होगा :

Options :

1. S1 तथा S2 दोनों सही हैं।
2. S1 तथा S2 दोनों गलत हैं।
3. S1 गलत है तथा S2 सही है।
4. S1 सही है तथा S2 गलत है।

Question Number : 58 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

S1 અને S2 વિધાનોને ધ્યાનમાં લો :

S1 : વિદ્યુતવિભાજ્ય નાં સાંદ્રણમાં ઘટાડો થાય તો તેની વાહકતામાં હમેશા વધારો થાય છે.

S2 : વિદ્યુતવિભાજ્ય નાં સાંદ્રણમાં ઘટાડો થાય તો તેની મોલર વાહકતામાં હમેશા વધારો થાય છે.

તો નીચેનાં પૈકી સાચો વિધાનો શોધો -

Options :

1. S1 અને S2 બંને સાચા છે.
2. S1 અને S2 બંને ખોટા છે.
3. S1 ખોટું છે અને S2 સાચું છે.
4. S1 સાચું છે અને S2 ખોટું છે.

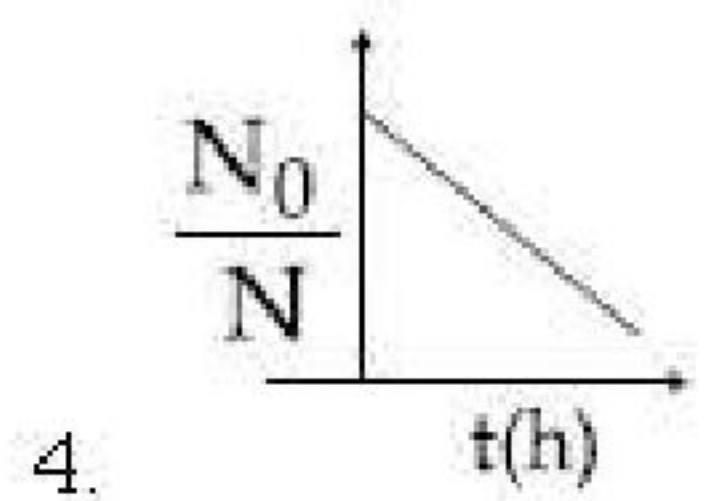
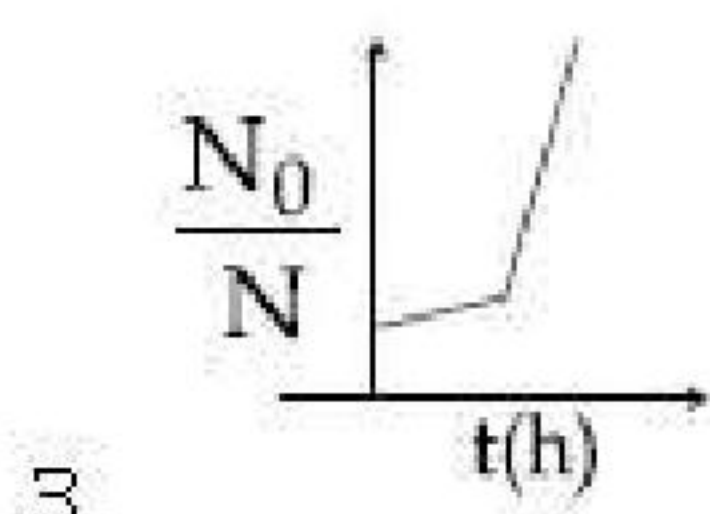
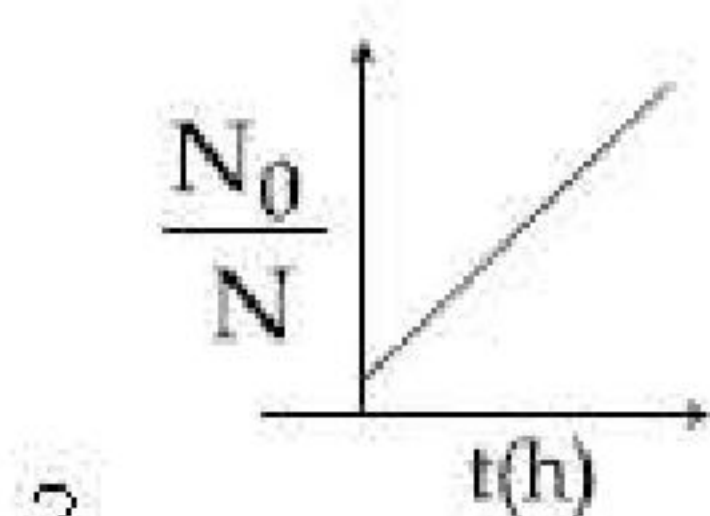
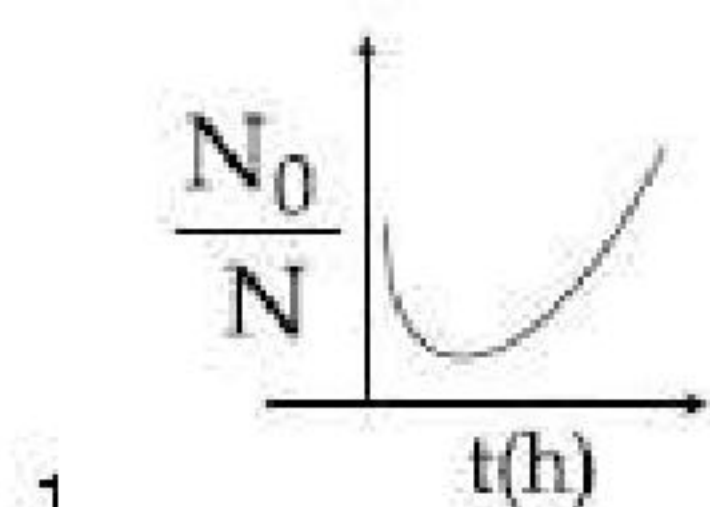


Correct Marks : 4 Wrong Marks : 1

A bacterial infection in an internal wound grows as  $N'(t) = N_0 \exp(t)$ , where the time  $t$  is in hours. A dose of antibiotic, taken orally, needs 1 hour to reach the wound. Once it reaches there, the bacterial population goes down as  $\frac{dN}{dt} = -5N^2$ .

What will be the plot of  $\frac{N_0}{N}$  vs.  $t$  after 1 hour ?

Options :



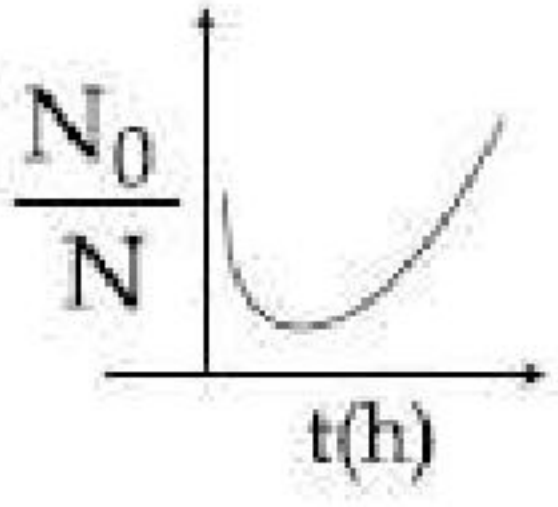
Question Number : 59 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

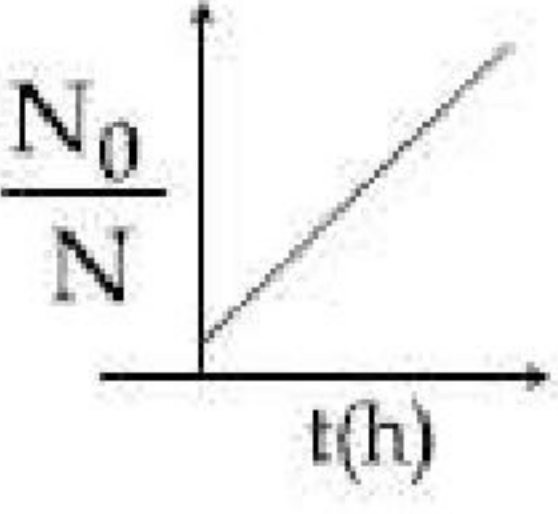
एक आंतरिक घाव में बैक्टीरिया संक्रमण इस प्रकार बढ़ता है  $N'(t) = N_0 \exp(t)$ , जहाँ समय  $t$  घंटे में है। मुख से एन्टीबायोटिक की एक खुराक लेने पर एन्टीबायोटिक घाव तक पहुँचने में एक घंटे लेती है। एक बार वह वहाँ पहुँच जाती है तो बैक्टीरिया की संख्या नीचे इस प्रकार,  $\frac{dN}{dt} = -5N^2$  चली जाती



