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|------------------------------|----------------------------------|
| <b>Question Paper Name :</b> | B TECH ETE 24th Feb 2021 Shift 1 |
| <b>Subject Name :</b>        | B TECH ETE                       |
| <b>Creation Date :</b>       | 2021-02-23 19:56:50              |
| <b>Duration :</b>            | 180                              |
| <b>Number of Questions :</b> | 90                               |
| <b>Total Marks :</b>         | 300                              |
| <b>Display Marks:</b>        | Yes                              |

## B TECH ETE

|                                      |           |
|--------------------------------------|-----------|
| <b>Group Number :</b>                | 1         |
| <b>Group Id :</b>                    | 708191173 |
| <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        |

## Physics Section A

|                         |           |
|-------------------------|-----------|
| <b>Section Id :</b>     | 708191616 |
| <b>Section Number :</b> | 1         |
| <b>Section type :</b>   | Online    |

|  |           |
|--|-----------|
| <b>Mandatory or Optional :</b>               | Mandatory |
| <b>Number of Questions :</b>                 | 20        |
| <b>Number of Questions to be attempted :</b> | 20        |
| <b>Section Marks :</b>                       | 80        |
| <b>Mark As Answered Required? :</b>          | Yes       |
| <b>Sub-Section Number :</b>                  | 1         |
| <b>Sub-Section Id :</b>                      | 708191896 |
| <b>Question Shuffling Allowed :</b>          | Yes       |

**Question Number : 1 Question Id : 70819116144 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

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

The workdone by a gas molecule in an isolated system is given by,  $W = \alpha\beta^2 e^{-\frac{x^2}{\alpha kT}}$ , where  $x$  is the displacement,  $k$  is the Boltzmann constant and  $T$  is the temperature.  $\alpha$  and  $\beta$  are constants. Then the dimensions of  $\beta$  will be :

**Options :**

70819153581.  $[M^2 L T^2]$

70819153582.  $[M^0 L T^0]$

70819153583.  $[M L T^{-2}]$

70819153584.  $[M L^2 T^{-2}]$

**Question Number : 1 Question Id : 70819116144 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

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

ఒక వియక్త వ్యవస్థలోని వాయు అణువు చేసిన పని  $W = \alpha\beta^2 e^{-\frac{x^2}{\alpha kT}}$ ,  $x$  స్థానభ్రంశము,  $k$  బోల్ట్జ్మన్ స్థిరాంకము,  $T$  ఉష్ణోగ్రత.  $\alpha$  మరియు  $\beta$  స్థిరాంకములు. అయితే  $\beta$  మితిఛార్కులా :

**Options :**

70819153581.  $[M^2 L T^2]$

70819153582.  $[M^0 L T^0]$

70819153583.  $[M L T^{-2}]$

70819153584.  $[M L^2 T^{-2}]$

**Question Number : 2 Question Id : 70819116145 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

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

Two stars of masses  $m$  and  $2m$  at a distance  $d$  rotate about their common centre of mass in free space. The period of revolution is :

**Options :**

70819153585.  $\frac{1}{2\pi} \sqrt{\frac{3Gm}{d^3}}$

70819153586.  $2\pi \sqrt{\frac{d^3}{3Gm}}$

70819153587.  $2\pi \sqrt{\frac{3Gm}{d^3}}$

70819153588.  $\frac{1}{2\pi} \sqrt{\frac{d^3}{3Gm}}$

**Question Number : 2 Question Id : 70819116145 Question Type : MCQ Op**

**Question Mandatory : No**

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

m మరియు 2m ద్రవ్యరాశులు గల రెండు నక్షత్రములు d దూరములో ఉండి శూన్యములో వాటి ద్రవ్యరాశి కేంద్రము చుట్టూ భ్రమించుచున్నవి. ఆవర్తనకాలము :

**Options :**

70819153585.  $\frac{1}{2\pi} \sqrt{\frac{3Gm}{d^3}}$

70819153586.  $2\pi \sqrt{\frac{d^3}{3Gm}}$

70819153587.  $2\pi \sqrt{\frac{3Gm}{d^3}}$

70819153588.  $\frac{1}{2\pi} \sqrt{\frac{d^3}{3Gm}}$

**Question Number : 3 Question Id : 70819116146 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

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

Four identical particles of equal masses 1 kg made to move along the circumference of a circle of radius 1 m under the action of their own mutual gravitational attraction. The speed of each particle will be :

**Options :**

70819153589.  $\frac{\sqrt{(1+2\sqrt{2})G}}{2}$

70819153590.  $\sqrt{\frac{G}{2}(1+2\sqrt{2})}$

70819153591.  $\sqrt{G(1+2\sqrt{2})}$

70819153592.  $\sqrt{\frac{G}{2}(2\sqrt{2}-1)}$

**Question Number : 3 Question Id : 70819116146 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

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

నాలుగు సమాన ద్రవ్యరాశులు 1 kg గల సర్పసమాన కణములు, 1 m వ్యాసార్థముగల వృత్తపు పరిధిపై, వాటి మధ్యనగల పరస్పర గురుత్వాకర్షణ శక్తి ప్రభావంలో తిరిగేటట్లు చేయబడినవి. ప్రతికణము యొక్క వడి :

**Options :**

70819153589.  $\frac{\sqrt{(1+2\sqrt{2})G}}{2}$

70819153590.  $\sqrt{\frac{G}{2}(1+2\sqrt{2})}$

70819153591.  $\sqrt{G(1+2\sqrt{2})}$

70819153592.  $\sqrt{\frac{G}{2}(2\sqrt{2}-1)}$

**Question Number : 4 Question Id : 70819116147 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

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

Moment of inertia (M.I.) of four bodies, having same mass and radius, are reported as ;

$I_1$  = M.I. of thin circular ring about its diameter,

$I_2$  = M.I. of circular disc about an axis perpendicular to disc and going through the centre,

$I_3$  = M.I. of solid cylinder about its axis and

$I_4$  = M.I. of solid sphere about its diameter.

Then :

**Options :**

70819153593.  $I_1 + I_2 = I_3 + \frac{5}{2} I_4$

70819153594.  $I_1 + I_3 < I_2 + I_4$

70819153595.  $I_1 = I_2 = I_3 < I_4$

70819153596.  $I_1 = I_2 = I_3 > I_4$

**Question Number : 4 Question Id : 70819116147 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

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

ఒకే ద్రవ్యరాశి మరియు వ్యాసార్థములు గల నాలుగు వస్తువుల జడత్వ భ్రామకములు (M.I.) ఇలా ఇవ్వబడినవి;

$I_1$  = ఒక సన్నని వృత్తాకారపు ఉంగరము యొక్క M.I. దాని వ్యాసము చుట్టూ,

$I_2$  = ఒక గుండ్రని బిళ్ళ యొక్క M.I., దాని కేంద్రం గుండా పోతూన్న అక్షమునకు లంబంగా,

$I_3$  = ఒక ఘనపు స్థూపము యొక్క అక్షము గుండా పోవు M.I.

$I_4$  = ఒక ఘనపు గోళము యొక్క వ్యాసము గుండా పోవు M.I.

అయితే :

**Options :**

70819153593.  $I_1 + I_2 = I_3 + \frac{5}{2} I_4$

70819153594.  $I_1 + I_3 < I_2 + I_4$

70819153595.  $I_1 = I_2 = I_3 < I_4$

70819153596.  $I_1 = I_2 = I_3 > I_4$

**Question Number : 5 Question Id : 70819116148 Question Type : MCQ Op**

**Question Mandatory : No**

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

Consider two satellites  $S_1$  and  $S_2$  with periods of revolution 1 hr. and 8 hr. respectively revolving around a planet in circular orbits. The ratio of angular velocity of satellite  $S_1$  to the angular velocity of satellite  $S_2$  is :

**Options :**

70819153597. 8 : 1

70819153598. 1 : 8

70819153599. 2 : 1

70819153600. 1 : 4

**Question Number : 5 Question Id : 70819116148 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

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

1 hr. మరియు 8 hr. భ్రమణావర్తన కాలములు గల రెండు ఉపగ్రహాలు  $S_1$  మరియు  $S_2$  ఒక వృత్తాకార కక్ష్యలో ఒక గ్రహము చుట్టూ తిరుగుచున్నవి. అయితే  $S_1$  మరియు  $S_2$  ల కోణీయ వేగాల నిష్పత్తి :

**Options :**

70819153597. 8 : 1

70819153598. 1 : 8

70819153599. 2 : 1

70819153600. 1 : 4

**Question Number : 6 Question Id : 70819116149 Question Type : MCQ Op**

**Question Mandatory : No**

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

Each side of a box made of metal sheet in cubic shape is 'a' at room temperature 'T', the coefficient of linear expansion of the metal sheet is ' $\alpha$ '. The metal sheet is heated uniformly, by a small temperature  $\Delta T$ , so that its new temperature is  $T + \Delta T$ . Calculate the increase in the volume of the metal box.

**Options :**

70819153601.  $4\pi a^3 \alpha \Delta T$

70819153602.  $4a^3 \alpha \Delta T$

70819153603.  $\frac{4}{3} \pi a^3 \alpha \Delta T$

70819153604.  $3a^3 \alpha \Delta T$

**Question Number : 6 Question Id : 70819116149 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

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

ఒక లోహపు రేకుతో చేసిన ఘనాకారపు పెట్టె యొక్క గది ఉష్ణోగ్రత 'T' దగ్గరి ఒక్కొక్క భుజము 'a'. ఆ లోహపు రేఖీయ వ్యాకోచ గుణకము ' $\alpha$ '. ఆ లోహపు రేకును ఏకరీతిగా  $\Delta T$  ఉష్ణోగ్రతా భేదమునకు పెంచి కొత్త ఉష్ణోగ్రత  $T + \Delta T$  కు తీసుకెళ్ళడమైనది. అయితే ఆ లోహపు రేకు ఘనపరిమాణములోని పెరుగుదల.

**Options :**

70819153601.  $4\pi a^3 \alpha \Delta T$

70819153602.  $4a^3 \alpha \Delta T$

70819153603.  $\frac{4}{3} \pi a^3 \alpha \Delta T$

70819153604.  $3a^3 \alpha \Delta T$



Question Number : 7 Question Id : 70819116150 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If  $Y$ ,  $K$  and  $\eta$  are the values of Young's modulus, bulk modulus and modulus of rigidity of any material respectively. Choose the correct relation for these parameters.

