

# National Testing Agency

|                                                |                              |
|------------------------------------------------|------------------------------|
| <b>Question Paper Name :</b>                   | BTECH E 6th Sep 2020 Shift 2 |
| <b>Subject Name :</b>                          | BTECH E                      |
| <b>Creation Date :</b>                         | 2020-09-06 20:43:29          |
| <b>Duration :</b>                              | 180                          |
| <b>Total Marks :</b>                           | 300                          |
| <b>Display Marks:</b>                          | Yes                          |
| <b>Share Answer Key With Delivery Engine :</b> | Yes                          |
| <b>Actual Answer Key :</b>                     | Yes                          |

## BTECH

|                                      |           |
|--------------------------------------|-----------|
| <b>Group Number :</b>                | 1         |
| <b>Group Id :</b>                    | 405036127 |
| <b>Group Maximum Duration :</b>      | 0         |
| <b>Group Minimum Duration :</b>      | 180       |
| <b>Show Attended Group? :</b>        | No        |
| <b>Edit Attended Group? :</b>        | No        |
| <b>Break time :</b>                  | 0         |
| <b>Group Marks :</b>                 | 300       |
| <b>Is this Group for Examiner? :</b> | No        |

## Mathematics

|                                       |           |
|---------------------------------------|-----------|
| Section Id :                          | 405036423 |
| Section Number :                      | 3         |
| Section type :                        | Online    |
| Mandatory or Optional :               | Mandatory |
| Number of Questions :                 | 25        |
| Number of Questions to be attempted : | 25        |
| Section Marks :                       | 100       |
| Display Number Panel :                | Yes       |
| Group All Questions :                 | Yes       |
| Mark As Answered Required? :          | Yes       |
| Sub-Section Number :                  | 1         |
| Sub-Section Id :                      | 405036813 |
| Question Shuffling Allowed :          | Yes       |

Question Number : 51 Question Id : 40503611581 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option  
Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

For a suitably chosen real constant  $a$ , let a function,  $f : \mathbb{R} - \{-a\} \rightarrow \mathbb{R}$  be defined by

$$f(x) = \frac{a-x}{a+x}. \text{ Further suppose that for any}$$

real number  $x \neq -a$  and  $f(x) \neq -a$ ,

$(f \circ f)(x) = x$ . Then  $f\left(-\frac{1}{2}\right)$  is equal to :

**Options :**

40503641966.  $3$

40503641967.  $-3$

40503641968.  $\frac{1}{3}$

40503641969.  $-\frac{1}{3}$

**Question Number : 51 Question Id : 40503611581 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option  
Orientation : Vertical**

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

एक उपयुक्त वास्तविक अचर  $a$  चुनकर फलन

$f: \mathbb{R} - \{-a\} \rightarrow \mathbb{R}, f(x) = \frac{a-x}{a+x}$  द्वारा परिभाषित

किया गया है। इसके अतिरिक्त माना किसी वास्तविक संख्या  $x \neq -a$  तथा  $f(x) \neq -a$  के लिए  $(f \circ f)(x) = x$

है, तो  $f\left(-\frac{1}{2}\right)$  निम्न में से किसके बराबर है?

**Options :**

40503641966.  $3$

40503641967.  $-3$

40503641968.  $\frac{1}{3}$

40503641969.  $-\frac{1}{3}$

**Question Number : 52 Question Id : 40503611582 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option  
Orientation : Vertical**

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

If  $\alpha$  and  $\beta$  are the roots of the equation

$2x(2x+1)=1$ , then  $\beta$  is equal to :

Options :

40503641970.  $2\alpha(\alpha+1)$

40503641971.  $-2\alpha(\alpha+1)$

40503641972.  $2\alpha^2$

40503641973.  $2\alpha(\alpha-1)$

Question Number : 52 Question Id : 40503611582 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option

Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

यदि  $\alpha$  तथा  $\beta$  समीकरण  $2x(2x+1)=1$  के मूल हैं, तो  $\beta$  बराबर है :

Options :

40503641970.  $2\alpha(\alpha+1)$

40503641971.  $-2\alpha(\alpha+1)$

40503641972.  $2\alpha^2$

40503641973.  $2\alpha(\alpha-1)$

Question Number : 53 Question Id : 40503611583 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option

Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Let  $z = x + iy$  be a non-zero complex number such that  $z^2 = i|z|^2$ , where  $i = \sqrt{-1}$ , then  $z$  lies on the :