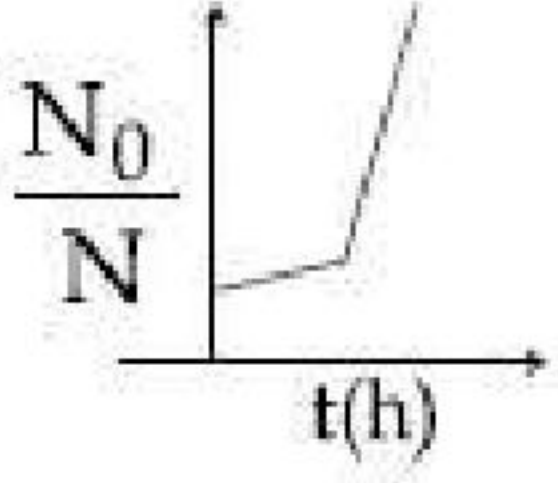
1.



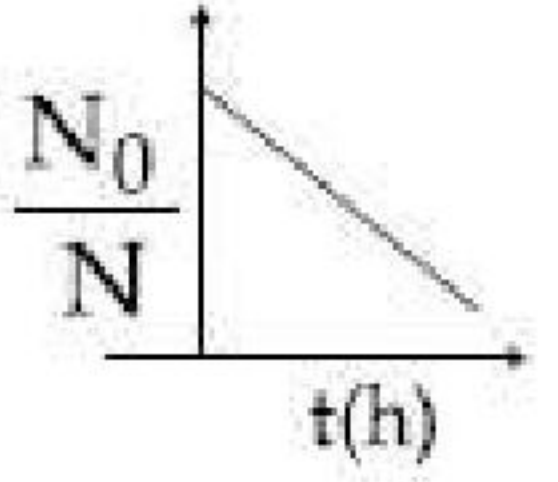
2.



3.



4.



Question Number : 59 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

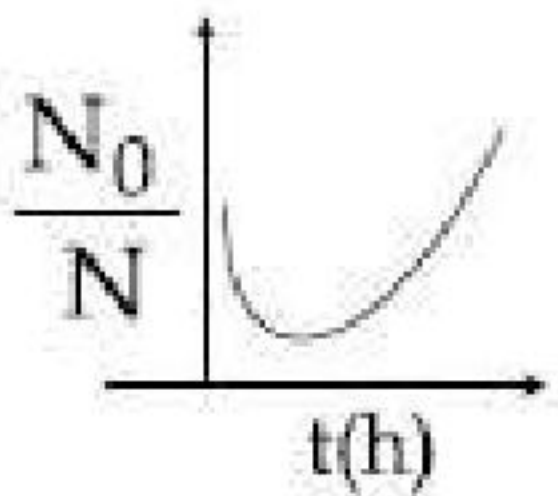
આંતરિક ધાવમાં જીવાણુઓનું સંક્રમણ  $N'(t) = N_0 \exp(t)$  થી વધે છે જ્યાં સમય  $t$  કલાકમાં છે. એન્ટીબાયોટિકની માત્રા મુખવાટે લેતા ધાવ સુધી પહોંચવા એક કલાક લાગે છે. અને ત્યાં પહોંચે પછી જીવાણુઓની

સંખ્યામાં ઘટાડો થાય છે. જે  $\frac{dN}{dt} = -5N^2$  છે. તો

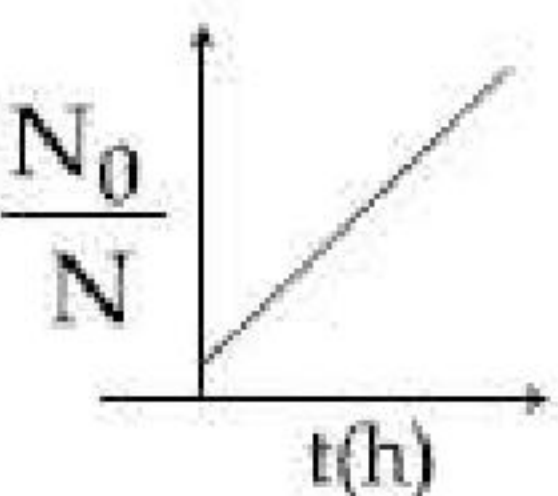
$\frac{N_0}{N}$  વિરૂદ્ધ  $t$  નો સાચો આલેખ શોધો :

Options :

1.

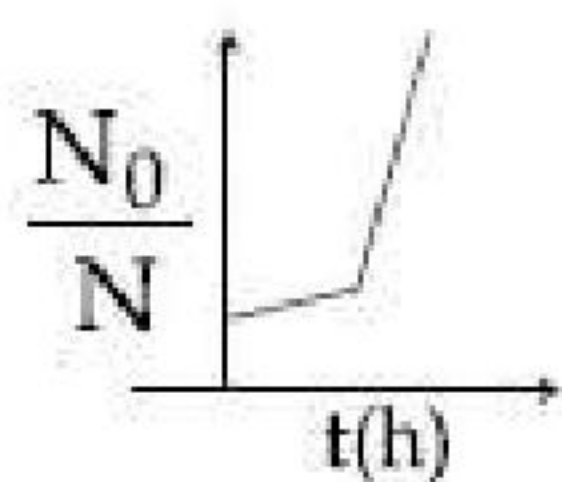


2.

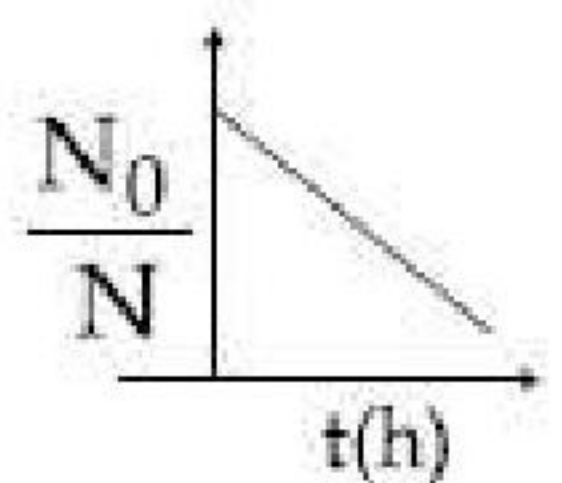




3.



4.



