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**Question Paper Name :** B Tech 27July2021 Shift S1  
**Subject Name :** B TECH  
**Creation Date :** 2021-07-24 17:19:13  
**Duration :** 180  
**Total Marks :** 300  
**Display Marks:** Yes

## B TECH

**Group Number :** 1  
**Group Id :** 864351231  
**Group Maximum Duration :** 0  
**Group Minimum Duration :** 180  
**Show Attended Group? :** No  
**Edit Attended Group? :** No  
**Break time :** 0  
**Group Marks :** 300  
**Is this Group for Examiner? :** No

## Physics Section A

**Section Id :** 864351824  
**Section Number :** 1  
**Section type :** Online

|                                                              |            |
|--------------------------------------------------------------|------------|
| Number of Questions :                                        | 20         |
| Number of Questions to be attempted :                        | 20         |
| Section Marks :                                              | 80         |
| Enable Mark as Answered Mark for Review and Clear Response : | Yes        |
| Sub-Section Number :                                         | 1          |
| Sub-Section Id :                                             | 8643511051 |
| Question Shuffling Allowed :                                 | Yes        |

**Question Type : MCQ Is Question Mandatory : No**

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

If ' $f$ ' denotes the ratio of the number of nuclei decayed ( $N_d$ ) to the number of nuclei at  $t=0$  ( $N_0$ ) then for a collection of radioactive nuclei, the rate of change of ' $f$ ' with respect to time is given as :

[ $\lambda$  is the radioactive decay constant]

**Options :**

1.  $-\lambda e^{-\lambda t}$
2.  $\lambda e^{-\lambda t}$
3.  $\lambda(1 - e^{-\lambda t})$
4.  $-\lambda(1 - e^{-\lambda t})$

**Question Type : MCQ Is Question Mandatory : No**

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

In Young's double slit experiment, if the source of light changes from orange to blue

1. the intensity of the minima will increase.
2. the distance between consecutive fringes will increase.
3. the distance between consecutive fringes will decrease.
4. the central bright fringe will become a dark fringe.

**Question Type : MCQ Is Question Mandatory : No**

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

The relative permittivity of distilled water is 81. The velocity of light in it will be :