Options :

40503641974. imaginary axis

40503641975. real axis

40503641976. line,  $y = x$

40503641977. line,  $y = -x$

**Question Number : 53 Question Id : 40503611583 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**

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

माना कि एक अशून्य सम्मिश्र संख्या  $z = x + iy$  इस प्रकार है कि  $z^2 = i|z|^2$ , जहाँ  $i = \sqrt{-1}$ , तो  $z$  निम्न में से किस पर स्थित है :

**Options :**

40503641974. काल्पनिक अक्ष

40503641975. वास्तविक अक्ष

40503641976. रेखा,  $y = x$

40503641977. रेखा,  $y = -x$

**Question Number : 54 Question Id : 40503611584 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**

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

Let  $\theta = \frac{\pi}{5}$  and  $A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$ . If

$B = A + A^4$ , then  $\det(B)$  :

**Options :**

40503641978. is zero.

40503641979. is one.

40503641980. lies in  $(2, 3)$ .

40503641981. lies in (1, 2).

**Question Number : 54 Question Id : 40503611584 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**

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

माना  $\theta = \frac{\pi}{5}$  तथा  $A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$  हैं। यदि

$B = A + A^4$ , तो  $\det(B)$  :

**Options :**

40503641978. 0 के बराबर है।

40503641979. 1 के बराबर है।

40503641980. अंतराल (2, 3) में है।

40503641981. अंतराल (1, 2) में है।

**Question Number : 55 Question Id : 40503611585 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**

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

If the constant term in the binomial

expansion of  $\left(\sqrt{x} - \frac{k}{x^2}\right)^{10}$  is 405, then  $|k|$

equals :

**Options :**

40503641982. 1

40503641983. 3

40503641984. 2

40503641985. 9

Question Number : 55 Question Id : 40503611585 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option  
Orientation : Vertical  
Correct Marks : 4 Wrong Marks : 1

यदि  $\left(\sqrt{x} - \frac{k}{x^2}\right)^{10}$  के द्विपद प्रसार में अचर पद 405

है, तो  $|k|$  बराबर है :

Options :

40503641982. 1

40503641983. 3

40503641984. 2

40503641985. 9

Question Number : 56 Question Id : 40503611586 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option  
Orientation : Vertical  
Correct Marks : 4 Wrong Marks : 1

The common difference of the A.P.  
 $b_1, b_2, \dots, b_m$  is 2 more than the common  
difference of A.P.  $a_1, a_2, \dots, a_n$ . If  $a_{40} = -159$ ,  
 $a_{100} = -399$  and  $b_{100} = a_{70}$ , then  $b_1$  is equal  
to :

Options :

40503641986. 81

40503641987. -81

40503641988. 127

40503641989. -127

Question Number : 56 Question Id : 40503611586 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option  
Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

समान्तर श्रेणी  $b_1, b_2, \dots, b_m$  का सार्वअन्तर, समान्तर श्रेणी  $a_1, a_2, \dots, a_n$  के सार्वअन्तर से 2 अधिक है। यदि  $a_{40} = -159, a_{100} = -399$  तथा  $b_{100} = a_{70}$ , तो  $b_1$  बराबर है :

Options :

40503641986. 81

40503641987. -81

40503641988. 127

40503641989. -127

Question Number : 57 Question Id : 40503611587 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option  
Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

For all twice differentiable functions

$f: \mathbb{R} \rightarrow \mathbb{R}$ , with  $f(0) = f(1) = f'(0) = 0$ ,

Options :

40503641990.  $f''(x) \neq 0$  at every point  $x \in (0, 1)$

40503641991.  $f''(0) = 0$

40503641992.  $f''(x) = 0$ , for some  $x \in (0, 1)$

40503641993.  $f''(x) = 0$ , at every point  $x \in (0, 1)$

Question Number : 57 Question Id : 40503611587 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option  
Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

प्रत्येक दो बार अवकलनीय फलन  $f: \mathbb{R} \rightarrow \mathbb{R}$  जिसके

लिए  $f(0) = f(1) = f'(0) = 0$  है, तो :

Options :



40503641990. प्रत्येक बिन्दु  $x \in (0, 1)$  पर  $f'(x) \neq 0$

40503641991.  $f''(0) = 0$

40503641992. किसी  $x \in (0, 1)$  के लिए  $f'(x) = 0$

40503641993. प्रत्येक बिन्दु  $x \in (0, 1)$  पर  $f'(x) = 0$

**Question Number : 58 Question Id : 40503611588 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**

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

Let  $f : \mathbb{R} \rightarrow \mathbb{R}$  be a function defined by  $f(x) = \max\{x, x^2\}$ . Let  $S$  denote the set of all points in  $\mathbb{R}$ , where  $f$  is not differentiable.