Question Number : 60 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A gas undergoes physical adsorption on a surface and follows the given Freundlich adsorption isotherm equation

$$\frac{x}{m} = kp^{0.5}$$

Adsorption of the gas increases with :

Options :

1. Increase in  $p$  and increase in  $T$
2. Increase in  $p$  and decrease in  $T$
3. Decrease in  $p$  and increase in  $T$
4. Decrease in  $p$  and decrease in  $T$

Question Number : 60 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक गैस का एक पृष्ठ पर भौतिक अधिशोषण होता है और वह दिये गये फ्रायन्डलिक अधिशोषण समतापी समीकरण का अनुसरण करती है

$$\frac{x}{m} = kp^{0.5}$$

गैस का अधिशोषण बढ़ेगा यदि :

Options :

1.  $p$  बढ़ायें तथा  $T$  बढ़ायें



3. p ઘટાયેં તથા T બઢાયેં

4. p ઘટાયેં તથા T ઘટાયેં

Question Number : 60 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

એક વાયુનું સપાટી પર ભૌતિક અધિશોષણ થાય છે.  
અને તે કુન્ડલીય અધિશોષણ સમતાપી સમીકરણ

$\frac{x}{m} = kp^{0.5}$  ને અનુસરે છે. તો વાયુનું અધિશોષણ  
વધશે જ્યારે :

Options :

1. p માં વધારો અને T માં વધારો

2. p માં વધારો અને T માં ઘટાડો

3. p માં ઘટાડો અને T માં વધારો

4. p માં ઘટાડો અને T માં ઘટાડો

Mathematics

|                                      |           |
|--------------------------------------|-----------|
| Section Id :                         | 416529267 |
| Section Number :                     | 3         |
| Section type :                       | Online    |
| Mandatory or Optional:               | Mandatory |
| Number of Questions:                 | 30        |
| Number of Questions to be attempted: | 30        |
| Section Marks:                       | 120       |
| Display Number Panel:                | Yes       |
| Group All Questions:                 | No        |

|                              |           |
|------------------------------|-----------|
| Sub-Section Number:          | 1         |
| Sub-Section Id:              | 416529407 |
| Question Shuffling Allowed : | Yes       |

Question Number : 61 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1



Let  $f(x) = x^2$ ,  $x \in \mathbb{R}$ . For any  $A \subseteq \mathbb{R}$ , define  $g(A) = \{x \in \mathbb{R} : f(x) \in A\}$ . If  $S = [0, 4]$ , then which one of the following statements is not true ?

Options :

1.  $f(g(S)) \neq f(S)$
2.  $f(g(S)) = S$
3.  $g(f(S)) \neq S$
4.  $g(f(S)) = g(S)$

Question Number : 61 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

माना  $f(x) = x^2$ ,  $x \in \mathbb{R}$ । किसी भी  $A \subseteq \mathbb{R}$ , के लिए  $g(A) = \{x \in \mathbb{R} : f(x) \in A\}$  है। यदि  $S = [0, 4]$  है, तो निम्न में से कौन सा एक कथन सही नहीं है?

Options :

1.  $f(g(S)) \neq f(S)$
2.  $f(g(S)) = S$
3.  $g(f(S)) \neq S$
4.  $g(f(S)) = g(S)$

Question Number : 61 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

ધારો કે  $f(x) = x^2$ ,  $x \in \mathbb{R}$ . કોઈપણ  $A \subseteq \mathbb{R}$  માટે,  $g(A) = \{x \in \mathbb{R} : f(x) \in A\}$  થી વ્યાખ્યાયિત કરો. જો  $S = [0, 4]$  તો નીચેના વિધાનો પૈકી કયું સાચું નથી?

Options :

1.  $f(g(S)) \neq f(S)$
2.  $f(g(S)) = S$



4.  $g(f(S)) = g(S)$

Question Number : 62 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

If  $a > 0$  and  $z = \frac{(1+i)^2}{a-i}$ , has magnitude

$\sqrt{\frac{2}{5}}$ , then  $\bar{z}$  is equal to :

Options :

1.  $-\frac{1}{5} - \frac{3}{5}i$

2.  $-\frac{1}{5} + \frac{3}{5}i$

3.  $-\frac{3}{5} - \frac{1}{5}i$

4.  $\frac{1}{5} - \frac{3}{5}i$

Question Number : 62 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

यदि  $a > 0$  तथा  $z = \frac{(1+i)^2}{a-i}$  का परिमाण

(magnitude)  $\sqrt{\frac{2}{5}}$  है, तो  $\bar{z}$  बराबर है :

Options :

1.  $-\frac{1}{5} - \frac{3}{5}i$

2.  $-\frac{1}{5} + \frac{3}{5}i$

3.  $-\frac{3}{5} - \frac{1}{5}i$



Question Number : 62 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

જો  $a > 0$  અને  $z = \frac{(1+i)^2}{a-i}$  નો માનક  $\sqrt{\frac{2}{5}}$  હોય,  
તો  $\bar{z} =$  \_\_\_\_\_.

Options :

1.  $-\frac{1}{5} - \frac{3}{5}i$

2.  $-\frac{1}{5} + \frac{3}{5}i$

3.  $-\frac{3}{5} - \frac{1}{5}i$

4.  $\frac{1}{5} - \frac{3}{5}i$

Question Number : 63 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

If  $\alpha$  and  $\beta$  are the roots of the quadratic  
equation,  $x^2 + x \sin \theta - 2 \sin \theta = 0$ ,  $\theta \in \left(0, \frac{\pi}{2}\right)$ ,

then  $\frac{\alpha^{12} + \beta^{12}}{(\alpha^{-12} + \beta^{-12})(\alpha - \beta)^{24}}$  is equal to :

Options :

1.  $\frac{2^6}{(\sin \theta + 8)^{12}}$

2.  $\frac{2^{12}}{(\sin \theta - 8)^6}$

3.  $\frac{2^{12}}{(\sin \theta + 8)^{12}}$



$$4. \frac{2^{12}}{(\sin\theta - 4)^{12}}$$

Question Number : 63 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

यदि द्विघाती समीकरण,  $x^2 + x \sin\theta - 2\sin\theta = 0$ ,

$\theta \in \left(0, \frac{\pi}{2}\right)$  के मूल  $\alpha$  तथा  $\beta$  हैं, तो

$$\frac{\alpha^{12} + \beta^{12}}{(\alpha^{-12} + \beta^{-12})(\alpha - \beta)^{24}} \text{ बराबर है :}$$

Options :

$$1. \frac{2^6}{(\sin\theta + 8)^{12}}$$

$$2. \frac{2^{12}}{(\sin\theta - 8)^6}$$

$$3. \frac{2^{12}}{(\sin\theta + 8)^{12}}$$

$$4. \frac{2^{12}}{(\sin\theta - 4)^{12}}$$

Question Number : 63 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

જો  $\alpha$  અને  $\beta$  દ્વિઘાત સમીકરણ

$x^2 + x \sin\theta - 2\sin\theta = 0$ ,  $\theta \in \left(0, \frac{\pi}{2}\right)$  ની બીજા હોય,

$$\text{તો } \frac{\alpha^{12} + \beta^{12}}{(\alpha^{-12} + \beta^{-12})(\alpha - \beta)^{24}} = \underline{\hspace{2cm}}.$$

Options :

$$1. \frac{2^6}{(\sin\theta + 8)^{12}}$$



$$2. \frac{2^{12}}{(\sin\theta - 8)^6}$$

$$3. \frac{2^{12}}{(\sin\theta + 8)^{12}}$$

$$4. \frac{2^{12}}{(\sin\theta - 4)^{12}}$$

Question Number : 64 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

If  $\Delta_1 = \begin{vmatrix} x & \sin\theta & \cos\theta \\ -\sin\theta & -x & 1 \\ \cos\theta & 1 & x \end{vmatrix}$  and

$$\Delta_2 = \begin{vmatrix} x & \sin 2\theta & \cos 2\theta \\ -\sin 2\theta & -x & 1 \\ \cos 2\theta & 1 & x \end{vmatrix}, \quad x \neq 0; \text{ then}$$

for all  $\theta \in \left(0, \frac{\pi}{2}\right)$  :

Options :

$$1. \Delta_1 - \Delta_2 = -2x^3$$

$$2. \Delta_1 + \Delta_2 = -2x^3$$

$$3. \Delta_1 + \Delta_2 = -2(x^3 + x - 1)$$

$$4. \Delta_1 - \Delta_2 = x(\cos 2\theta - \cos 4\theta)$$

Question Number : 64 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1



यदि  $\Delta_1 = \begin{vmatrix} x & \sin\theta & \cos\theta \\ -\sin\theta & -x & 1 \\ \cos\theta & 1 & x \end{vmatrix}$  तथा

$\Delta_2 = \begin{vmatrix} x & \sin 2\theta & \cos 2\theta \\ -\sin 2\theta & -x & 1 \\ \cos 2\theta & 1 & x \end{vmatrix}$ ,  $x \neq 0$ ; तो सभी

$\theta \in \left(0, \frac{\pi}{2}\right)$  के लिए :

Options :

1.  $\Delta_1 - \Delta_2 = -2x^3$
2.  $\Delta_1 + \Delta_2 = -2x^3$
3.  $\Delta_1 + \Delta_2 = -2(x^3 + x - 1)$
4.  $\Delta_1 - \Delta_2 = x(\cos 2\theta - \cos 4\theta)$