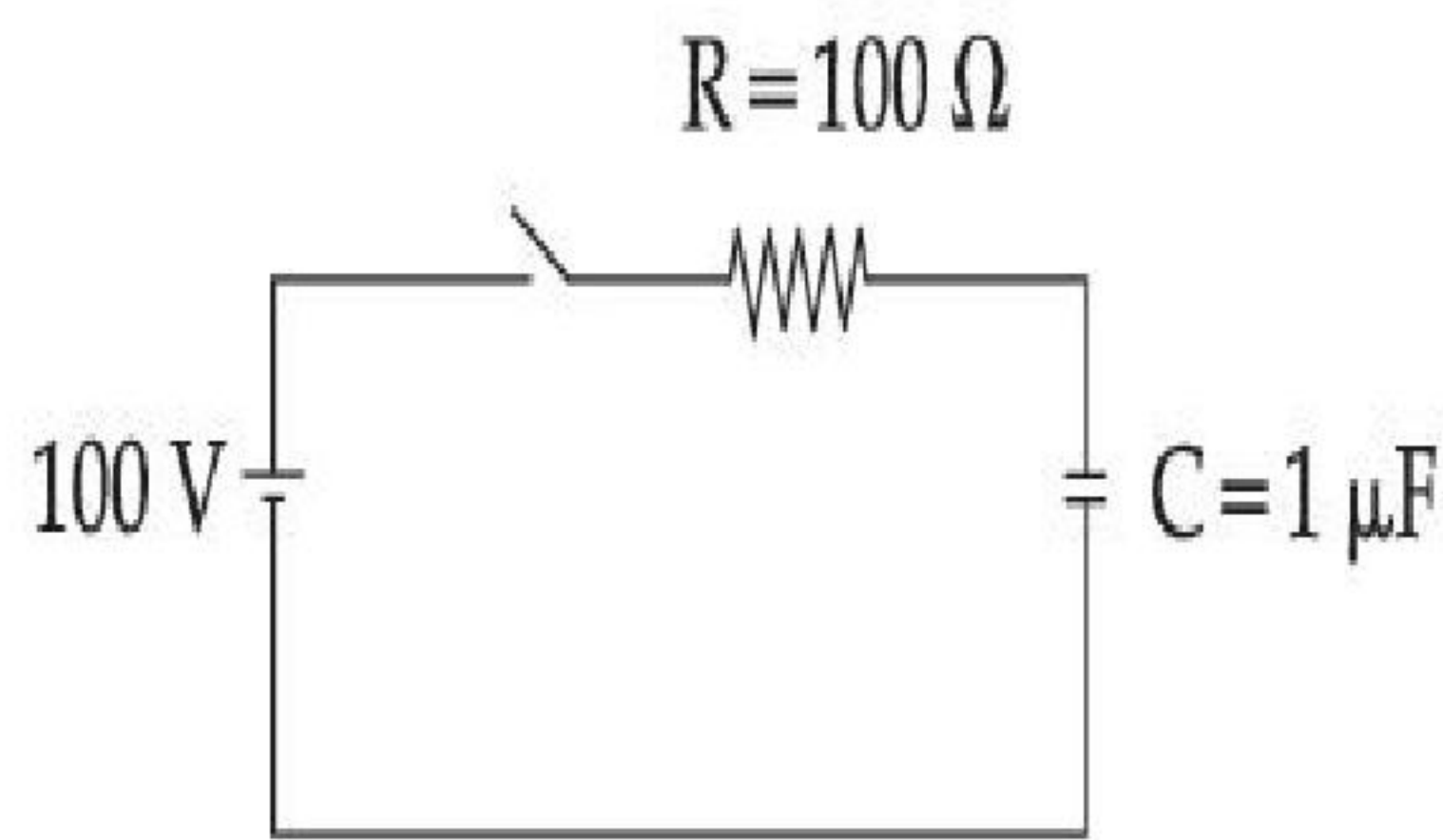
(Given  $\mu_r = 1$ )

**Options :**

1.  $3.33 \times 10^7 \text{ m/s}$
2.  $4.33 \times 10^7 \text{ m/s}$
3.  $5.33 \times 10^7 \text{ m/s}$
4.  $2.33 \times 10^7 \text{ m/s}$

**Question Type : MCQ Is Question Mandatory : No**

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



A capacitor of capacitance  $C = 1 \, \mu\text{F}$  is suddenly connected to a battery of 100 volt through a resistance  $R = 100 \, \Omega$ . The time taken for the capacitor to be charged to get 50 V is :

[Take  $\ln 2 = 0.69$ ]

**Options :**

1.  $0.69 \times 10^{-4} \, \text{s}$
2.  $0.30 \times 10^{-4} \, \text{s}$
3.  $1.44 \times 10^{-4} \, \text{s}$
4.  $3.33 \times 10^{-4} \, \text{s}$

**Question Type : MCQ Is Question Mandatory : No**

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

A 0.07 H inductor and a  $12 \, \Omega$  resistor are connected in series to a 220 V, 50 Hz ac source.

The approximate current in the circuit and the phase angle between current and source

voltage are respectively. [Take  $\pi$  as  $\frac{22}{7}$ ]