Then :

**Options :**

40503641994.  $\phi$  (an empty set)

40503641995.  $\{0, 1\}$

40503641996.  $\{0\}$

40503641997.  $\{1\}$

**Question Number : 58 Question Id : 40503611588 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**

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

माना  $f : \mathbb{R} \rightarrow \mathbb{R}$ ,  $f(x) = \max\{x, x^2\}$  द्वारा परिभाषित एक फलन है। माना  $S$ ,  $\mathbb{R}$  के उन सभी बिन्दुओं जहाँ  $f$  अवकलनीय नहीं है, का समुच्चय है। तो :

**Options :**

40503641994.  $\phi$  (एक रिक्त समुच्चय)

40503641995.  $\{0, 1\}$

40503641996. {0}

40503641997. {1}

**Question Number : 59 Question Id : 40503611589 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**

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

If the tangent to the curve,  $y=f(x)=x\log_e x$ , ( $x>0$ ) at a point  $(c, f(c))$  is parallel to the line - segment joining the points  $(1, 0)$  and  $(e, e)$ , then  $c$  is equal to :

**Options :**

40503641998.  $e^{\left(\frac{1}{e-1}\right)}$

40503641999.  $e^{\left(\frac{1}{1-e}\right)}$

40503642000.  $\frac{e-1}{e}$

40503642001.  $\frac{1}{e-1}$

**Question Number : 59 Question Id : 40503611589 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**

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

यदि वक्र  $y=f(x)=x\log_e x$ , ( $x>0$ ) के एक बिन्दु  $(c, f(c))$  पर स्पर्शरेखा बिन्दुओं  $(1, 0)$  तथा  $(e, e)$  को मिलाने वाले रेखाखण्ड के समान्तर है, तो  $c$  बराबर है :

**Options :**

40503641998.  $e^{\left(\frac{1}{e-1}\right)}$

40503641999.  $e^{\left(\frac{1}{1-e}\right)}$

40503642000.  $\frac{e-1}{e}$

40503642001.  $\frac{1}{e-1}$

**Question Number : 60 Question Id : 40503611590 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**

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

The set of all real values of  $\lambda$  for which the function  $f(x) = (1 - \cos^2 x) \cdot (\lambda + \sin x)$ ,  $x \in \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ , has exactly one maxima and exactly one minima, is :

**Options :**

40503642002.  $\left(-\frac{1}{2}, \frac{1}{2}\right) - \{0\}$

40503642003.  $\left(-\frac{1}{2}, \frac{1}{2}\right)$

40503642004.  $\left(-\frac{3}{2}, \frac{3}{2}\right) - \{0\}$

40503642005.  $\left(-\frac{3}{2}, \frac{3}{2}\right)$

**Question Number : 60 Question Id : 40503611590 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**

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

$\lambda$  के सभी वास्तविक मानों, जिनके लिए फलन

$$f(x) = (1 - \cos^2 x) \cdot (\lambda + \sin x), x \in \left(-\frac{\pi}{2}, \frac{\pi}{2}\right) \text{ का}$$

केवल एक उच्चिष्ठ (maxima) तथा केवल एक निम्निष्ठ (minima) है, का समुच्चय है :

**Options :**

40503642002.  $\left(-\frac{1}{2}, \frac{1}{2}\right) - \{0\}$

40503642003.  $\left(-\frac{1}{2}, \frac{1}{2}\right)$

40503642004.  $\left(-\frac{3}{2}, \frac{3}{2}\right) - \{0\}$

40503642005.  $\left(-\frac{3}{2}, \frac{3}{2}\right)$

**Question Number : 61 Question Id : 40503611591 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option  
Orientation : Vertical**

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

The integral  $\int_1^2 e^x \cdot x^x (2 + \log_e x) dx$

equals :