Question Number : 64 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

એ  $\Delta_1 = \begin{vmatrix} x & \sin\theta & \cos\theta \\ -\sin\theta & -x & 1 \\ \cos\theta & 1 & x \end{vmatrix}$  અને

$\Delta_2 = \begin{vmatrix} x & \sin 2\theta & \cos 2\theta \\ -\sin 2\theta & -x & 1 \\ \cos 2\theta & 1 & x \end{vmatrix}$ ,  $x \neq 0$ ; તો બધા

એ  $\theta \in \left(0, \frac{\pi}{2}\right)$  માટે :

Options :

1.  $\Delta_1 - \Delta_2 = -2x^3$
2.  $\Delta_1 + \Delta_2 = -2x^3$
3.  $\Delta_1 + \Delta_2 = -2(x^3 + x - 1)$

$\Delta_1 - \Delta_2 = x(\cos 2\theta - \cos 4\theta)$



Question Number : 65 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

If the system of linear equations

$$x + y + z = 5$$

$$x + 2y + 2z = 6$$

$x + 3y + \lambda z = \mu$ , ( $\lambda, \mu \in \mathbb{R}$ ), has infinitely many solutions, then the value of  $\lambda + \mu$  is :

Options :

1. 12

2. 10

3. 9

4. 7

Question Number : 65 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

यदि रेखिक समीकरण निकाय

$$x + y + z = 5$$

$$x + 2y + 2z = 6$$

$x + 3y + \lambda z = \mu$ , ( $\lambda, \mu \in \mathbb{R}$ ) के अनन्त हल हैं, तो  $\lambda + \mu$  का मान है :

Options :

1. 12

2. 10

3. 9

4. 7

Question Number : 65 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1



જો સુરેખ સમીકરણ સંહિતિ

$$x + y + z = 5$$

$$x + 2y + 2z = 6$$

$x + 3y + \lambda z = \mu$ , ( $\lambda, \mu \in \mathbb{R}$ ), ને અનંત ઉકેલો હોય,  
તો  $\lambda + \mu$  ની કિંમત \_\_\_\_\_ છે.

Options :

1. 12
2. 10
3. 9
4. 7

Question Number : 66 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The number of 6 digit numbers that can be formed using the digits 0, 1, 2, 5, 7 and 9 which are divisible by 11 and no digit is repeated, is :

Options :

1. 48
2. 60
3. 72
4. 36

Question Number : 66 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

અંકો (digits) 0, 1, 2, 5, 7 તથા 9 કે પ્રયોગ સે છઃ  
અંકો વાલી ઁસી સંખ્યાઓ, જો 11 સે ભાજ્ય હોં તથા  
જિનમેં કોઈ ભી અંક દોબારા ન આઁ, કી સંખ્યા હૈ :

Options :

1. 48



3. 72

4. 36

Question Number : 66 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

પુનરાવર્તન વગર 0, 1, 2, 5, 7, 9 અંકોનો ઉપયોગ કરી 6 અંકોની 11 વડે વિભાજ્ય કેટલી સંખ્યા મળે?

Options :

1. 48

2. 60

3. 72

4. 36

Question Number : 67 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

If  $a_1, a_2, a_3, \dots, a_n$  are in A.P. and  $a_1 + a_4 + a_7 + \dots + a_{16} = 114$ , then  $a_1 + a_6 + a_{11} + a_{16}$  is equal to :

Options :

1. 38

2. 64

3. 76

4. 98

Question Number : 67 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

યદિ  $a_1, a_2, a_3, \dots, a_n$  એક સમાન્તર શ્રેઢી મેં હેં તથા  $a_1 + a_4 + a_7 + \dots + a_{16} = 114$  હે, તો  $a_1 + a_6 + a_{11} + a_{16}$  બરાબર હે :

Options :



2. 64

3. 76

4. 98

Question Number : 67 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

જો  $a_1, a_2, a_3, \dots, a_n$  સમાંતર શ્રેણીમાં (A.P.) હોય અને  $a_1 + a_4 + a_7 + \dots + a_{16} = 114$ , તો  $a_1 + a_6 + a_{11} + a_{16} =$  \_\_\_\_\_.

Options :

1. 38

2. 64

3. 76

4. 98

Question Number : 68 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The sum

$$\frac{3 \times 1^3}{1^2} + \frac{5 \times (1^3 + 2^3)}{1^2 + 2^2} + \frac{7 \times (1^3 + 2^3 + 3^3)}{1^2 + 2^2 + 3^2} + \dots$$

upto  $10^{\text{th}}$  term, is :

Options :

1. 600

2. 620

3. 660

4. 680

Question Number : 68 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1



$$\frac{3 \times 1^3}{1^2} + \frac{5 \times (1^3 + 2^3)}{1^2 + 2^2} + \frac{7 \times (1^3 + 2^3 + 3^3)}{1^2 + 2^2 + 3^2} + \dots$$

के प्रथम दस पदों का योगफल है :

Options :

1. 600
2. 620
3. 660
4. 680

Question Number : 68 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

સરવાળો

$$\frac{3 \times 1^3}{1^2} + \frac{5 \times (1^3 + 2^3)}{1^2 + 2^2} + \frac{7 \times (1^3 + 2^3 + 3^3)}{1^2 + 2^2 + 3^2} + \dots$$

(10 પદ સુધી) બરાબર \_\_\_\_\_.

Options :

1. 600
2. 620
3. 660
4. 680

Question Number : 69 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

If the coefficients of  $x^2$  and  $x^3$  are both zero, in the expansion of the expression  $(1 + ax + bx^2)(1 - 3x)^{15}$  in powers of  $x$ , then the ordered pair  $(a, b)$  is equal to :

Options :

1.  $(-21, 714)$
2.  $(-54, 315)$



4. (28, 315)

Question Number : 69 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

यदि  $x$  की घातों (powers) में, व्यंजक  $(1 + ax + bx^2)(1 - 3x)^{15}$  के प्रसार में  $x^2$  तथा  $x^3$  दोनों के गुणांक शून्य के बराबर हैं, तो क्रमित युग्म  $(a, b)$  बराबर है :

Options :

1.  $(-21, 714)$

2.  $(-54, 315)$

3.  $(28, 861)$

4.  $(28, 315)$

Question Number : 69 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

$x$  ની ઘાતોમાં, નિરૂપણ  $(1 + ax + bx^2)(1 - 3x)^{15}$  ના વિસ્તરણમાં, જો  $x^2$  અને  $x^3$  બંનેનાં સહગુણકો શૂન્ય હોય, તો ક્રમયુક્ત જોડ  $(a, b) =$  \_\_\_\_\_.

Options :

1.  $(-21, 714)$

2.  $(-54, 315)$

3.  $(28, 861)$

4.  $(28, 315)$

Question Number : 70 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

If  $\lim_{x \rightarrow 1} \frac{x^4 - 1}{x - 1} = \lim_{x \rightarrow k} \frac{x^3 - k^3}{x^2 - k^2}$ , then  $k$  is :

Options :



1.  $\frac{4}{3}$

2.  $\frac{8}{3}$

3.  $\frac{3}{8}$

4.  $\frac{3}{2}$

Question Number : 70 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

यदि  $\lim_{x \rightarrow 1} \frac{x^4 - 1}{x - 1} = \lim_{x \rightarrow k} \frac{x^3 - k^3}{x^2 - k^2}$ , तो  $k$  बराबर है :

Options :

1.  $\frac{4}{3}$

2.  $\frac{8}{3}$

3.  $\frac{3}{8}$

4.  $\frac{3}{2}$

Question Number : 70 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

यदि  $\lim_{x \rightarrow 1} \frac{x^4 - 1}{x - 1} = \lim_{x \rightarrow k} \frac{x^3 - k^3}{x^2 - k^2}$ , तो  $k =$  \_\_\_\_\_.