**Options :**

1.  $8.8 \, \text{A}$  and  $\tan^{-1}\left(\frac{11}{6}\right)$

0.88 A and  $\tan^{-1}\left(\frac{11}{6}\right)$

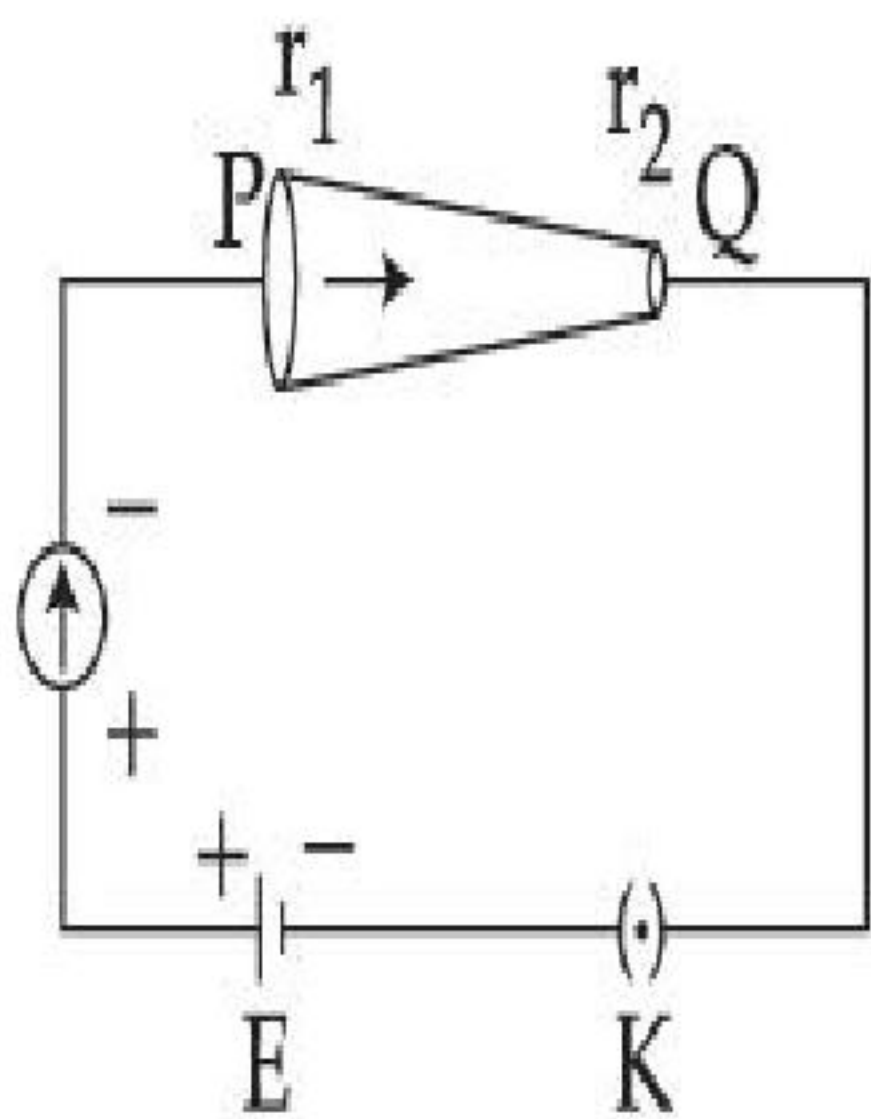
3. 88 A and  $\tan^{-1}\left(\frac{$

4. None of these

**Question Type : MCQ Is Question Mandatory : No**

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

In the given figure, a battery of emf  $E$  is connected across a conductor PQ of length ' $l$ ' and different area of cross-sections having radii  $r_1$  and  $r_2$  ( $r_2 < r_1$ ).



Choose the correct option as one moves from P to Q :

**Options :**

1. Drift velocity of electron increases.
2. Electron current decreases.
3. Electric field decreases.
4. All of these

**Question Type : MCQ Is Question Mandatory : No**

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

Two capacitors of capacities  $2C$  and  $C$  are joined in parallel and charged up to potential  $V$ . The battery is removed and the capacitor of capacity  $C$  is filled completely with a medium of dielectric constant  $K$ . The potential difference across the capacitors will now be :

$$\frac{25}{6} \frac{K\epsilon_0 A}{d}$$

$$2. \frac{15}{34} \frac{K\epsilon_0 A}{d}$$

$$3. \frac{9}{6} \frac{K\epsilon_0 A}{d}$$

$$4. \frac{15}{6} \frac{K\epsilon_0 A}{d}$$

**Question Type : MCQ Is Question Mandatory : No**

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

A particle starts executing simple harmonic motion (SHM) of amplitude 'a' and total energy

E. At any instant, its kinetic energy is  $\frac{3E}{4}$  then its displacement 'y' is given by :

**Options :**

$$1. y = \frac{a}{\sqrt{2}}$$

$$2. y = \frac{a}{2}$$

$$3. y = \frac{a\sqrt{3}}{2}$$

**Question Type : MCQ Is Question Mandatory : No**

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

In the reported figure, there is a cyclic process ABCDA on a sample of 1 mol of a diatomic gas. The temperature of the gas during the process  $A \rightarrow B$  and  $C \rightarrow D$  are  $T_1$  and  $T_2$  ( $T_1 &$

1. 3 min.
2. 4 min.
3. 6 min.
4. 8 min.