**Options :**

40503642006.  $4e^2 - 1$

40503642007.  $e(2e - 1)$

40503642008.  $e(4e - 1)$

40503642009.  $e(4e + 1)$

**Question Number : 61 Question Id : 40503611591 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option  
Orientation : Vertical**

Correct Marks : 4 Wrong Marks : 1

समाकल  $\int_1^2 e^x \cdot x^x (2 + \log_e x) dx$  बराबर है :

Options :

40503642006.  $4e^2 - 1$

40503642007.  $e(2e - 1)$

40503642008.  $e(4e - 1)$

40503642009.  $e(4e + 1)$

Question Number : 62 Question Id : 40503611592 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option  
Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The area (in sq. units) of the region enclosed  
by the curves  $y = x^2 - 1$  and  $y = 1 - x^2$  is  
equal to :

Options :

40503642010.  $\frac{16}{3}$

40503642011.  $\frac{7}{2}$

40503642012.  $\frac{8}{3}$

40503642013.  $\frac{4}{3}$

Question Number : 62 Question Id : 40503611592 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option  
Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

वक्रों  $y = x^2 - 1$  तथा  $y = 1 - x^2$  द्वारा घिरे क्षेत्र का  
क्षेत्रफल (वर्ग इकाइयों में) है :

**Options :**

40503642010.  $\frac{16}{3}$

40503642011.  $\frac{7}{2}$

40503642012.  $\frac{8}{3}$

40503642013.  $\frac{4}{3}$

**Question Number : 63 Question Id : 40503611593 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option  
Orientation : Vertical**

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

If  $y = \left( \frac{2}{\pi}x - 1 \right) \operatorname{cosec} x$  is the solution of the differential equation,

$\frac{dy}{dx} + p(x)y = \frac{2}{\pi} \operatorname{cosec} x$ ,  $0 < x < \frac{\pi}{2}$ , then the function  $p(x)$  is equal to :

**Options :**

40503642014.  $\sec x$

40503642015.  $\operatorname{cosec} x$

40503642016.  $\tan x$

40503642017.  $\cot x$

**Question Number : 63 Question Id : 40503611593 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option  
Orientation : Vertical**

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

यदि अवकल समीकरण

$$\frac{dy}{dx} + p(x)y = \frac{2}{\pi} \operatorname{cosec} x, \quad 0 < x < \frac{\pi}{2}, \quad \text{का हल}$$

$$y = \left( \frac{2}{\pi} x - 1 \right) \operatorname{cosec} x \text{ है, तो फलन } p(x) \text{ बराबर है}$$

**Options :**

40503642014.  $\sec x$

40503642015.  $\operatorname{cosec} x$

40503642016.  $\tan x$

40503642017.  $\cot x$

**Question Number : 64 Question Id : 40503611594 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option  
Orientation : Vertical**

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

Let L denote the line in the  $xy$ -plane with  $x$  and  $y$  intercepts as 3 and 1 respectively. Then the image of the point  $(-1, -4)$  in this line is :

**Options :**

40503642018.  $\left( \frac{8}{5}, \frac{29}{5} \right)$

40503642019.  $\left( \frac{29}{5}, \frac{8}{5} \right)$

40503642020.  $\left( \frac{29}{5}, \frac{11}{5} \right)$

40503642021.  $\left( \frac{11}{5}, \frac{28}{5} \right)$

Question Number : 64 Question Id : 40503611594 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option  
Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

माना  $xy$ -समतल में  $L$  उस रेखा को प्रदर्शित करता है  
जिसके  $x$  तथा  $y$  अन्तःखण्ड क्रमशः 3 तथा 1 हैं। तो  
इस रेखा में बिन्दु  $(-1, -4)$  का प्रतिबिम्ब है :

Options :

40503642018.  $\left(\frac{8}{5}, \frac{29}{5}\right)$

40503642019.  $\left(\frac{29}{5}, \frac{8}{5}\right)$

40503642020.  $\left(\frac{29}{5}, \frac{11}{5}\right)$

40503642021.  $\left(\frac{11}{5}, \frac{28}{5}\right)$

Question Number : 65 Question Id : 40503611595 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option  
Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The centre of the circle passing through  
the point  $(0, 1)$  and touching the parabola  
 $y = x^2$  at the point  $(2, 4)$  is :

Options :