Options :

1.  $\frac{4}{3}$



2.  $\frac{8}{3}$

3.  $\frac{3}{8}$

4.  $\frac{3}{2}$

Question Number : 71 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

If  $f(x) = \begin{cases} \frac{\sin(p+1)x + \sin x}{x} & , \quad x < 0 \\ q & , \quad x = 0 \\ \frac{\sqrt{x+x^2} - \sqrt{x}}{x^{3/2}} & , \quad x > 0 \end{cases}$

is continuous at  $x=0$ , then the ordered pair  $(p, q)$  is equal to :

Options :

1.  $\left(-\frac{3}{2}, \frac{1}{2}\right)$

2.  $\left(\frac{5}{2}, \frac{1}{2}\right)$

3.  $\left(-\frac{1}{2}, \frac{3}{2}\right)$

4.  $\left(-\frac{3}{2}, -\frac{1}{2}\right)$

Question Number : 71 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1



$$\text{यदि } f(x) = \begin{cases} \frac{\sin(p+1)x + \sin x}{x} & , \quad x < 0 \\ q & , \quad x = 0 \\ \frac{\sqrt{x+x^2} - \sqrt{x}}{x^{3/2}} & , \quad x > 0 \end{cases}$$

$x=0$  पर संतत है, तो क्रमित युग्म  $(p, q)$  बराबर है :

Options :

1.  $\left(-\frac{3}{2}, \frac{1}{2}\right)$

2.  $\left(\frac{5}{2}, \frac{1}{2}\right)$

3.  $\left(-\frac{1}{2}, \frac{3}{2}\right)$

4.  $\left(-\frac{3}{2}, -\frac{1}{2}\right)$

Question Number : 71 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

$$\text{જે } f(x) = \begin{cases} \frac{\sin(p+1)x + \sin x}{x} & , \quad x < 0 \\ q & , \quad x = 0 \\ \frac{\sqrt{x+x^2} - \sqrt{x}}{x^{3/2}} & , \quad x > 0 \end{cases}$$

એ  $x=0$  અગળ સતત હોય, તો ક્રમયુક્ત જોડ  $(p, q)$   
=\_\_\_\_\_.

Options :

1.  $\left(-\frac{3}{2}, \frac{1}{2}\right)$

2.  $\left(\frac{5}{2}, \frac{1}{2}\right)$

$\left(-\frac{1}{2}, \frac{3}{2}\right)$



4.  $\left(-\frac{3}{2}, -\frac{1}{2}\right)$

Question Number : 72 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Let  $f : \mathbb{R} \rightarrow \mathbb{R}$  be differentiable at  $c \in \mathbb{R}$  and

$f(c) = 0$ . If  $g(x) = |f(x)|$ , then at  $x = c$ ,  $g$  is :

Options :

1. differentiable if  $f'(c) \neq 0$
2. differentiable if  $f'(c) = 0$
3. not differentiable if  $f'(c) = 0$
4. not differentiable

Question Number : 72 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

માના  $f : \mathbb{R} \rightarrow \mathbb{R}$ ,  $c \in \mathbb{R}$  પર અવકલનીય છે તથા

$f(c) = 0$  છે. જો  $g(x) = |f(x)|$ , તો  $x = c$  પર,  $g$  :

Options :

1. અવકલનીય છે, જો  $f'(c) \neq 0$
2. અવકલનીય છે, જો  $f'(c) = 0$
3. અવકલનીય નથી છે, જો  $f'(c) = 0$
4. અવકલનીય નથી છે.

Question Number : 72 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

ધારો કે  $f : \mathbb{R} \rightarrow \mathbb{R}$  એ  $c \in \mathbb{R}$  આગળ વિકલનીય હોય

અને  $f(c) = 0$ . જો  $g(x) = |f(x)|$ , તો  $x = c$  આગળ,

$g$  એ :



1. વિકલનીય છે જો  $f'(c) \neq 0$
2. વિકલનીય છે જો  $f'(c) = 0$
3. વિકલનીય નથી જો  $f'(c) = 0$
4. વિકલનીય નથી

Question Number : 73 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Let  $f(x) = e^x - x$  and  $g(x) = x^2 - x, \forall x \in \mathbb{R}$ .

Then the set of all  $x \in \mathbb{R}$ , where the function

$h(x) = (f \circ g)(x)$  is increasing, is :

Options :

1.  $\left[-\frac{1}{2}, 0\right] \cup [1, \infty)$
2.  $\left[0, \frac{1}{2}\right] \cup [1, \infty)$
3.  $\left[-1, \frac{-1}{2}\right] \cup \left[\frac{1}{2}, \infty\right)$
4.  $[0, \infty)$

Question Number : 73 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

માના  $f(x) = e^x - x$  તથા  $g(x) = x^2 - x, \forall x \in \mathbb{R}$ , તો

સર્થી  $x \in \mathbb{R}$ , જિનકે લિખ ફલન  $h(x) = (f \circ g)(x)$

વર્ધમાન હૈ, કા સમુચ્ચય હૈ :

Options :

1.  $\left[-\frac{1}{2}, 0\right] \cup [1, \infty)$
2.  $\left[0, \frac{1}{2}\right] \cup [1, \infty)$



3.  $\left[-1, \frac{-1}{2}\right] \cup \left[\frac{1}{2}, \infty\right)$

4.  $[0, \infty)$

Question Number : 73 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

ધારો કે  $f(x) = e^x - x$  અને  $g(x) = x^2 - x, \forall x \in \mathbb{R}$ .

તો  $h(x) = (f \circ g)(x)$  જ્યાં વધતું વિધેય હોય તેવા તમામ  $x \in \mathbb{R}$  નો ગણ \_\_\_\_\_ છે.

Options :

1.  $\left[\frac{-1}{2}, 0\right] \cup [1, \infty)$

2.  $\left[0, \frac{1}{2}\right] \cup [1, \infty)$

3.  $\left[-1, \frac{-1}{2}\right] \cup \left[\frac{1}{2}, \infty\right)$

4.  $[0, \infty)$

Question Number : 74 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

If  $\int \frac{dx}{(x^2 - 2x + 10)^2}$

$= A \left( \tan^{-1} \left( \frac{x-1}{3} \right) + \frac{f(x)}{x^2 - 2x + 10} \right) + C$

where C is a constant of integration, then :

Options :

1.  $A = \frac{1}{81}$  and  $f(x) = 3(x-1)$

2.  $A = \frac{1}{27}$  and  $f(x) = 9(x-1)$



3.  $A = \frac{1}{54}$  and  $f(x) = 3(x-1)$

4.  $A = \frac{1}{54}$  and  $f(x) = 9(x-1)^2$

Question Number : 74 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

યદિ  $\int \frac{dx}{(x^2-2x+10)^2}$

$= A \left( \tan^{-1} \left( \frac{x-1}{3} \right) + \frac{f(x)}{x^2-2x+10} \right) + C$

જહોં C ઁક સમાકલન અચર હૈ, તો :

Options :

1.  $A = \frac{1}{81}$  તથા  $f(x) = 3(x-1)$

2.  $A = \frac{1}{27}$  તથા  $f(x) = 9(x-1)$

3.  $A = \frac{1}{54}$  તથા  $f(x) = 3(x-1)$

4.  $A = \frac{1}{54}$  તથા  $f(x) = 9(x-1)^2$

Question Number : 74 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

જો  $\int \frac{dx}{(x^2-2x+10)^2}$

$= A \left( \tan^{-1} \left( \frac{x-1}{3} \right) + \frac{f(x)}{x^2-2x+10} \right) + C$ , જ્યાં

C ઁ સંકલનનો અચળાંક છે, તો :

Options :

1.  $A = \frac{1}{81}$  તથા  $f(x) = 3(x-1)$

2.  $A = \frac{1}{27}$  તથા  $f(x) = 9(x-1)$

3.  $A = \frac{1}{54}$  તથા  $f(x) = 3(x-1)$

4.  $A = \frac{1}{54}$  તથા  $f(x) = 9(x-1)^2$



2.  $A = \frac{1}{27}$  અને  $f(x) = 9(x-1)$

3.  $A = \frac{1}{54}$  અને  $f(x) = 3(x-1)$

4.  $A = \frac{1}{54}$  અને  $f(x) = 9(x-1)^2$

Question Number : 75 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The value of  $\int_0^{2\pi} [\sin 2x(1+\cos 3x)] dx$ ,

where  $[t]$  denotes the greatest integer function, is :

Options :

1.  $2\pi$

2.  $-2\pi$

3.  $\pi$

4.  $-\pi$

Question Number : 75 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

$\int_0^{2\pi} [\sin 2x(1+\cos 3x)] dx$  का मान, जहाँ  $[t]$

सहत्तम पूर्णांक फलन है, है :

Options :

1.  $2\pi$

2.  $-2\pi$

3.  $\pi$

4.  $-\pi$



Question Number : 75 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

જો  $[t]$  એ મહત્તમ પૂર્ણાંક વિધેય દર્શાવે, તો

$$\int_0^{2\pi} [\sin 2x (1 + \cos 3x)] dx \quad \text{ની} \quad \text{કિંમત}$$

\_\_\_\_\_ છે.