Options :

70819153605.  $Y = \frac{9K\eta}{2\eta + 3K} \text{ N/m}^2$

70819153606.  $Y = \frac{9K\eta}{3K - \eta} \text{ N/m}^2$

70819153607.  $K = \frac{Y\eta}{9\eta - 3Y} \text{ N/m}^2$

70819153608.  $\eta = \frac{3YK}{9K + Y} \text{ N/m}^2$

Question Number : 7 Question Id : 70819116150 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ఒకవేళ  $Y$ ,  $K$  మరియు  $\eta$  విలువలు ఒక పదార్థము యొక్క యంగ్ గుణకము, బల్క్ గుణకము మరియు రిజిడిటీ గుణకములుగా వరుసగా తెలియజేసినచో, వాటి మధ్యగల సరియైన సంబంధము ఎన్నుకొనుము.

Options :

70819153605.  $Y = \frac{9K\eta}{2\eta + 3K} \text{ N/m}^2$

70819153606.  $Y = \frac{9K\eta}{3K - \eta} \text{ N/m}^2$

70819153607.  $K = \frac{Y\eta}{9\eta - 3Y} \text{ N/m}^2$

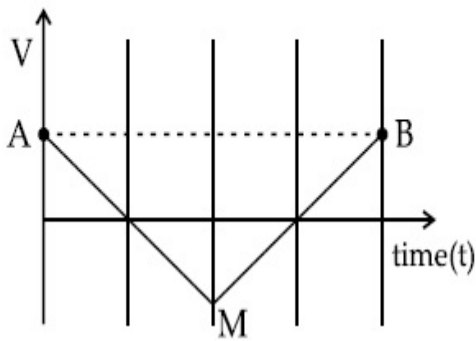
70819153608.  $\eta = \frac{3YK}{9K+Y} \text{ N/m}^2$

**Question Number : 8 Question Id : 70819116151 Question Type : MCQ Option Shuffling : Yes Is**

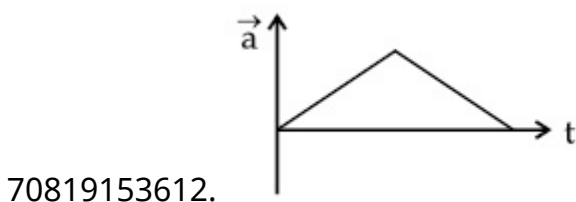
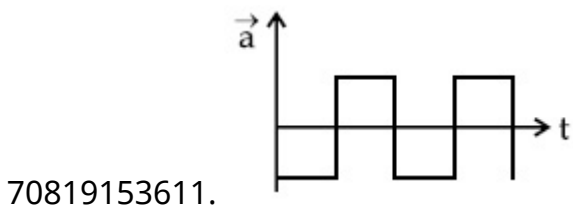
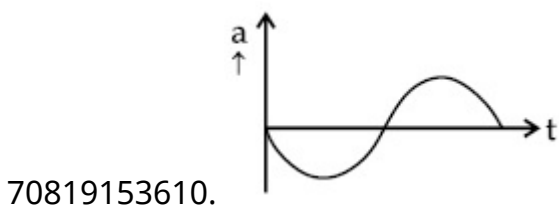
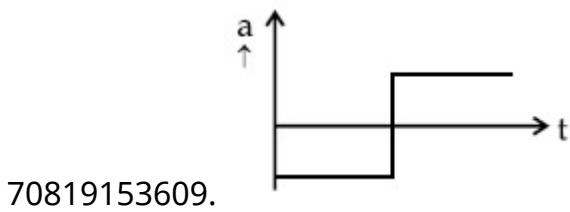
**Question Mandatory : No**

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

If the velocity-time graph has the shape AMB, what would be the shape of the corresponding acceleration-time graph ?



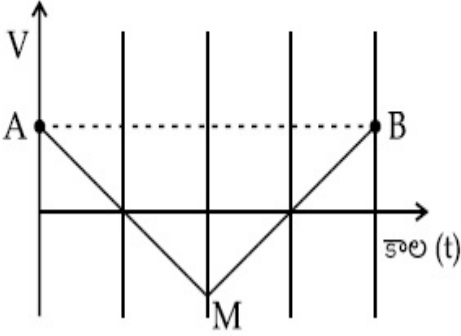
**Options :**



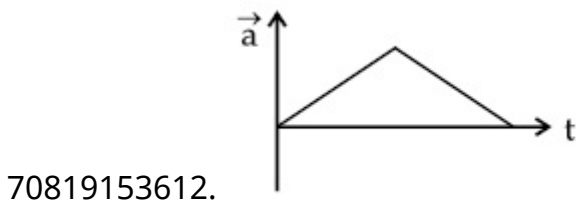
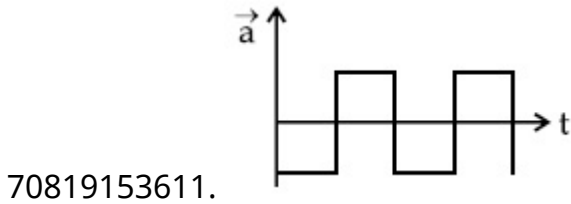
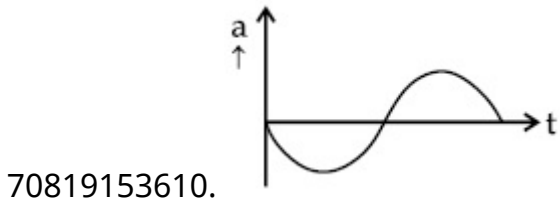
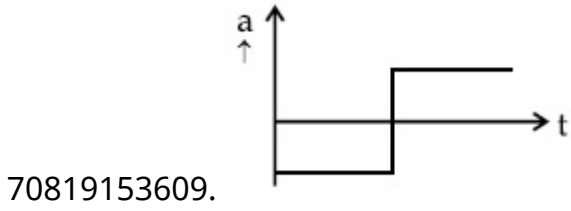
Question Number : 8 Question Id : 70819116151 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ఒకవేళ వేగ - కాల రేఖాచిత్రము AMB లాగ ఉంటే దానికి సంబంధించిన త్వరణ-కాల గ్రాఫు ఎలా ఉంటుంది ?



Options :



Question Number : 9 Question Id : 70819116152 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

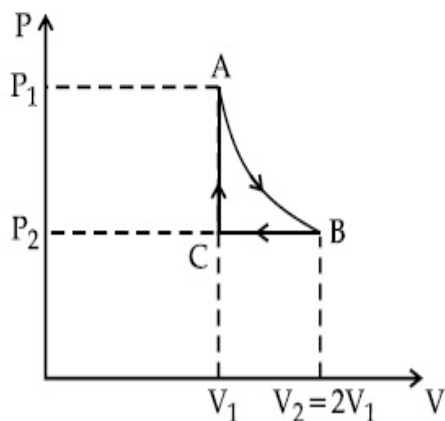
$n$  mole of a perfect gas undergoes a cyclic process ABCA (see figure) consisting of the following processes.

A  $\rightarrow$  B : Isothermal expansion at temperature  $T$  so that the volume is doubled from  $V_1$  to  $V_2 = 2V_1$  and pressure changes from  $P_1$  to  $P_2$ .

B  $\rightarrow$  C : Isobaric compression at pressure  $P_2$  to initial volume  $V_1$ .

C  $\rightarrow$  A : Isochoric change leading to change of pressure from  $P_2$  to  $P_1$ .

Total workdone in the complete cycle ABCA is :



Options :

70819153613. 0

70819153614.  $nRT \ln 2$

70819153615.  $nRT \left( \ln 2 + \frac{1}{2} \right)$

70819153616.  $nRT \left( \ln 2 - \frac{1}{2} \right)$

Question Number : 9 Question Id : 70819116152 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

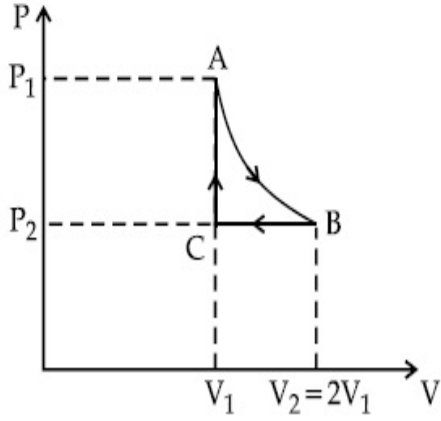
n మోలుల ఆదర్శవాయువు పటములో చూపిన విధంగా ఒక చక్రీయ ప్రక్రియ ABCA కు లోనైనది. దీనిలో ఈ క్రింది ప్రక్రియలు గలవు.

A → B : T ఉష్ణోగ్రత వద్ద పీడనము  $P_1$  నుండి  $P_2$  కు మారి ఘనపరిమాణము రెండింతలు  $V_1$  to  $V_2=2V_1$  అగు సమోష్ణోగ్రతా వ్యాకోచము.

B → C :  $P_2$  పీడనము వద్ద తొలి ఘనపరిమాణము  $V_1$  నకు సంపీడనము చెందించిన సమపీడన క్రియ.

C → A :  $P_2$  నుండి తొలిపీడనము  $P_1$  నకు సమఘన పరిమాణక్రియ.