**Assertion A :** If A, B, C, D are four points on a semi-circular arc with centre at 'O' such

that  $|\vec$

The figure shows two solid discs with radius  $R$  and  $r$  respectively. If mass per unit area is same for both, what is the ratio of MI of bigger disc around axis  $AB$  (which is  $\perp$  to the plane



**Options :**

1.  $6 \text{ m/s}$

**Question Type : MCQ Is Question Mandatory : No**

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

|                                                                     |     |
|---------------------------------------------------------------------|-----|
| <b>Section Marks :</b>                                              | 20  |
| <b>Enable Mark as Answered Mark for Review and Clear Response :</b> | Yes |

1

**Question Type : SA**

**Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**



**Evaluation Required For SA :** Yes

**Show Word Count :** Yes













2. 5, 4 and 3

3. 5, 3 and 4



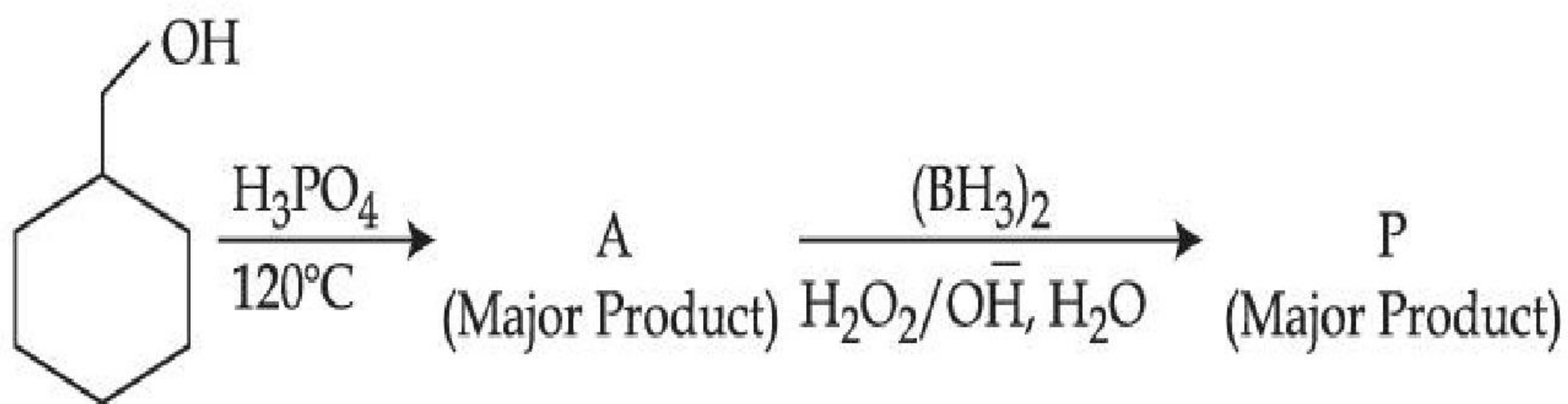
2. Barfoed test
3. Tollen's test
4. Iodine test

**Options :**

1.  $D > B > C > A$
- 2.

Which one of the following compounds will give orange precipitate when treated with 2,4-dinitrophenyl hydrazine ?

Options :





1. (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)
2. (a)-(i), (b)-(iii), (c)-(iv), (d)-(ii)
3. (

## Chemistry Section B

|              |
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| Section Id : |
|--------------|













If the coefficients of  $x^7$  in  $\left(x^2 + \frac{1}{bx}\right)^{11}$  and  $x^{-7}$  in  $\left(x - \frac{1}{bx^2}\right)^{11}$ ,





3. 4

4. 8







4.  $-27$

**Question Type : MCQ Is Question Mandatory :**

