Options :

1.  $2\pi$

2.  $-2\pi$

3.  $\pi$

4.  $-\pi$

Question Number : 76 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

$$\lim_{n \rightarrow \infty} \left( \frac{(n+1)^{1/3}}{n^{4/3}} + \frac{(n+2)^{1/3}}{n^{4/3}} + \dots + \frac{(2n)^{1/3}}{n^{4/3}} \right)$$

is equal to :

Options :

1.  $\frac{3}{4} (2)^{4/3} - \frac{3}{4}$

2.  $\frac{4}{3} (2)^{4/3}$

3.  $\frac{3}{4} (2)^{4/3} - \frac{4}{3}$

4.  $\frac{4}{3} (2)^{3/4}$

Question Number : 76 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

$$\lim_{n \rightarrow \infty} \left( \frac{(n+1)^{1/3}}{n^{4/3}} + \frac{(n+2)^{1/3}}{n^{4/3}} + \dots + \frac{(2n)^{1/3}}{n^{4/3}} \right)$$



Options :

1.  $\frac{3}{4} (2)^{4/3} - \frac{3}{4}$

2.  $\frac{4}{3} (2)^{4/3}$

3.  $\frac{3}{4} (2)^{4/3} - \frac{4}{3}$

4.  $\frac{4}{3} (2)^{3/4}$

Question Number : 76 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

$$\lim_{n \rightarrow \infty} \left( \frac{(n+1)^{1/3}}{n^{4/3}} + \frac{(n+2)^{1/3}}{n^{4/3}} + \dots + \frac{(2n)^{1/3}}{n^{4/3}} \right) = \underline{\hspace{2cm}}.$$

Options :

1.  $\frac{3}{4} (2)^{4/3} - \frac{3}{4}$

2.  $\frac{4}{3} (2)^{4/3}$

3.  $\frac{3}{4} (2)^{4/3} - \frac{4}{3}$

4.  $\frac{4}{3} (2)^{3/4}$

Question Number : 77 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1



If  $y = y(x)$  is the solution of the differential

equation  $\frac{dy}{dx} = (\tan x - y) \sec^2 x,$

$x \in \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ , such that  $y(0) = 0$ , then

$y\left(-\frac{\pi}{4}\right)$  is equal to :

Options :

1.  $\frac{1}{2} - e$

2.  $e - 2$

3.  $2 + \frac{1}{e}$

4.  $\frac{1}{e} - 2$

Question Number : 77 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

यदि  $y = y(x)$ , अवकल समीकरण

$$\frac{dy}{dx} = (\tan x - y) \sec^2 x, \quad x \in \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$$

जबकि  $y(0) = 0$  का हल है, तो  $y\left(-\frac{\pi}{4}\right)$  बराबर

है :

Options :

1.  $\frac{1}{2} - e$

2.  $e - 2$

3.  $2 + \frac{1}{e}$

4.  $\frac{1}{e} - 2$



Question Number : 77 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

જો  $y = y(x)$  એ વિકલ સમીકરણ

$$\frac{dy}{dx} = (\tan x - y) \sec^2 x, \quad x \in \left(-\frac{\pi}{2}, \frac{\pi}{2}\right) \text{ નો}$$

ઉકેલ હોય કે જેથી  $y(0) = 0$ , તો  $y\left(-\frac{\pi}{4}\right)$   
= \_\_\_\_\_.

Options :

1.  $\frac{1}{2} - e$
2.  $e - 2$
3.  $2 + \frac{1}{e}$
4.  $\frac{1}{e} - 2$

Question Number : 78 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The region represented by  $|x - y| \leq 2$  and  
 $|x + y| \leq 2$  is bounded by a :

Options :

1. rhombus of side length 2 units
2. rhombus of area  $8\sqrt{2}$  sq. units
3. square of side length  $2\sqrt{2}$  units
4. square of area 16 sq. units

Question Number : 78 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

$|x - y| \leq 2$  तथा  $|x + y| \leq 2$  द्वारा प्रदर्शित क्षेत्र जिसके



1. एक समचतुर्भुज जिसकी भुजा की लम्बाई 2 इकाई है।
2. एक समचतुर्भुज जिसका क्षेत्रफल  $8\sqrt{2}$  वर्ग इकाई है।
3. एक वर्ग जिसकी भुजा की लम्बाई  $2\sqrt{2}$  इकाई है।
4. एक वर्ग जिसका क्षेत्रफल 16 वर्ग इकाई है।

Question Number : 78 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

$|x-y| \leq 2$  અને  $|x+y| \leq 2$  દ્વારા દર્શાવેલ પ્રદેશ નીચેના પૈકી કોના દ્વારા ઘેરાયેલો છે?

Options :

1. બાજુની લંબાઈ 2 એકમ હોય તેવા સમબાજુ ચતુષ્કોણ.
2.  $8\sqrt{2}$  ચો. એકમ ક્ષેત્રફળ હોય તેવા સમબાજુ ચતુષ્કોણ.
3. બાજુની લંબાઈ  $2\sqrt{2}$  એકમ હોય તેવા ચોરસ.
4. 16 ચો. એકમ ક્ષેત્રફળ હોય તેવા ચોરસ.

Question Number : 79 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

If the circles  $x^2 + y^2 + 5Kx + 2y + K = 0$  and  $2(x^2 + y^2) + 2Kx + 3y - 1 = 0$ , ( $K \in \mathbb{R}$ ), intersect at the points P and Q, then the line  $4x + 5y - K = 0$  passes through P and Q, for :

Options :

1. exactly one value of K



3. infinitely many values of K

4. no value of K.

Question Number : 79 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

यदि वृत्तों  $x^2 + y^2 + 5Kx + 2y + K = 0$  तथा  $2(x^2 + y^2) + 2Kx + 3y - 1 = 0$ , ( $K \in \mathbb{R}$ ), के प्रतिच्छेदन बिन्दु P तथा Q हैं, तो रेखा  $4x + 5y - K = 0$  के बिन्दुओं P तथा Q से होकर जाने के लिए :

Options :

1. K का मात्र एक मान है।

2. K के मात्र दो मान हैं।

3. K के अनन्त मान हैं।

4. K का कोई भी मान नहीं है।

Question Number : 79 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

જો વર્તુળો  $x^2 + y^2 + 5Kx + 2y + K = 0$  અને  $2(x^2 + y^2) + 2Kx + 3y - 1 = 0$ , ( $K \in \mathbb{R}$ ), P અને Q બિંદુઓમાં છેદે, તો રેખા  $4x + 5y - K = 0$ , P અને Q માંથી પસાર થાય, તે માટે :

Options :

1. K ની એક જ કિંમત મળે

2. K ની બે જ કિંમતો મળે

3. K ની અનંત કિંમતો મળે

4. K ની એક પણ કિંમત ન મળે

Question Number : 80 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1



The line  $x = y$  touches a circle at the point  $(1, 1)$ . If the circle also passes through the point  $(1, -3)$ , then its radius is :

Options :

1. 2
2. 3
3.  $2\sqrt{2}$
4.  $3\sqrt{2}$

Question Number : 80 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

રેખા  $x = y$  એક વૃત્ત કો બિન્દુ  $(1, 1)$  પર સ્પર્શ કરતી છે. જો આ વૃત્ત  $(1, -3)$  બિન્દુમાંથી પણ પસાર થતું હોય, તો તેની ત્રિજ્યા \_\_\_\_\_ છે.