40503642022.  $\left(\frac{-53}{10}, \frac{16}{5}\right)$

40503642023.  $\left(\frac{3}{10}, \frac{16}{5}\right)$

40503642024.  $\left(\frac{-16}{5}, \frac{53}{10}\right)$



40503642025.  $\left(\frac{6}{5}, \frac{53}{10}\right)$

**Question Number : 65 Question Id : 40503611595 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**

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

बिन्दु  $(0, 1)$  से होकर जाने वाले तथा परवलय  $y = x^2$  को बिन्दु  $(2, 4)$  पर स्पर्श करने वाले वृत्त का केन्द्र है :

**Options :**

40503642022.  $\left(\frac{-53}{10}, \frac{16}{5}\right)$

40503642023.  $\left(\frac{3}{10}, \frac{16}{5}\right)$

40503642024.  $\left(\frac{-16}{5}, \frac{53}{10}\right)$

40503642025.  $\left(\frac{6}{5}, \frac{53}{10}\right)$

**Question Number : 66 Question Id : 40503611596 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**

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

If the normal at an end of a latus rectum of an ellipse passes through an extremity of the minor axis, then the eccentricity  $e$  of the ellipse satisfies :

**Options :**

40503642026.  $e^2 + e - 1 = 0$

40503642027.  $e^2 + 2e - 1 = 0$

40503642028.  $e^4 + 2e^2 - 1 = 0$

40503642029.  $e^4 + e^2 - 1 = 0$

**Question Number : 66 Question Id : 40503611596 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**

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

यदि एक दीर्घवृत्त की नाभिलम्ब जीवा के एक किनारे पर अभिलम्ब लघु अक्ष के एक शीर्ष से होकर जाता है, तो दीर्घवृत्त की उत्केन्द्रता  $e$  सन्तुष्ट करती है :

**Options :**

40503642026.  $e^2 + e - 1 = 0$

40503642027.  $e^2 + 2e - 1 = 0$

40503642028.  $e^4 + 2e^2 - 1 = 0$

40503642029.  $e^4 + e^2 - 1 = 0$

**Question Number : 67 Question Id : 40503611597 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**

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

A plane P meets the coordinate axes at A, B and C respectively. The centroid of  $\Delta ABC$  is given to be  $(1, 1, 2)$ . Then the equation of the line through this centroid and perpendicular to the plane P is :

**Options :**

40503642030.  $\frac{x-1}{1} = \frac{y-1}{1} = \frac{z-2}{2}$

40503642031.  $\frac{x-1}{2} = \frac{y-1}{1} = \frac{z-2}{1}$

40503642032.  $\frac{x-1}{1} = \frac{y-1}{2} = \frac{z-2}{2}$

40503642033.  $\frac{x-1}{2} = \frac{y-1}{2} = \frac{z-2}{1}$

**Question Number : 67 Question Id : 40503611597 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**

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

एक समतल P निदेशांक अक्षों को क्रमशः A, B तथा C पर मिलता है। यदि त्रिभुज ABC का केन्द्रक (1, 1, 2) है, तो इस केन्द्रक से जाने वाली तथा समतल P के लम्बवत रेखा का समीकरण है :

**Options :**

40503642030.  $\frac{x-1}{1} = \frac{y-1}{1} = \frac{z-2}{2}$

40503642031.  $\frac{x-1}{2} = \frac{y-1}{1} = \frac{z-2}{1}$

40503642032.  $\frac{x-1}{1} = \frac{y-1}{2} = \frac{z-2}{2}$

40503642033.  $\frac{x-1}{2} = \frac{y-1}{2} = \frac{z-2}{1}$

**Question Number : 68 Question Id : 40503611598 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**

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

The probabilities of three events A, B and C are given by  $P(A) = 0.6$ ,  $P(B) = 0.4$  and  $P(C) = 0.5$ . If  $P(A \cup B) = 0.8$ ,  $P(A \cap C) = 0.3$ ,  $P(A \cap B \cap C) = 0.2$ ,  $P(B \cap C) = \beta$  and  $P(A \cup B \cup C) = \alpha$ , where  $0.85 \leq \alpha \leq 0.95$ , then  $\beta$  lies in the interval :

**Options :**

40503642034. [0.35, 0.36]

40503642035. [0.36, 0.40]

40503642036. [0.25, 0.35]

40503642037. [0.20, 0.25]

**Question Number : 68 Question Id : 40503611598 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option  
Orientation : Vertical**

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

तीन घटनाओं A, B तथा C की प्रायिकताएं  $P(A) = 0.6$ ,  
 $P(B) = 0.4$  तथा  $P(C) = 0.5$  द्वारा दी गई हैं।  
यदि  $P(A \cup B) = 0.8$ ,  $P(A \cap C) = 0.3$ ,  
 $P(A \cap B \cap C) = 0.2$ ,  $P(B \cap C) = \beta$  तथा  
 $P(A \cup B \cup C) = \alpha$ , जहाँ  $0.85 \leq \alpha \leq 0.95$ , तो  $\beta$   
निम्न में से किस अंतराल में है?