అయితే ఈ పూర్తి చక్రీయ ప్రక్రియలో జరిగిన పని :



**Options :**

70819153613. 0

70819153614.  $nRT \ln 2$

70819153615.  $nRT \left( \ln 2 + \frac{1}{2} \right)$

70819153616.  $nRT \left( \ln 2 - \frac{1}{2} \right)$

**Question Number : 10 Question Id : 70819116153 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

Match List I with List II.

| List I         | List II                       |
|----------------|-------------------------------|
| (a) Isothermal | (i) Pressure constant         |
| (b) Isochoric  | (ii) Temperature constant     |
| (c) Adiabatic  | (iii) Volume constant         |
| (d) Isobaric   | (iv) Heat content is constant |

Choose the correct answer from the options given below :

**Options :**

70819153617. (a) → (i), (b) → (iii), (c) → (ii), (d) → (iv)

70819153618. (a) → (iii), (b) → (ii), (c) → (i), (d) → (iv)

70819153619. (a) → (ii), (b) → (iv), (c) → (iii), (d) → (i)

70819153620. (a) → (ii), (b) → (iii), (c) → (iv), (d) → (i)

**Question Number : 10 Question Id : 70819116153 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

List-I మరియు List-II లను జతపరుచుము.

| List-I          | List-II                   |
|-----------------|---------------------------|
| (a) సమోష్ణోగ్రత | (i) పీడనము స్థిరము        |
| (b) సమఘనపరిమాణ  | (ii) ఉష్ణోగ్రత స్థిరము    |
| (c) సమోష్ణక     | (iii) ఘనపరిమాణము స్థిరము  |
| (d) సమపీడన      | (iv) ఉష్ణపరిమాణము స్థిరము |

అయితే కింది వానిలో ఏది సరియైనది:

**Options :**

70819153617. (a) → (i), (b) → (iii), (c) → (ii), (d) → (iv)

70819153618. (a) → (iii), (b) → (ii), (c) → (i), (d) → (iv)

70819153619. (a) → (ii), (b) → (iv), (c) → (iii), (d) → (i)

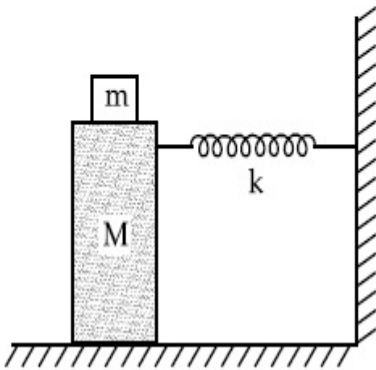
70819153620. (a)  $\rightarrow$  (ii), (b)  $\rightarrow$  (iii), (c)  $\rightarrow$  (iv), (d)  $\rightarrow$  (i)

**Question Number : 11 Question Id : 70819116154 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

In the given figure, a mass  $M$  is attached to a horizontal spring which is fixed on one side to a rigid support. The spring constant of the spring is  $k$ . The mass oscillates on a frictionless surface with time period  $T$  and amplitude  $A$ . When the mass is in equilibrium position, as shown in the figure, another mass  $m$  is gently fixed upon it. The new amplitude of oscillation will be :



**Options :**

70819153621.  $A \sqrt{\frac{M+m}{M}}$

70819153622.  $A \sqrt{\frac{M}{M+m}}$

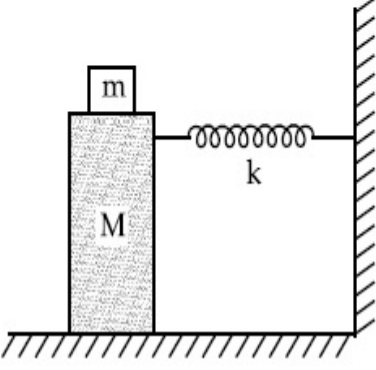
70819153623.  $A \sqrt{\frac{M-m}{M}}$

70819153624.  $A \sqrt{\frac{M}{M-m}}$

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ధృఢమైన చట్రానికి బిగించిన ఒక క్షితిజసమాంతర స్ప్రింగ్ యొక్క మరొక చివరకు  $M$  ద్రవ్యరాశిని పటములో చూపిన విధంగా అమర్చినారు. స్ప్రింగ్ యొక్క బలస్థిరాంకము  $k$ . ఈ ద్రవ్యరాశి ఒక ఘర్షణ లేమి ఉపరితలముపై ఆవర్తన కాలము  $T$  మరియు కంపన పరిమితి  $A$  తో డోలనము చేయుచున్నది. ఇది సమతాస్థితిలో ఉన్నప్పుడు మరొక ద్రవ్యరాశి  $m$  ను,  $M$  పై ఉంచినారు. అయితే కొత్త డోలన కంపన పరిమితి :



Options :

70819153621.  $A \sqrt{\frac{M+m}{M}}$

70819153622.  $A \sqrt{\frac{M}{M+m}}$

70819153623.  $A \sqrt{\frac{M-m}{M}}$

70819153624.  $A \sqrt{\frac{M}{M-m}}$

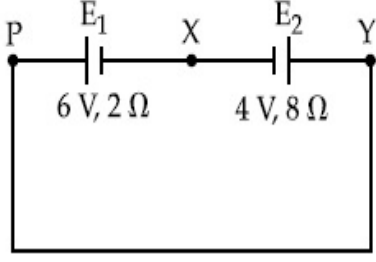
Question Number : 12 Question Id : 70819116155 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1



A cell  $E_1$  of emf 6 V and internal resistance  $2 \Omega$  is connected with another cell  $E_2$  of emf 4 V and internal resistance  $8 \Omega$  (as shown in the figure). The potential difference across points X and Y is :



**Options :**

70819153625. 2.0 V

70819153626. 3.6 V

70819153627. 5.6 V

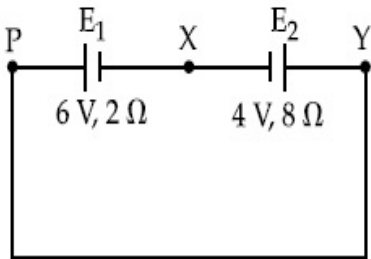
70819153628. 10.0 V

**Question Number : 12 Question Id : 70819116155 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

పటములో చూపిన విధంగా 6 V emf మరియు అంతర్నిరోధము  $2 \Omega$  గల ఒక ఘటము  $E_1$  ను మరొక 4 V emf మరియు  $8 \Omega$  అంతర్నిరోధముగల  $E_2$  ఘటమునకు కలిపినారు. అయితే X మరియు Y మధ్యన గల పొటెన్షియల్ భేదము :



**Options :**

70819153625. 2.0 V

70819153626. 3.6 V

70819153627. 5.6 V

70819153628. 10.0 V

**Question Number : 13 Question Id : 70819116156 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

A current through a wire depends on time as

$$i = \alpha_0 t + \beta t^2$$

where  $\alpha_0 = 20 \text{ A/s}$  and  $\beta = 8 \text{ As}^{-2}$ . Find the charge crossed through a section of the wire in 15 s.

**Options :**

70819153629. 260 C

70819153630. 2100 C

70819153631. 11250 C

70819153632. 2250 C

**Question Number : 13 Question Id : 70819116156 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

ఒక తీగలోని విద్యుత్ ప్రవాహము కాలముపై ఈ విధంగా ఆధారపడినది

$$i = \alpha_0 t + \beta t^2$$

$\alpha_0 = 20 \text{ A/s}$  మరియు  $\beta = 8 \text{ As}^{-2}$ . అయితే 15 సెకనులలో తీగలోని ఒక నిర్దిష్ట భాగం గుండా పోతున్న విద్యుదావేశపు విలువ.

**Options :**

70819153629. 260 C

70819153630. 2100 C

70819153631. 11250 C

70819153632. 2250 C

**Question Number : 14 Question Id : 70819116157 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

Two equal capacitors are first connected in series and then in parallel. The ratio of the equivalent capacities in the two cases will be :

**Options :**

70819153633. 1 : 2

70819153634. 2 : 1

70819153635. 4 : 1

70819153636. 1 : 4

**Question Number : 14 Question Id : 70819116157 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

రెండు సమాన క్షమశీలులను మొదట శ్రేణిలోను తర్వాత సమాంతరంగాను కలిపినారు. అయితే ఈ రెండింటి తుల్యాంక క్షమత్వముల నిష్పత్తి :

**Options :**

70819153633. 1 : 2

70819153634. 2 : 1

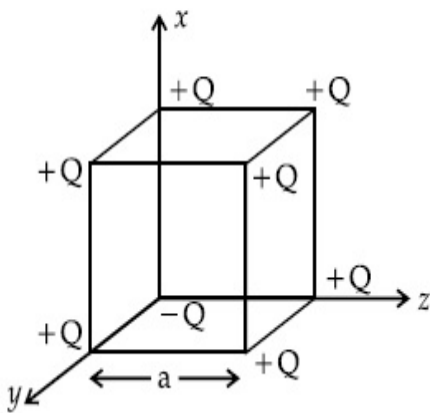
70819153635. 4 : 1

70819153636. 1 : 4

**Question Number : 15 Question Id : 70819116158 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

A cube of side 'a' has point charges +Q located at each of its vertices except at the origin where the charge is -Q. The electric field at the centre of cube is :



**Options :**

70819153637. 
$$\frac{-Q}{3\sqrt{3}\pi\epsilon_0 a^2} (\hat{x} + \hat{y} + \hat{z})$$

70819153638. 
$$\frac{Q}{3\sqrt{3}\pi\epsilon_0 a^2} (\hat{x} + \hat{y} + \hat{z})$$

70819153639. 
$$\frac{-2Q}{3\sqrt{3}\pi\epsilon_0 a^2} (\hat{x} + \hat{y} + \hat{z})$$

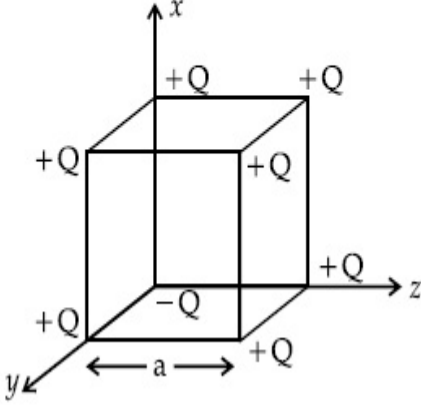
70819153640. 
$$\frac{2Q}{3\sqrt{3}\pi\epsilon_0 a^2} (\hat{x} + \hat{y} + \hat{z})$$

**Question Number : 15 Question Id : 70819116158 Question Type : MCQ O**

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

'a' భుజముగల ఒక ఘనపు అన్ని శీర్షముల వద్ద బిందు విద్యుదావేశాలు +Q మూలబిందువు వద్ద మాత్రం -Q ఉంచినచో ఘనపు మధ్య బిందువు వద్ద గల విద్యుత్ క్షేత్రము :



Options :

70819153637. 
$$\frac{-Q}{3\sqrt{3} \pi \epsilon_0 a^2} (\hat{x} + \hat{y} + \hat{z})$$

70819153638. 
$$\frac{Q}{3\sqrt{3} \pi \epsilon_0 a^2} (\hat{x} + \hat{y} + \hat{z})$$

70819153639. 
$$\frac{-2Q}{3\sqrt{3} \pi \epsilon_0 a^2} (\hat{x} + \hat{y} + \hat{z})$$

70819153640. 
$$\frac{2Q}{3\sqrt{3} \pi \epsilon_0 a^2} (\hat{x} + \hat{y} + \hat{z})$$

Question Number : 16 Question Id : 70819116159 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If an emitter current is changed by 4 mA, the collector current changes by 3.5 mA. The value of  $\beta$  will be :

Options :

70819153641. 7

70819153642. 0.875

70819153643. 0.5

70819153644. 3.5

**Question Number : 16 Question Id : 70819116159 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

ఒకవేళ ఎమిటర్ కరెంటు లోని మార్పు 4 mA మరియు కలెక్టర్ కరెంటు లోని మార్పు 3.5 mA అయినచో

β విలువ :

**Options :**

70819153641. 7

70819153642. 0.875

70819153643. 0.5

70819153644. 3.5

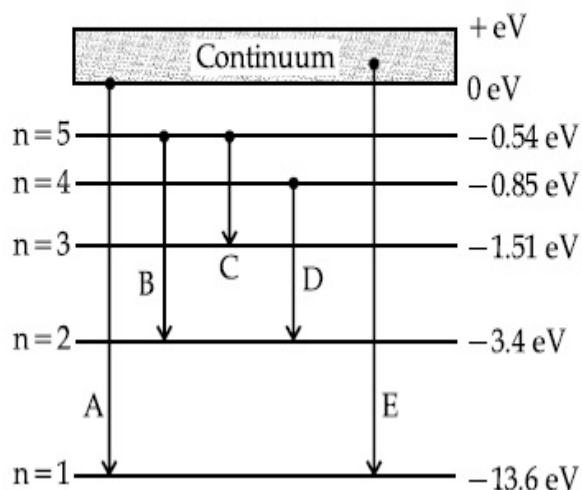
**Question Number : 17 Question Id : 70819116160 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

In the given figure, the energy levels of hydrogen atom have been shown along with some transitions marked A, B, C, D and E.