Options :

1. 2
2. 3
3.  $2\sqrt{2}$
4.  $3\sqrt{2}$

Question Number : 80 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

રેખા  $x = y$  કોઈ વર્તુળ ને બિંદુ  $(1, 1)$  આગળ સ્પર્શે છે. જો આ વર્તુળ  $(1, -3)$  બિંદુમાંથી પણ પસાર થતું હોય, તો તેની ત્રિજ્યા \_\_\_\_\_ છે.

Options :

1. 2
2. 3
3.  $2\sqrt{2}$
4.  $3\sqrt{2}$



4.  $3\sqrt{2}$

Question Number : 81 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

If the line  $x - 2y = 12$  is tangent to the ellipse

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \text{ at the point } \left(3, -\frac{9}{2}\right), \text{ then the}$$

length of the latus rectum of the ellipse is :

Options :

1. 9

2.  $8\sqrt{3}$

3. 5

4.  $12\sqrt{2}$

Question Number : 81 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

यदि रेखा,  $x - 2y = 12$  दीर्घवृत्त,  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$  को

बिन्दु  $\left(3, -\frac{9}{2}\right)$  पर स्पर्श करती है, तो इसके नाभिलम्ब

की लम्बाई है :

Options :

1. 9

2.  $8\sqrt{3}$

3. 5

4.  $12\sqrt{2}$

Question Number : 81 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1



જો રેખા  $x - 2y = 12$  એ ઉપવલય  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$  ના

બિંદુ  $\left(3, -\frac{9}{2}\right)$  આગળનો સ્પર્શક હોય, તો આ ઉપવલયના નાભિલંબની લંબાઈ \_\_\_\_\_ છે.

Options :

1. 9
2.  $8\sqrt{3}$
3. 5
4.  $12\sqrt{2}$

Question Number : 82 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

If a directrix of a hyperbola centred at the origin and passing through the point  $(4, -2\sqrt{3})$  is  $5x = 4\sqrt{5}$  and its eccentricity is  $e$ , then :

Options :

1.  $4e^4 - 24e^2 + 27 = 0$
2.  $4e^4 - 12e^2 - 27 = 0$
3.  $4e^4 + 8e^2 - 35 = 0$
4.  $4e^4 - 24e^2 + 35 = 0$

Question Number : 82 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक अतिपरवलय का केन्द्र मूलबिन्दु पर है तथा यह बिन्दु  $(4, -2\sqrt{3})$  से होकर जाता है। यदि इसकी एक नियता (directrix)  $5x = 4\sqrt{5}$  है तथा इसकी उत्केन्द्रता  $e$  है, तो :



1.  $4e^4 - 24e^2 + 27 = 0$

2.  $4e^4 - 12e^2 - 27 = 0$

3.  $4e^4 + 8e^2 - 35 = 0$

4.  $4e^4 - 24e^2 + 35 = 0$

Question Number : 82 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

જો ઉગમબિંદુ કેન્દ્રવાળા અને  $(4, -2\sqrt{3})$  બિંદુમાંથી

પસાર થતા અતિવલયની નિયામિકા  $5x = 4\sqrt{5}$  હોય

તથા ઉત્કેન્દ્રતા  $e$  હોય, તો :

Options :

1.  $4e^4 - 24e^2 + 27 = 0$

2.  $4e^4 - 12e^2 - 27 = 0$

3.  $4e^4 + 8e^2 - 35 = 0$

4.  $4e^4 - 24e^2 + 35 = 0$

Question Number : 83 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Let  $A(3, 0, -1)$ ,  $B(2, 10, 6)$  and  $C(1, 2, 1)$  be the vertices of a triangle and  $M$  be the midpoint of  $AC$ . If  $G$  divides  $BM$  in the ratio,  $2 : 1$ , then  $\cos(\angle GOA)$  ( $O$  being the origin) is equal to :

Options :

1.  $\frac{1}{\sqrt{15}}$

2.  $\frac{1}{\sqrt{30}}$



3.  $\frac{1}{2\sqrt{15}}$

4.  $\frac{1}{6\sqrt{10}}$

Question Number : 83 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

માના એક ત્રિભુજ કે શીર્ષ બિન્દુ  $A(3, 0, -1)$ ,  $B(2, 10, 6)$  તથા  $C(1, 2, 1)$  હૈં તથા AC કા મધ્યબિન્દુ M હૈ। યદિ G, BM કો 2 : 1 કે અનુપાત મેં વિભાજિત કરતા હૈ, તો  $\cos(\angle GOA)$  (O મૂલબિન્દુ હૈ) બરાબર હૈ :

Options :

1.  $\frac{1}{\sqrt{15}}$

2.  $\frac{1}{\sqrt{30}}$

3.  $\frac{1}{2\sqrt{15}}$

4.  $\frac{1}{6\sqrt{10}}$

Question Number : 83 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

ધારો કે  $A(3, 0, -1)$ ,  $B(2, 10, 6)$  અને  $C(1, 2, 1)$  એ કોઈ ત્રિકોણના શિરોબિંદુઓ છે અને M એ AC નું મધ્યબિંદુ છે. જો G એ BM નું 2 : 1 ગુણોત્તરમાં વિભાજન કરે, તો  $\cos(\angle GOA)$  (જ્યાં O ઉગમબિંદુ છે) બરાબર \_\_\_\_\_ છે.

Options :

1.  $\frac{1}{\sqrt{15}}$



3.  $\frac{1}{2\sqrt{15}}$

4.  $\frac{1}{6\sqrt{10}}$

Question Number : 84 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

If  $Q(0, -1, -3)$  is the image of the point  $P$  in the plane  $3x - y + 4z = 2$  and  $R$  is the point  $(3, -1, -2)$ , then the area (in sq. units) of  $\Delta PQR$  is :

Options :

1.  $\frac{\sqrt{91}}{4}$

2.  $2\sqrt{13}$

3.  $\frac{\sqrt{65}}{2}$

4.  $\frac{\sqrt{91}}{2}$

Question Number : 84 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

यदि बिन्दु  $P$  का समतल  $3x - y + 4z = 2$  में प्रतिबिम्ब  $Q(0, -1, -3)$  है तथा  $R(3, -1, -2)$  एक अन्य बिन्दु है, तो  $\Delta PQR$  का क्षेत्रफल (वर्ग इकाइयों में) है :

Options :

1.  $\frac{\sqrt{91}}{4}$

2.  $2\sqrt{13}$

3.  $\frac{\sqrt{65}}{2}$



4.  $\frac{\sqrt{91}}{2}$

Question Number : 84 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

જો  $Q(0, -1, -3)$  એ સમતલ  $3x - y + 4z = 2$  માં બિંદુ  $P$  નું પ્રતિબિંબ હોય અને  $R$  એ બિંદુ  $(3, -1, -2)$  હોય, તો  $\Delta PQR$  નું ક્ષેત્રફળ (ચો. એકમ માં) \_\_\_\_\_ છે.

Options :

1.  $\frac{\sqrt{91}}{4}$

2.  $2\sqrt{13}$

3.  $\frac{\sqrt{65}}{2}$

4.  $\frac{\sqrt{91}}{2}$

Question Number : 85 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

If the length of the perpendicular from the point  $(\beta, 0, \beta)$  ( $\beta \neq 0$ ) to the line,

$$\frac{x}{1} = \frac{y-1}{0} = \frac{z+1}{-1} \text{ is } \sqrt{\frac{3}{2}}, \text{ then } \beta \text{ is equal}$$

to :

Options :

1.  $-2$

2.  $-1$

3.  $1$

4.  $2$



Correct Marks : 4 Wrong Marks : 1

यदि बिंदु  $(\beta, 0, \beta)$  ( $\beta \neq 0$ ) से रेखा

$$\frac{x}{1} = \frac{y-1}{0} = \frac{z+1}{-1}$$
 पर खींचे गए लंब की लंबाई

$\sqrt{\frac{3}{2}}$  है, तो  $\beta$  बराबर है :

Options :

1.  $-2$
2.  $-1$
3.  $1$
4.  $2$

Question Number : 85 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

बिंदु  $(\beta, 0, \beta)$  ( $\beta \neq 0$ ) की रेखा

$$\frac{x}{1} = \frac{y-1}{0} = \frac{z+1}{-1}$$
 पर लंब की लंबाई  $\sqrt{\frac{3}{2}}$  होय,

तो  $\beta =$  \_\_\_\_\_.