**Options :**

40503642034. [0.35, 0.36]

40503642035. [0.36, 0.40]

40503642036. [0.25, 0.35]

40503642037. [0.20, 0.25]

**Question Number : 69 Question Id : 40503611599 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option  
Orientation : Vertical**

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

The angle of elevation of the summit of a mountain from a point on the ground is  $45^\circ$ . After climbing up one km towards the summit at an inclination of  $30^\circ$  from the ground, the angle of elevation of the summit is found to be  $60^\circ$ . Then the height (in km) of the summit from the ground is :

Options :

40503642038.  $\frac{\sqrt{3}+1}{\sqrt{3}-1}$

40503642039.  $\frac{1}{\sqrt{3}-1}$

40503642040.  $\frac{\sqrt{3}-1}{\sqrt{3}+1}$

40503642041.  $\frac{1}{\sqrt{3}+1}$

Question Number : 69 Question Id : 40503611599 Question Type : MCQ Option Shuffling : Yes  
Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option  
Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

भूमि पर एक बिन्दु से एक पर्वत के शिखर का उन्नयन कोण  $45^\circ$  है। भूमि से  $30^\circ$  के झुकाव पर शिखर की तरफ एक km चढ़ने पर, शिखर का उन्नयन कोण  $60^\circ$  पाया गया। तो शिखर की भूमि से ऊँचाई (km में) है :

Options :

40503642038.  $\frac{\sqrt{3}+1}{\sqrt{3}-1}$

40503642039.  $\frac{1}{\sqrt{3}-1}$

40503642040.  $\frac{\sqrt{3}-1}{\sqrt{3}+1}$

40503642041.  $\frac{1}{\sqrt{3}+1}$

**Question Number : 70 Question Id : 40503611600 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**

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

Consider the statement : “For an integer  $n$ , if  $n^3 - 1$  is even, then  $n$  is odd.” The contrapositive statement of this statement is :

**Options :**

40503642042. For an integer  $n$ , if  $n$  is even, then  $n^3 - 1$  is odd.

40503642043. For an integer  $n$ , if  $n^3 - 1$  is not even, then  $n$  is not odd.

40503642044. For an integer  $n$ , if  $n$  is odd, then  $n^3 - 1$  is even.

40503642045. For an integer  $n$ , if  $n$  is even, then  $n^3 - 1$  is even.

**Question Number : 70 Question Id : 40503611600 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**

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

कथन पर विचार कीजिए : “एक पूर्णांक  $n$  के लिए, यदि  $n^3 - 1$  सम है तो  $n$  विषम है।” इस कथन का प्रतिधनात्मक (contrapositive) कथन है :

**Options :**

40503642042. एक पूर्णांक  $n$  के लिए, यदि  $n$  सम है, तो  $n^3 - 1$  विषम है।



40503642043. एक पूर्णांक  $n$  के लिए, यदि  $n^3 - 1$  सम नहीं है, तो  $n$  विषम नहीं है।

40503642044. एक पूर्णांक  $n$  के लिए, यदि  $n$  विषम है, तो  $n^3 - 1$  सम है।

40503642045. एक पूर्णांक  $n$  के लिए, यदि  $n$  सम है, तो  $n^3 - 1$  सम है।

Sub-Section Number :

2

Sub-Section Id :

405036814

Question Shuffling Allowed :

Yes

Question Number : 71 Question Id : 40503611601 Question Type : SA Display Question Number : Yes  
Correct Marks : 4 Wrong Marks : 0

The sum of distinct values of  $\lambda$  for which the system of equations

$$(\lambda - 1)x + (3\lambda + 1)y + 2\lambda z = 0$$

$$(\lambda - 1)x + (4\lambda - 2)y + (\lambda + 3)z = 0$$

$$2x + (3\lambda + 1)y + 3(\lambda - 1)z = 0,$$

has non-zero solutions, is \_\_\_\_\_.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.002