The transitions A, B and C respectively represent :



**Options :**

70819153645. The first member of the Lyman series, third member of Balmer series and second member of Paschen series.

70819153646. The ionization potential of hydrogen, second member of Balmer series and third member of Paschen series.

70819153647. The series limit of Lyman series, second member of Balmer series and second member of Paschen series.

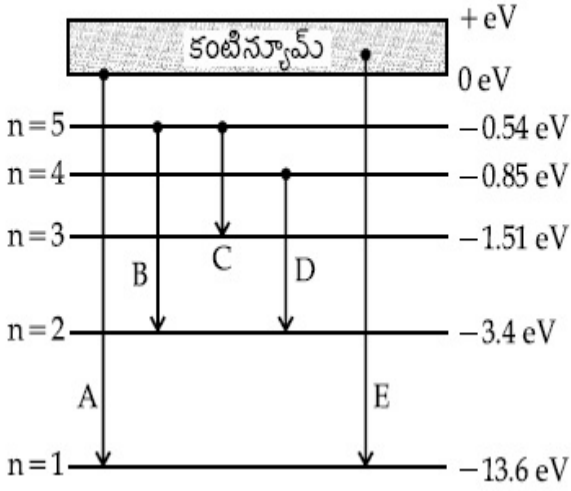
70819153648. The series limit of Lyman series, third member of Balmer series and second member of Paschen series.

**Question Number : 17 Question Id : 70819116160 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

హైడ్రోజన్ పరమాణువులోని శక్తిస్థాయిలు మరియు; A, B, C, D మరియు E సంక్రమణలు పటములో చూపించబడ్డాయి. సంక్రమణలు A, B మరియు C లు వరుసగా ఈ కింది వాటిని సూచించును :



**Options :**

70819153645. లైమన్ శ్రేణి మొదటి, బామర్ శ్రేణిలోని మూడవ మరియు పాశ్చన్ శ్రేణిలోని రెండవ రేఖలు.

70819153646. హైడ్రోజన్ యొక్క అయనీకరణ పొటెన్షియల్, బామర్ శ్రేణిలోని రెండవ మరియు పాశ్చన్ శ్రేణిలోని మూడవ రేఖలు.

70819153647. లైమన్ శ్రేణి హద్దు, బామర్ శ్రేణి రెండవ మరియు పాశ్చన్ శ్రేణి రెండవ రేఖలు.

70819153648. లైమన్ శ్రేణి హద్దు, బామర్ శ్రేణి మూడవ మరియు పాశ్చన్ శ్రేణి రెండవ రేఖలు.

**Question Number : 18 Question Id : 70819116161 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

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

Given below are two statements :

Statement I : Two photons having equal linear momenta have equal wavelengths.

Statement II : If the wavelength of photon is decreased, then the momentum and energy of a photon will also decrease.

In the light of the above statements, choose the correct answer from the options given below.

**Options :**

70819153649. Both Statement I and Statement II are true



70819153650. Both Statement I and Statement II are false

70819153651. Statement I is true but Statement II is false

70819153652. Statement I is false but Statement II is true

**Question Number : 18 Question Id : 70819116161 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

క్రింద రెండు వివరణలు ఇవ్వబడ్డాయి :

**వివరణ I :** సమాన రేఖీయ ద్రవ్యవేగములు గల రెండు ఫోటాన్ల తరంగదైర్ఘ్యాలు సమానము.

**వివరణ II :** ఒకవేళ ఫోటాన్ తరంగదైర్ఘ్యము తగ్గించినచో, దాని ద్రవ్యవేగము మరియు శక్తి కూడా తగ్గును.

ఈ సందర్భాలలో, కింది వాటిలో సరియైన జవాబు ఎన్నుకొనుము.

**Options :**

70819153649. రెండు వివరణలు సరియైనవి

70819153650. రెండు వివరణలు సరియైనవి కావు

70819153651. వివరణ I సరియైనది, కాని II కాదు

70819153652. వివరణ I సరియైనది కాదు, కాని II సరియైనది.

**Question Number : 19 Question Id : 70819116162 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

The focal length  $f$  is related to the radius of curvature  $r$  of the spherical convex mirror by :

**Options :**

70819153653.  $f = r$

70819153654.  $f = -r$

70819153655.  $f = -\frac{1}{2}r$

70819153656.  $f = +\frac{1}{2}r$

**Question Number : 19 Question Id : 70819116162 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

ఒక గోళ కుంభాకార దర్పణపు వక్రతా వ్యాసార్థము  $r$  మరియు నాభ్యంతరము  $f$  లు ఈ క్రింది విధంగా సంబంధమును కలిగి ఉంటాయి :

**Options :**

70819153653.  $f = r$

70819153654.  $f = -r$

70819153655.  $f = -\frac{1}{2}r$

70819153656.  $f = +\frac{1}{2}r$

**Question Number : 20 Question Id : 70819116163 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

In a Young's double slit experiment, the width of the one of the slit is three times the other slit. The amplitude of the light coming from a slit is proportional to the slit-width. Find the ratio of the maximum to the minimum intensity in the interference pattern.

**Options :**

70819153657. 4 : 1

70819153658. 2 : 1

70819153659. 1 : 4

70819153660. 3 : 1

**Question Number : 20 Question Id : 70819116163 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

ఒక యంగ్ ద్విచీలిక ప్రయోగము నందు ఒకచీలిక వెడల్పు రెండవ చీలిక వెడల్పు కన్న మూడురెట్లు. ఒక చీలిక ద్వారా వెలువడు కాంతి యొక్క కంపన పరిమితి ఆ చీలిక యొక్క వెడల్పునకు అనులోమానుపాతములో ఉండును. అయితే వ్యతిరేకములోని గరిష్ట మరియు కనిష్ట తీవ్రతల నిష్పత్తి :

**Options :**

70819153657. 4 : 1

70819153658. 2 : 1

70819153659. 1 : 4

70819153660. 3 : 1

## Physics Section B

**Section Id :** 708191617

**Section Number :** 2

**Section type :** Online

**Mandatory or Optional :** Mandatory

|                                       |           |
|---------------------------------------|-----------|
| Number of Questions :                 | 10        |
| Number of Questions to be attempted : | 5         |
| Section Marks :                       | 20        |
| Mark As Answered Required? :          | Yes       |
| Sub-Section Number :                  | 1         |
| Sub-Section Id :                      | 708191897 |
| Question Shuffling Allowed :          | Yes       |

Question Number : 21 Question Id : 70819116164 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The coefficient of static friction between a wooden block of mass 0.5 kg and a vertical rough wall is 0.2. The magnitude of horizontal force that should be applied on the block to keep it adhere to the wall will be \_\_\_\_\_ N.

[  $g = 10 \text{ ms}^{-2}$  ]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 21 Question Id : 70819116164 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

నిలువుగా ఉన్న గరకు గోడకు మరియు 0.5 kg ద్రవ్యరాశిగల చెక్క దిమ్మకు మధ్యనగల స్థైతిక ఘర్షణ గుణకము 0.2. దిమ్మను వడకుండా అపుటకు దాని పై వ్రయోగించవలసిన క్షితిజనమాంతర బలపరిమాణము \_\_\_\_\_ N.

[  $g = 10 \text{ ms}^{-2}$  ]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 22 Question Id : 70819116165 Question Type : SA**

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

An unpolarized light beam is incident on the polarizer of a polarization experiment and the intensity of light beam emerging from the analyzer is measured as 100 Lumens. Now, if the analyzer is rotated around the horizontal axis (direction of light) by  $30^\circ$  in clockwise direction, the intensity of emerging light will be \_\_\_\_\_ Lumens.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 22 Question Id : 70819116165 Question Type : SA**

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

ఒక ప్రయోగములో ధృవణకారి పైన అధృవిత కాంతి పుంజమును పతనము చేయించగా విశ్లేషకము నుండి వెలువడిన కాంతి తీవ్రత 100 ల్యూమెన్లుగా కొలిచినారు, ఇప్పుడు విశ్లేషకము దాని క్షితిజ సమాంతర అక్షము కాంతిదిశ ఆధారంగా సవ్యదిశలో  $30^\circ$  త్రిప్పినచో, వెలువడే కాంతి తీవ్రత \_\_\_\_\_ Lumens.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 23 Question Id : 70819116166 Question Type : SA**

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

A ball with a speed of 9 m/s collides with another identical ball at rest. After the collision, the direction of each ball makes an angle of  $30^\circ$  with the original direction. The ratio of velocities of the balls after collision is  $x : y$ , where  $x$  is \_\_\_\_\_ .

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.001

**Question Number : 23 Question Id : 70819116166 Question Type : SA**

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

9 m/s వడితో వెక్తున్న ఒక బంతి, విశ్రాంతిలో ఉన్న మరొక సర్వసమాన బంతిని ఢీకొన్నది. తొలిదశకు  $30^\circ$  కోణము చేస్తూ అభిఘాతం తర్వాత ఒక్కొక్క బంతి వెక్తున్నట్లైతే ఆ బంతుల వేగాల నిష్పత్తి,  $x : y$  అయితే  $x$  \_\_\_\_\_ .