Options :

1.  $-2$
2.  $-1$
3.  $1$
4.  $2$

Question Number : 86 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Assume that each born child is equally likely to be a boy or a girl. If two families have two children each, then the conditional probability that all children are girls given that at least two are girls is :



1.  $\frac{1}{10}$

2.  $\frac{1}{11}$

3.  $\frac{1}{12}$

4.  $\frac{1}{17}$

Question Number : 86 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

માના પ્રત્યેક જન્મ લેને વાલે બચ્ચે કા લડકા અથવા લડકી હોના સમસંભાવ્ય હૈ। માના દો પરિવારોં મેં પ્રત્યેક મેં દો બચ્ચે હૈં। યદિ યહ દિયા ગયા હૈ કિ કમ સે કમ દો બચ્ચે લડકિયાં હૈં, તો સભી બચ્ચોં કે લડકી હોને કી સપ્રતિબંધ પ્રાચિકતા હૈ :

Options :

1.  $\frac{1}{10}$

2.  $\frac{1}{11}$

3.  $\frac{1}{12}$

4.  $\frac{1}{17}$

Question Number : 86 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

ધારો કે પ્રત્યેક જન્મેલ બાળક છોકરો કે છોકરી હોય તેની શક્યતા સરખી છે. જો બે બાળકો ધરાવતા બે કુટુંબોમાં ઓછા માં ઓછી બે છોકરીઓ છે તેમ આપેલ હોય, તો



1.  $\frac{1}{10}$

2.  $\frac{1}{11}$

3.  $\frac{1}{12}$

4.  $\frac{1}{17}$

Question Number : 87 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

If for some  $x \in \mathbb{R}$ , the frequency distribution of the marks obtained by 20 students in a test is :

|           |           |        |          |     |
|-----------|-----------|--------|----------|-----|
| Marks     | 2         | 3      | 5        | 7   |
| Frequency | $(x+1)^2$ | $2x-5$ | $x^2-3x$ | $x$ |

then the mean of the marks is :

Options :

1. 2.5

2. 3.2

3. 3.0

4. 2.8

Question Number : 87 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

यदि किसी  $x \in \mathbb{R}$  के लिए, 20 विद्यार्थियों द्वारा एक परीक्षा में प्राप्त अंकों का बारंबारता बंटन है,

|           |           |        |          |     |
|-----------|-----------|--------|----------|-----|
| अंक       | 2         | 3      | 5        | 7   |
| बारंबारता | $(x+1)^2$ | $2x-5$ | $x^2-3x$ | $x$ |



1. 2.5
2. 3.2
3. 3.0
4. 2.8

Question Number : 87 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

જો કોઈ  $x \in \mathbb{R}$  માટે, 20 વિદ્યાર્થીઓ દ્વારા કોઈ એક પરીક્ષામાં મેળવેલ ગુણનું આવૃત્તિ વિતરણ

|         |           |        |          |     |
|---------|-----------|--------|----------|-----|
| ગુણ     | 2         | 3      | 5        | 7   |
| આવૃત્તિ | $(x+1)^2$ | $2x-5$ | $x^2-3x$ | $x$ |

હોય, તો ગુણનો મધ્યક \_\_\_\_\_ છે.

Options :

1. 2.5
2. 3.2
3. 3.0
4. 2.8

Question Number : 88 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

All the pairs  $(x, y)$  that satisfy the inequality

$$2\sqrt{\sin^2 x - 2\sin x + 5} \cdot \frac{1}{4\sin^2 y} \leq 1 \quad \text{also}$$

satisfy the equation :

Options :

1.  $\sin x = 2 \sin y$
2.  $2 \sin x = \sin y$
3.  $\sin x = |\sin y|$



4.  $2|\sin x| = 3\sin y$

Question Number : 88 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

वह सभी युग्म  $(x, y)$  जो असमिका

$$2\sqrt{\sin^2 x - 2\sin x + 5} \cdot \frac{1}{4\sin^2 y} \leq 1$$
 को संतुष्ट

करते हैं, निम्न में से किस समीकरण को भी संतुष्ट करते हैं?

Options :

1.  $\sin x = 2\sin y$

2.  $2\sin x = \sin y$

3.  $\sin x = |\sin y|$

4.  $2|\sin x| = 3\sin y$

Question Number : 88 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

તમામ જોડો  $(x, y)$  કે જે અસમતા

$$2\sqrt{\sin^2 x - 2\sin x + 5} \cdot \frac{1}{4\sin^2 y} \leq 1$$
 નું

સમાધાન કરતી હોય, તે \_\_\_\_\_ સમીકરણનું પણ સમાધાન કરશે.

Options :

1.  $\sin x = 2\sin y$

2.  $2\sin x = \sin y$

3.  $\sin x = |\sin y|$

4.  $2|\sin x| = 3\sin y$



ABC is a triangular park with  $AB=AC=100$  metres. A vertical tower is situated at the mid-point of BC. If the angles of elevation of the top of the tower at A and B are  $\cot^{-1}(3\sqrt{2})$  and  $\operatorname{cosec}^{-1}(2\sqrt{2})$  respectively, then the height of the tower (in metres) is :

Options :

1.  $\frac{100}{3\sqrt{3}}$
2. 25
3. 20
4.  $10\sqrt{5}$

Question Number : 89 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

ABC एक त्रिभुजाकार पार्क है जिसमें  $AB=AC=100$  मीटर है। BC के मध्य बिंदु पर एक सीधी मीनार खड़ी है। यदि मीनार के शिखर के बिंदुओं A तथा B पर उन्नयन कोण क्रमशः  $\cot^{-1}(3\sqrt{2})$  तथा  $\operatorname{cosec}^{-1}(2\sqrt{2})$  हैं, तो मीनार की ऊँचाई (मीटरों में) है :

Options :

1.  $\frac{100}{3\sqrt{3}}$
2. 25
3. 20
4.  $10\sqrt{5}$



ABC એ ત્રિકોણીય પાર્ક છે જેમાં  $AB = AC = 100$  મીટર BC ના મધ્યબિંદુએ એક શિરોલંબ ટાવર આવેલ છે. જો આ ટાવરની ટોચના, A અને B આગળના ઉત્સેધકોણો અનુક્રમે  $\cot^{-1}(3\sqrt{2})$  અને  $\operatorname{cosec}^{-1}(2\sqrt{2})$  હોય, તો આ ટાવર ની ઊંચાઈ (મીટર માં) \_\_\_\_\_ છે.

Options :

1.  $\frac{100}{3\sqrt{3}}$
2. 25
3. 20
4.  $10\sqrt{5}$

Question Number : 90 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Which one of the following Boolean expressions is a tautology ?

Options :

1.  $(p \vee q) \wedge (\sim p \vee \sim q)$
2.  $(p \wedge q) \vee (p \wedge \sim q)$
3.  $(p \vee q) \wedge (p \vee \sim q)$
4.  $(p \vee q) \vee (p \vee \sim q)$

Question Number : 90 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

बूले के निम्न व्यंजकों में से कौन सा एक, एक पुनरुक्ति है?

Options :

1.  $(p \vee q) \wedge (\sim p \vee \sim q)$



2.  $(p \wedge q) \vee (p \wedge \sim q)$

3.  $(p \vee q) \wedge (p \vee \sim q)$

4.  $(p \vee q) \vee (p \vee \sim q)$

Question Number : 90 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

નીચેનાં પૈકી કયું બુલીયન નિરૂપણ નિત્યસત્ય છે ?

Options :

1.  $(p \vee q) \wedge (\sim p \vee \sim q)$

2.  $(p \wedge q) \vee (p \wedge \sim q)$

3.  $(p \vee q) \wedge (p \vee \sim q)$

4.  $(p \vee q) \vee (p \vee \sim q)$

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