Question Number : 71 Question Id : 40503611601 Question Type : SA Display Question Number : Yes  
Correct Marks : 4 Wrong Marks : 0

$\lambda$  के उन भिन्न मानों का योग, जिनके लिए समीकरण निकाय

$$(\lambda - 1)x + (3\lambda + 1)y + 2\lambda z = 0$$

$$(\lambda - 1)x + (4\lambda - 2)y + (\lambda + 3)z = 0$$

$$2x + (3\lambda + 1)y + 3(\lambda - 1)z = 0,$$

के शून्येतर (non-zero) हल हैं, है \_\_\_\_\_।

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.002

**Question Number : 72 Question Id : 40503611602 Question Type : SA Display Question Number : Yes**

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

The number of words (with or without meaning) that can be formed from all the letters of the word "LETTER" in which vowels never come together is \_\_\_\_\_.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.002

**Question Number : 72 Question Id : 40503611602 Question Type : SA Display Question Number : Yes**

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

"LETTER" शब्द के सभी अक्षरों से बन सकने वाले ऐसे शब्दों (अर्थ वाले अथवा अर्थहीन), जिनमें स्वर कभी भी एक साथ नहीं आते, की संख्या है \_\_\_\_\_।

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.002

**Question Number : 73 Question Id : 40503611603 Question Type : SA Display Question Number : Yes**

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



Suppose that a function  $f: \mathbb{R} \rightarrow \mathbb{R}$  satisfies  $f(x+y) = f(x)f(y)$  for all  $x, y \in \mathbb{R}$  and  $f(1) = 3$ .

If  $\sum_{i=1}^n f(i) = 363$ , then  $n$  is equal to

\_\_\_\_\_.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.002

**Question Number :** 73 **Question Id :** 40503611603 **Question Type :** SA Display **Question Number :** Yes

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

माना कि एक फलन  $f: \mathbb{R} \rightarrow \mathbb{R}$ , सभी  $x, y \in \mathbb{R}$  के लिए  $f(x+y) = f(x)f(y)$  को संतुष्ट करता है तथा

$f(1) = 3$  है। यदि  $\sum_{i=1}^n f(i) = 363$  है, तो  $n$  बराबर है

\_\_\_\_\_।

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.002

**Question Number :** 74 **Question Id :** 40503611604 **Question Type :** SA Display **Question Number :** Yes

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

If  $\vec{x}$  and  $\vec{y}$  be two non-zero vectors such

that  $\left| \vec{x} + \vec{y} \right| = \left| \vec{x} \right|$  and  $2\vec{x} + \lambda\vec{y}$  is

perpendicular to  $\vec{y}$ , then the value of  $\lambda$  is

\_\_\_\_\_.

**Response Type :** Numeric

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.002

**Question Number : 74 Question Id : 40503611604 Question Type : SA Display Question Number : Yes**

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

यदि  $\vec{x}$  तथा  $\vec{y}$  दो शून्येत्तर सदिश इस प्रकार हैं कि

$|\vec{x} + \vec{y}| = |\vec{x}|$  और  $2\vec{x} + \lambda\vec{y}$ , सदिश  $\vec{y}$  के लम्बवत है, तो  $\lambda$  का मान है \_\_\_\_\_ ।

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.002

**Question Number : 75 Question Id : 40503611605 Question Type : SA Display Question Number : Yes**

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

Consider the data on  $x$  taking the values  
0, 2, 4, 8, ...,  $2^n$  with frequencies  
 ${}^nC_0, {}^nC_1, {}^nC_2, \dots, {}^nC_n$  respectively. If the

mean of this data is  $\frac{728}{2^n}$ , then  $n$  is equal  
to \_\_\_\_\_.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.002

**Question Number : 75 Question Id : 40503611605 Question Type : SA Display Question Number : Yes**

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

आंकड़े जिनमें  $x$  के मानों  $0, 2, 4, 8, \dots, 2^n$  की बारंबारता क्रमशः  ${}^nC_0, {}^nC_1, {}^nC_2, \dots, {}^nC_n$  है, पर विचार कीजिए। यदि इन आंकड़ों का माध्य  $\frac{728}{2^n}$  है, तो  $n$  बराबर है \_\_\_\_\_।

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.002