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.001

**Question Number : 24 Question Id : 70819116167 Question Type : SA**

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

A hydraulic press can lift 100 kg when a mass 'm' is placed on the smaller piston. It can lift \_\_\_\_\_ kg when the diameter of the larger piston is increased by 4 times and that of the smaller piston is decreased by 4 times keeping the same mass 'm' on the smaller piston.

**Response Type : Numeric**

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 24 **Question Id :** 70819116167 **Question Type :** SA

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

ఒక హైడ్రాలిక్ ప్రెస్ యొక్క చిన్న పిస్టన్ పైన 'm' ద్రవ్యరాశిని ఉంచటం వల్ల 100 kg బరువును లేపగలడు. అదే 'm' ద్రవ్యరాశిని చిన్న పిస్టన్ పైన ఉంచుతూ పెద్ద పిస్టన్ వ్యాసాన్ని 4 రెట్లు పెంచి, చిన్న పిస్టన్ వ్యాసాన్ని 4 రెట్లు తగ్గించినచో ఎత్తగల బరువు \_\_\_\_\_ kg.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 25 **Question Id :** 70819116168 **Question Type :** SA

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

An inclined plane is bent in such a way that the vertical cross-section is given by  $y = \frac{x^2}{4}$  where  $y$  is in vertical and  $x$  in horizontal direction. If the upper surface of this curved plane is rough with coefficient of friction  $\mu = 0.5$ , the maximum height in cm at which a stationary block will not slip downward is \_\_\_\_\_ cm.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 25 Question Id : 70819116168 Question Type : SA**

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

$y$  నిలువు దిశను,  $x$  క్షితిజ సమాంతర దిశను తెలియజేయునట్లు ఒక వాలుతలమును నిలువు మధ్యచ్ఛేదము

$y = \frac{x^2}{4}$  గా ఉండేటట్లు వంచినారు. ఈ వాలు ఉపరితలము గరకుగా ఉండి ఘర్షణ గుణకము  $\mu = 0.5$  కలిగి

ఉన్నచో నిశ్చల స్థితిలో ఉన్న ఒక దిమ్మ కిందికి జారకుండా ఉండాలంటే ఎత్తగలిగే గరిష్ట ఎత్తు \_\_\_\_\_ cm.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 26 Question Id : 70819116169 Question Type : SA**

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

A resonance circuit having inductance and resistance  $2 \times 10^{-4}$  H and  $6.28 \Omega$  respectively oscillates at 10 MHz frequency. The value of quality factor of this resonator is \_\_\_\_\_.

[ $\pi = 3.14$ ]

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001



**Question Number : 26 Question Id : 70819116169 Question Type : SA**

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

ఒక  $2 \times 10^{-4}$  H ప్రేరకము మరియు  $6.28 \Omega$  నిరోధములు కలిగిన ఒక అనునాద వలయము యొక్క పౌనఃపున్యము 10 MHz. అయితే ఈ అనునాద వలయపు దక్షతా గుణకము విలువ (Quality factor) \_\_\_\_\_ .  $[\pi = 3.14]$

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.001

**Question Number : 27 Question Id : 70819116170 Question Type : SA**

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

An audio signal  $v_m = 20 \sin 2\pi(1500t)$  amplitude modulates a carrier  $v_c = 80 \sin 2\pi(100,000t)$ .  
The value of percent modulation is \_\_\_\_\_.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.001

**Question Number : 27 Question Id : 70819116170 Question Type : SA**

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

$v_m = 20 \sin 2\pi(1500t)$  శ్రవ్యసంకేతాన్ని,  $v_c = 80 \sin 2\pi(100,000t)$  వాహక తరంగమును ఆంప్లిట్యూడ్ మాడ్యులేషన్‌ను గావించినది. అయితే మాడ్యులేషన్ శాతము \_\_\_\_\_.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

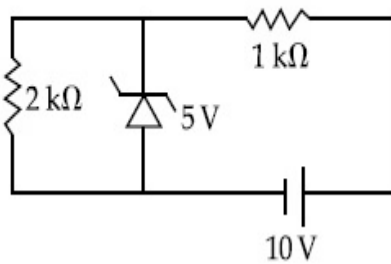
**Possible Answers :**

5 to 5.001

**Question Number : 28 Question Id : 70819116171 Question Type : SA**

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

In connection with the circuit drawn below, the value of current flowing through 2 k $\Omega$  resistor is \_\_\_\_\_  $\times 10^{-4}$  A.



**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

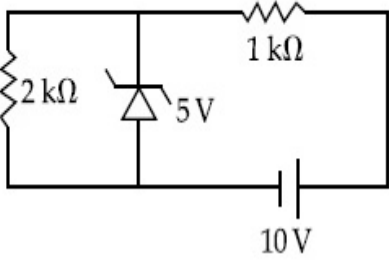
**Possible Answers :**

5 to 5.001

**Question Number : 28 Question Id : 70819116171 Question Type : SA**

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

వటములో చూపిన వలయమునందు  $2\text{ k}\Omega$  నిరోధము ద్వారా వెళ్తున్న విద్యుత్ ప్రవాహపు విలువ \_\_\_\_\_  $\times 10^{-4}$  A.



**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 29 **Question Id :** 70819116172 **Question Type :** SA

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

An electromagnetic wave of frequency 5 GHz, is travelling in a medium whose relative electric permittivity and relative magnetic permeability both are 2. Its velocity in this medium is \_\_\_\_\_  $\times 10^7$  m/s.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 29 **Question Id :** 70819116172 **Question Type :** SA

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

5 GHz పౌనపున్యముగల ఒక విద్యుదయస్కాంత తరంగము, సాపేక్ష విద్యుత్ పరిమితివిటి మరియు సాపేక్ష అయస్కాంత పరిమితివిటిలు రెండూ 2 గా గల యానకముగుండా ప్రయాణిస్తున్నది. అయితే ఆ తరంగపు వేగము ఆయానకములో  $\text{_____} \times 10^7 \text{ m/s}$ .

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 30 **Question Id :** 70819116173 **Question Type :** SA

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

A common transistor radio set requires 12 V (D.C.) for its operation. The D.C. source is constructed by using a transformer and a rectifier circuit, which are operated at 220 V (A.C.) on standard domestic A.C. supply. The number of turns of secondary coil are 24, then the number of turns of primary are \_\_\_\_\_.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 30 **Question Id :** 70819116173 **Question Type :** SA

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

ఒక సామాన్య ట్రాన్సిస్టర్ రేడియో సెట్టు 12 వోల్టుల D.C. పవరును వాడుచున్నది, ఈ D.C. జనకము, 220 V (A.C.) నపైని వాడే ఒక ట్రాన్స్ఫార్మర్ను మరియు ఒక ఢికారిని కలిగియున్నది. ఈ ట్రాన్స్ఫార్మర్ లోని సెకండరీలో 24 చుట్లున్నట్టైతే ప్రైమరీలోని చుట్ల సంఖ్య \_\_\_\_\_.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

## Chemistry Section A

|  |           |
|--|-----------|
| <b>Section Id :</b>                          | 708191618 |
| <b>Section Number :</b>                      | 3         |
| <b>Section type :</b>                        | Online    |
| <b>Mandatory or Optional :</b>               | Mandatory |
| <b>Number of Questions :</b>                 | 20        |
| <b>Number of Questions to be attempted :</b> | 20        |
| <b>Section Marks :</b>                       | 80        |
| <b>Mark As Answered Required? :</b>          | Yes       |
| <b>Sub-Section Number :</b>                  | 1         |
| <b>Sub-Section Id :</b>                      | 708191898 |
| <b>Question Shuffling Allowed :</b>          | Yes       |

**Question Number :** 31 **Question Id :** 70819116174 **Question Type :** MCQ **Option Shuffling :** Yes

**Is Question Mandatory :** No

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

Which of the following are isostructural pairs ?

- A.  $\text{SO}_4^{2-}$  and  $\text{CrO}_4^{2-}$
- B.  $\text{SiCl}_4$  and  $\text{TiCl}_4$
- C.  $\text{NH}_3$  and  $\text{NO}_3^-$
- D.  $\text{BCl}_3$  and  $\text{BrCl}_3$

**Options :**

70819153671. A and B only

70819153672. A and C only

70819153673. B and C only

70819153674. C and D only

**Question Number : 31 Question Id : 70819116174 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

క్రింది వాటిలో సమనిర్మాణము (isostructural) గల జంటలు ఏవి ?

- A.  $\text{SO}_4^{2-}$  మరియు  $\text{CrO}_4^{2-}$
- B.  $\text{SiCl}_4$  మరియు  $\text{TiCl}_4$
- C.  $\text{NH}_3$  మరియు  $\text{NO}_3^-$
- D.  $\text{BCl}_3$  మరియు  $\text{BrCl}_3$

**Options :**

70819153671. A మరియు B మాత్రమే

70819153672. A మరియు C మాత్రమే

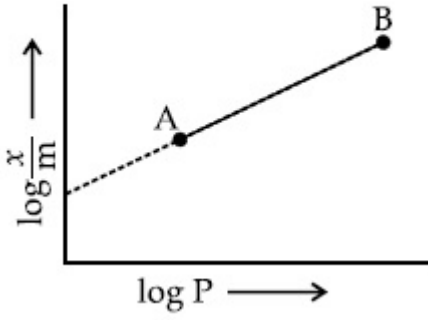
70819153673. B మరియు C మాత్రమే

70819153674. C మరియు D మాత్రమే

**Question Number : 32 Question Id : 70819116175 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

In Freundlich adsorption isotherm, slope of AB line is :



Options :

70819153675.  $n$  with  $(n, 0.1 \text{ to } 0.5)$

70819153676.  $\log n$  with  $(n > 1)$

70819153677.  $\log \frac{1}{n}$  with  $(n < 1)$

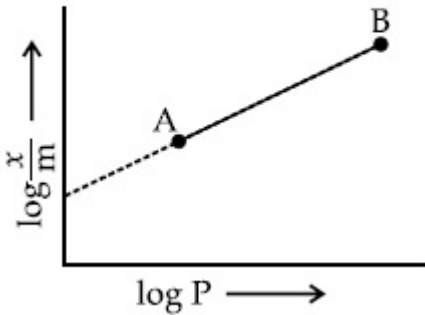
70819153678.  $\frac{1}{n}$  with  $\left(\frac{1}{n} = 0 \text{ to } 1\right)$

Question Number : 32 Question Id : 70819116175 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ప్రాయిండ్లిష్ అధిశోషణ సమోష్ట రేఖలో AB గీత యొక్క వాలు :



Options :

70819153675.  $(0.1 \text{ నుండి } 0.5)$  విలువలు గల  $n$

70819153676.  $(n > 1)$  తో  $\log n$

70819153677.  $(n < 1)$  తో  $\log \frac{1}{n}$

70819153678.  $(\frac{1}{n} = 0$  నుండి  $1)$  తో  $\frac{1}{n}$

**Question Number : 33 Question Id : 70819116176 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

Consider the elements Mg, Al, S, P and Si, the correct increasing order of their first ionization enthalpy is :

**Options :**

70819153679. Al < Mg < Si < S < P

70819153680. Mg < Al < Si < P < S

70819153681. Mg < Al < Si < S < P

70819153682. Al < Mg < S < Si < P

**Question Number : 33 Question Id : 70819116176 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

మూలకాలు Mg, Al, S, P మరియు Si లను పరిశీలించుము. వాటి మొదటి అయనీకరణ ఎంథాల్పి పెరుగు సరియైన క్రమము ఏది :

**Options :**

70819153679. Al < Mg < Si < S < P



70819153680.  $Mg < Al < Si < P < S$

70819153681.  $Mg < Al < Si < S < P$

70819153682.  $Al < Mg < S < Si < P$

**Question Number : 34 Question Id : 70819116177 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

Which of the following ore is concentrated using group 1 cyanide salt ?

**Options :**

70819153683. Calamine

70819153684. Malachite

70819153685. Siderite

70819153686. Sphalerite

**Question Number : 34 Question Id : 70819116177 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

ఈ క్రింది ఏ ధాతువును గ్రూపు 1 సైనైడ్ లవణం తో సాంద్రీకరణం గావిస్తారు ?

**Options :**

70819153683. కాలమైన్

70819153684. మాలకైట్

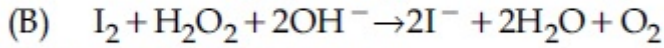
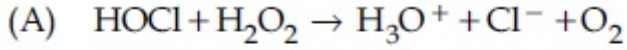
70819153685. సిడరైట్

70819153686. స్పెలరైట్

Question Number : 35 Question Id : 70819116178 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1



Choose the correct option.

Options :

70819153687.  $\text{H}_2\text{O}_2$  acts as oxidising agent in equations (A) and (B).

70819153688.  $\text{H}_2\text{O}_2$  acts as reducing agent in equations (A) and (B).

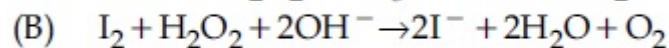
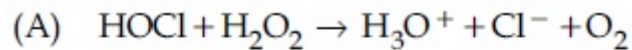
70819153689.  $\text{H}_2\text{O}_2$  act as oxidizing and reducing agent respectively in equations (A) and (B).

70819153690.  $\text{H}_2\text{O}_2$  acts as reducing and oxidising agent respectively in equations (A) and (B).

Question Number : 35 Question Id : 70819116178 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1



సరియైన ఐచ్ఛికాన్ని ఎన్నుకోండి.

Options :

70819153687. సమీకరణము (A) మరియు (B) లలో  $\text{H}_2\text{O}_2$  ఆక్సీకరణ కారకముగ పనిచేయును.

70819153688. సమీకరణము (A) మరియు (B) లలో  $\text{H}_2\text{O}_2$  క్షయకరణ కారకముగ ప

70819153689. సమీకరణము (A) మరియు (B) లలో  $H_2O_2$  వరుసగా ఆక్సీకరణ మరియు క్షయకరణ కారకంగా పనిచేయును.

70819153690. సమీకరణము (A) మరియు (B) లలో  $H_2O_2$  వరుసగా క్షయకరణ మరియు ఆక్సీకరణ కారకంగా పనిచేయును.

**Question Number : 36 Question Id : 70819116179 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

$Al_2O_3$  was leached with alkali to get X. The solution of X on passing of gas Y, forms Z. X, Y and Z respectively are :

**Options :**

70819153691.  $X = Na[Al(OH)_4]$ ,  $Y = SO_2$ ,  $Z = Al_2O_3$

70819153692.  $X = Al(OH)_3$ ,  $Y = SO_2$ ,  $Z = Al_2O_3 \cdot xH_2O$

70819153693.  $X = Al(OH)_3$ ,  $Y = CO_2$ ,  $Z = Al_2O_3$

70819153694.  $X = Na[Al(OH)_4]$ ,  $Y = CO_2$ ,  $Z = Al_2O_3 \cdot xH_2O$

**Question Number : 36 Question Id : 70819116179 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

$Al_2O_3$  ను అల్కలీతో నిక్షాళనం గావించినపుడు X ఏర్పడింది. X ద్రావణంలోనికి వాయువు Yని పంపినపుడు Z ఏర్పడింది.

X, Y మరియు Z లు వరుసగా :

**Options :**

70819153691.  $X = Na[Al(OH)_4]$ ,  $Y = SO_2$ ,  $Z = Al_2O_3$

70819153692.  $X = \text{Al}(\text{OH})_3$ ,  $Y = \text{SO}_2$ ,  $Z = \text{Al}_2\text{O}_3 \cdot x\text{H}_2\text{O}$

70819153693.  $X = \text{Al}(\text{OH})_3$ ,  $Y = \text{CO}_2$ ,  $Z = \text{Al}_2\text{O}_3$

70819153694.  $X = \text{Na}[\text{Al}(\text{OH})_4]$ ,  $Y = \text{CO}_2$ ,  $Z = \text{Al}_2\text{O}_3 \cdot x\text{H}_2\text{O}$

**Question Number : 37 Question Id : 70819116180 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

The electrode potential of  $\text{M}^{2+}/\text{M}$  of 3d-series elements shows positive value for :

**Options :**

70819153695. Fe

70819153696. Co

70819153697. Zn

70819153698. Cu

**Question Number : 37 Question Id : 70819116180 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

3d-శ్రేణి మూలకాల  $\text{M}^{2+}/\text{M}$  ఎలక్ట్రోడ్ శక్త్యం దేనికి ధనాత్మకంగా ఉంటుంది :

**Options :**

70819153695. Fe

70819153696. Co

70819153697. Zn

70819153698. Cu

**Question Number : 38 Question Id : 70819116181 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

The major components in "Gun Metal" are :

**Options :**

70819153699. Cu, Sn and Zn

70819153700. Cu, Zn and Ni

70819153701. Cu, Ni and Fe

70819153702. Al, Cu, Mg and Mn

**Question Number : 38 Question Id : 70819116181 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

"ఫిరంగి లోహము" (Gun Metal) లో ఉండు ప్రధాన అనుఘటకాలు ఏవి :

**Options :**

70819153699. Cu, Sn మరియు Zn

70819153700. Cu, Zn మరియు Ni

70819153701. Cu, Ni మరియు Fe

70819153702. Al, Cu, Mg మరియు Mn

**Question Number : 39 Question Id : 70819116182 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

The gas released during anaerobic degradation of vegetation may lead to :

**Options :**

70819153703. Acid rain

70819153704. Global warming and cancer

70819153705. Corrosion of metals

70819153706. Ozone hole

**Question Number : 39 Question Id : 70819116182 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

వృక్ష సంబంధితము (vegetation) గాలి సమక్షంలో క్రమపతనం (degradation) చెందినపుడు వెలువడు వాయువు దేనికి దారి తీయవచ్చు :

**Options :**

70819153703. ఆమ్ల వర్షం

70819153704. భూగోళం వేడెక్కడం మరియు క్యాన్సర్

70819153705. లోహాలు తుప్పు పట్టటం

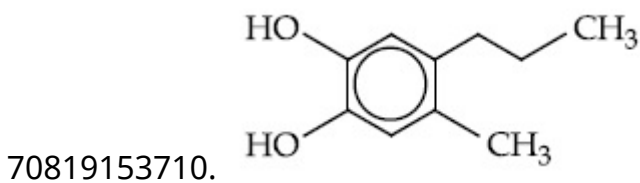
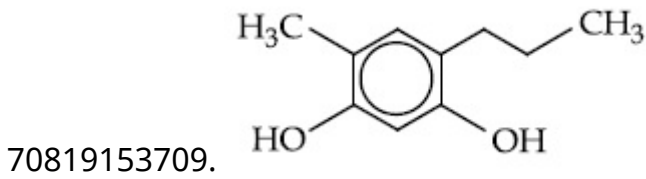
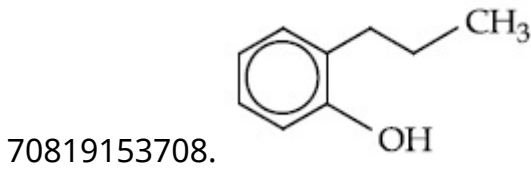
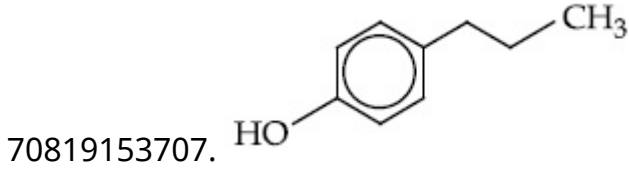
70819153706. ఓజోన్ రంధ్రం

Question Number : 40 Question Id : 70819116183 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which of the following compound gives pink colour on reaction with phthalic anhydride in conc.  $H_2SO_4$  followed by treatment with NaOH ?

Options :



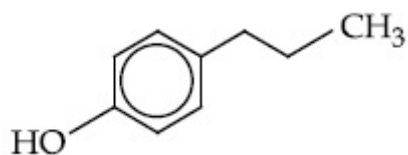
Question Number : 40 Question Id : 70819116183 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

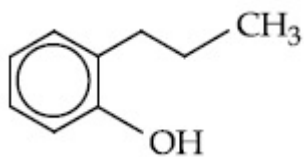
క్రింది సమ్మేళనాలలో ఏది గాఢ  $H_2SO_4$  లో ఉన్న థాలిక్ ఎన్ హైడ్రైడ్ తో చర్యనొంది తదుపరి NaOH తో చర్యగావించినపుడు పింక్ రంగును ఏర్పరుచును ?

Options :

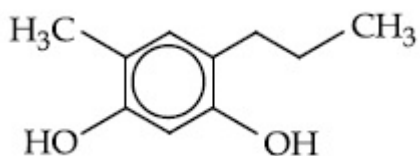
70819153707.



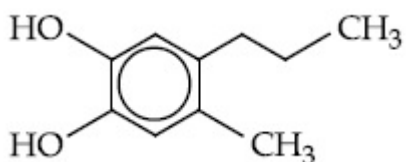
70819153708.



70819153709.



70819153710.

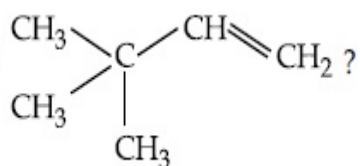


Question Number : 41 Question Id : 70819116184 Question Type : MCQ Option Shuffling : Yes

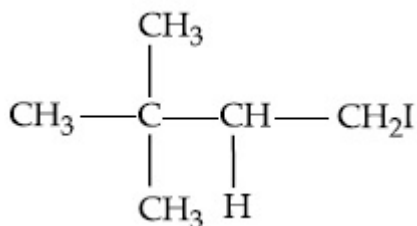
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

What is the major product formed by HI on reaction with



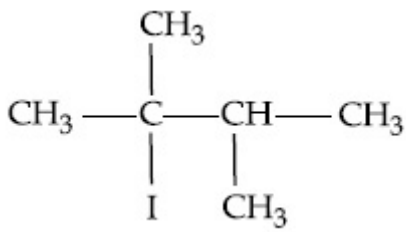
Options :



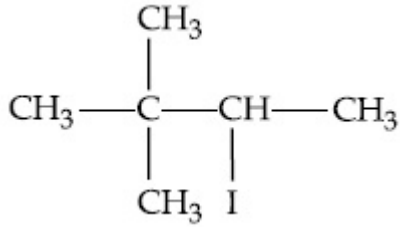
70819153711.

70819153712.

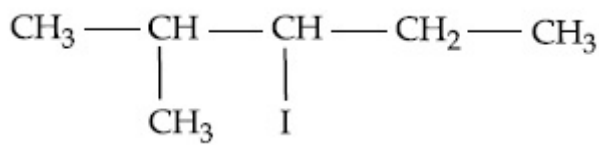




70819153713.

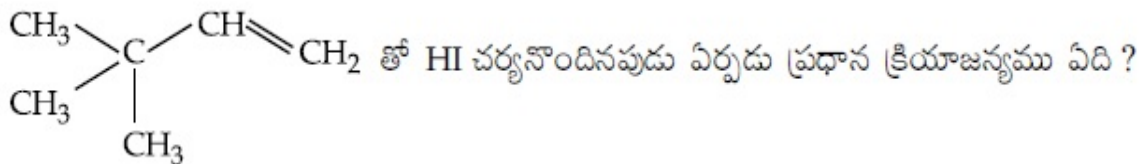


70819153714.



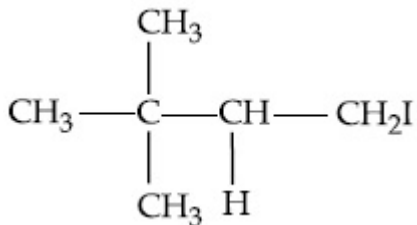
Question Number : 41 Question Id : 70819116184 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

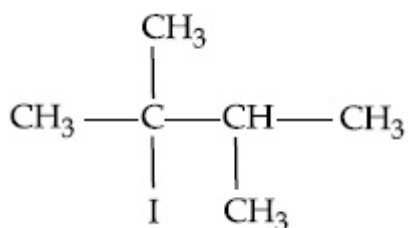


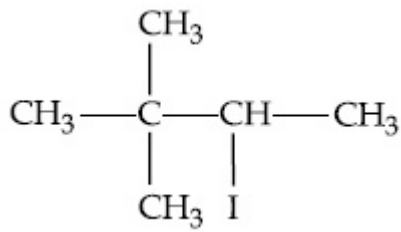
Options :

70819153711.

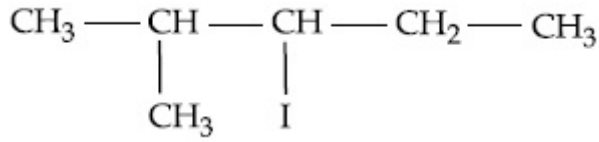


70819153712.





70819153713.



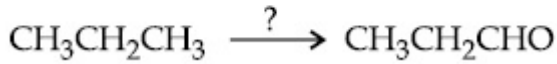
70819153714.

Question Number : 42 Question Id : 70819116185 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which of the following reagent is used for the following reaction ?



Options :

70819153715. Copper at high temperature and pressure

70819153716. Molybdenum oxide

70819153717. Manganese acetate

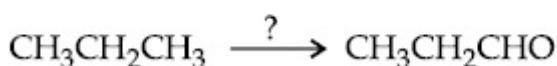
70819153718. Potassium permanganate

Question Number : 42 Question Id : 70819116185 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

క్రింది చర్యకు ఏ కారకాన్ని ఉపయోగిస్తారు ?



Options :

70819153715. అధిక ఉష్ణోగ్రత పీడనాల వద్ద కాపర్

70819153716. మాలబడినం ఆక్సైడ్

70819153717. మాంగనీస్ ఎసిటేట్

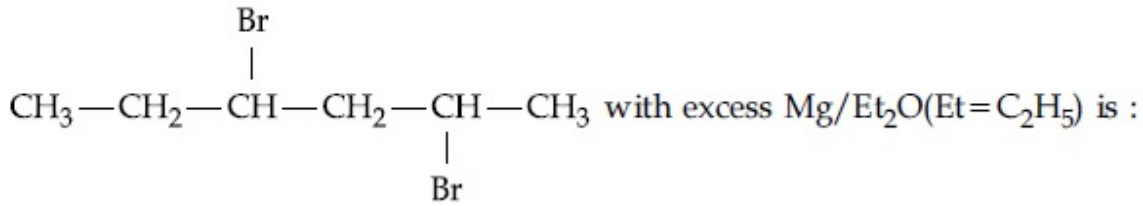
70819153718. పొటాషియం పర్మాంగనేట్

Question Number : 43 Question Id : 70819116186 Question Type : MCQ Option Shuffling : Yes

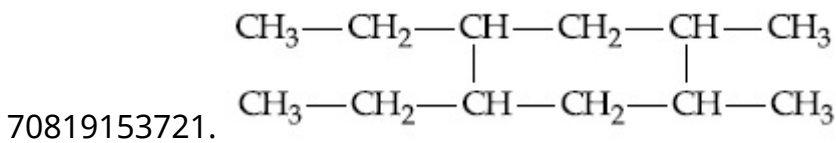
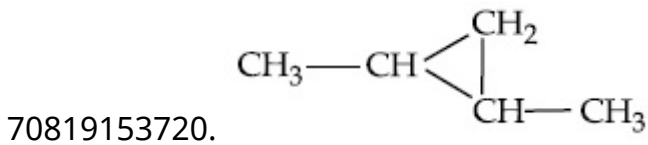
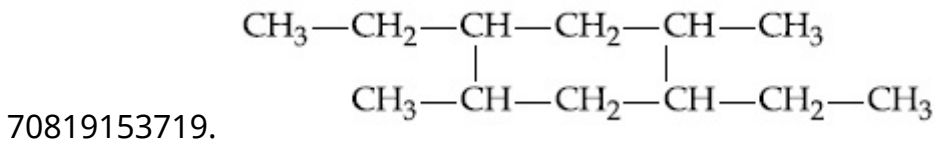
Is Question Mandatory : No

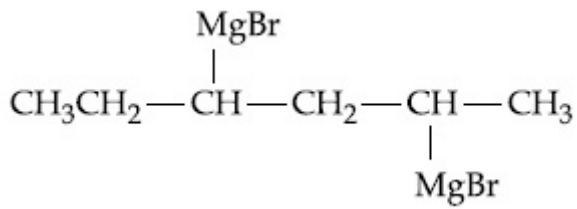
Correct Marks : 4 Wrong Marks : 1

The product formed in the first step of the reaction of



Options :

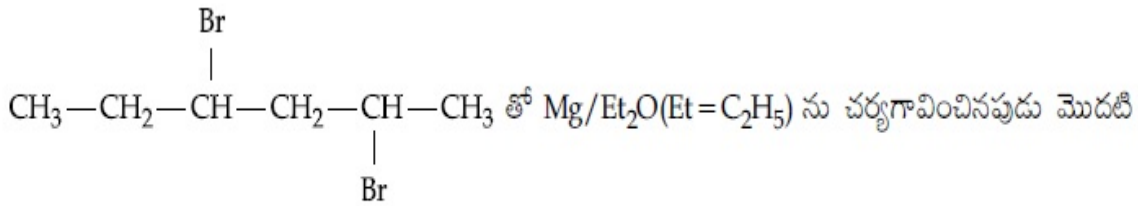




70819153722.

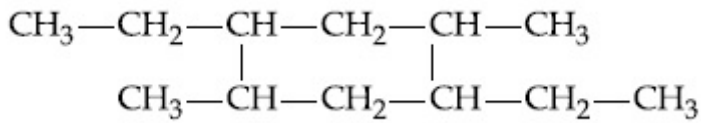
Question Number : 43 Question Id : 70819116186 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

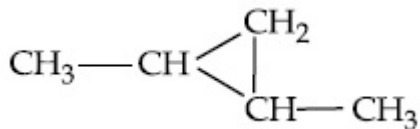


అంచెలో ఏర్పడు ఏర్పడు క్రియాజన్యము :

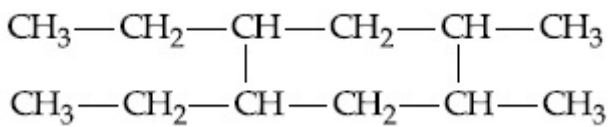
Options :



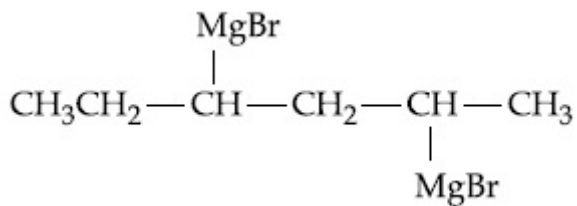
70819153719.



70819153720.



70819153721.



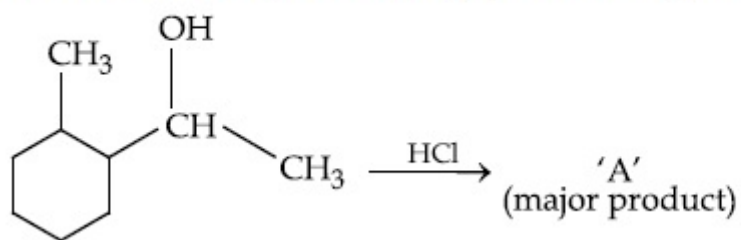
70819153722.

Question Number : 44 Question Id : 70819116187 Question Type : MCQ O

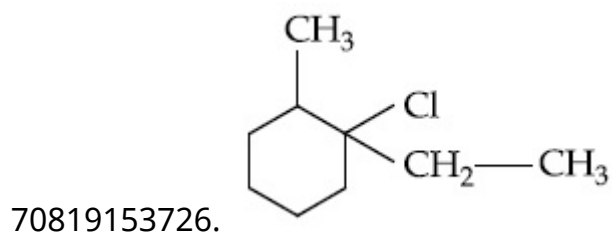
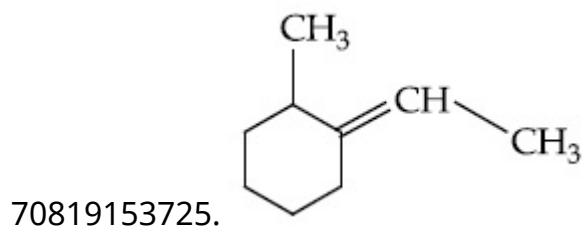
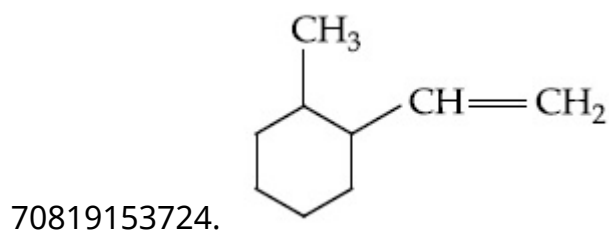
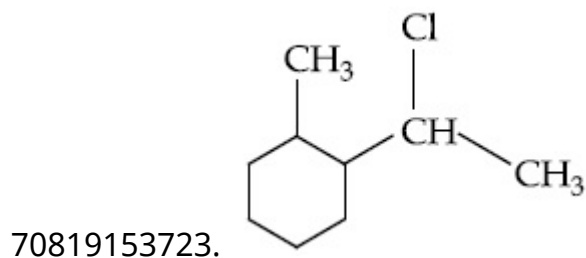
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

What is the final product (major) 'A' in the given reaction ?



Options :

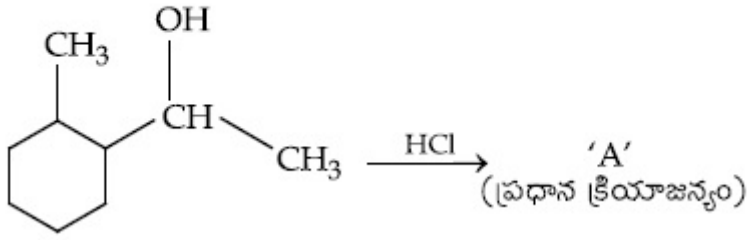


Question Number : 44 Question Id : 70819116187 Question Type : MCQ Option Shuffling : Yes

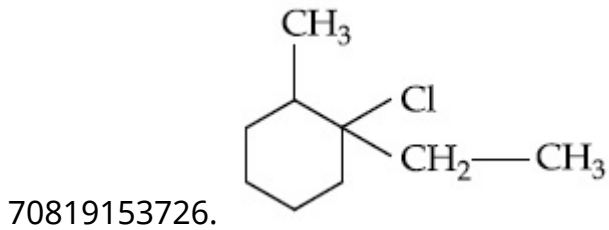
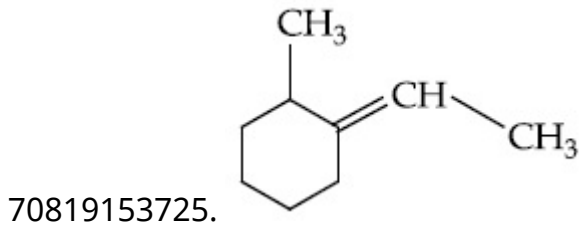
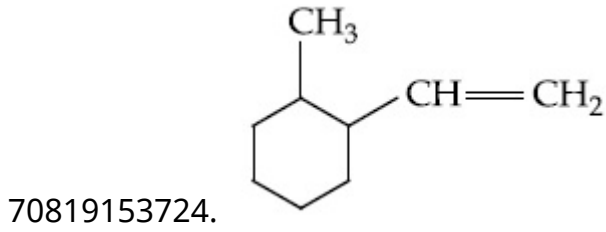
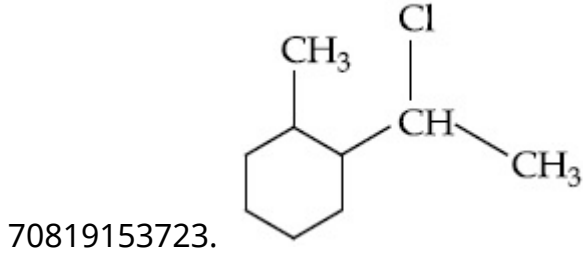
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ఇచ్చిన చర్యలో చివరి క్రియాజన్యం (ప్రధాన) 'A' ఏది ?



Options :

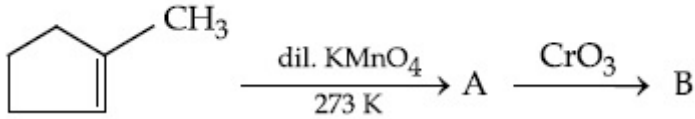


Question Number : 45 Question Id : 70819116188 Question Type : MCQ Option Shuffling : Yes

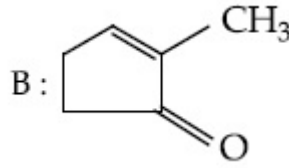
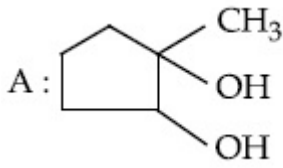
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

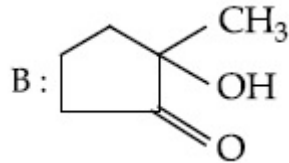
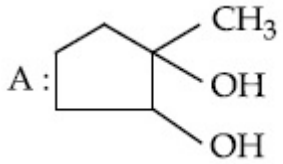
Identify products A and B.



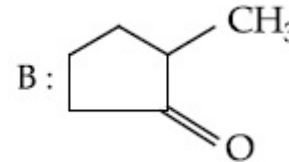
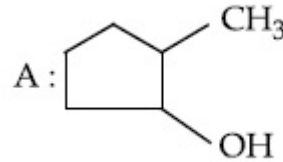
Options :



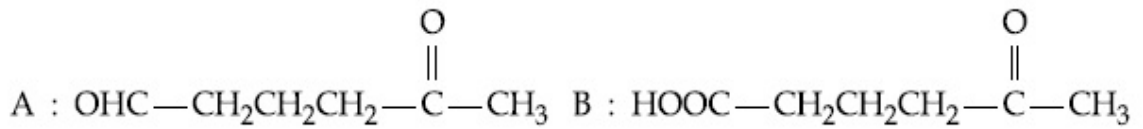
70819153727.



70819153728.



70819153729.



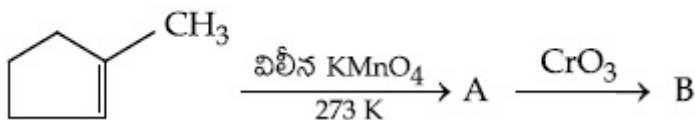
70819153730.

Question Number : 45 Question Id : 70819116188 Question Type : MCQ Option Shuffling : Yes

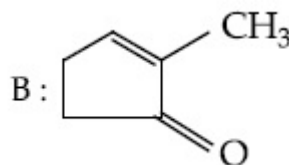
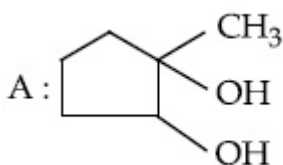
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

క్రియాజన్యాలు A మరియు B లను గుర్తించుము :

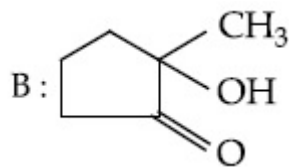
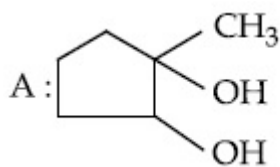


Options :

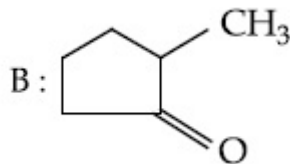
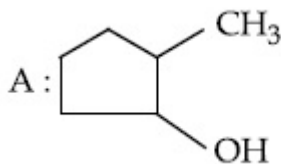


70819153727.

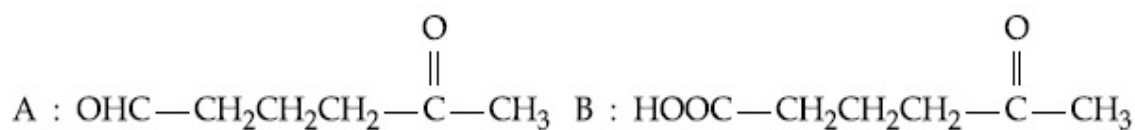
70819153728.



70819153729.



70819153730.

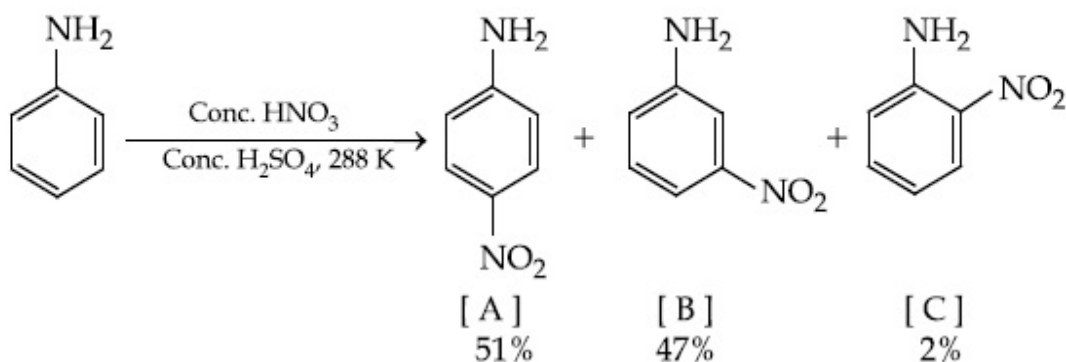


Question Number : 46 Question Id : 70819116189 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

In the following reaction the reason why *meta*-nitro product also formed is :



Options :

70819153731. -NH<sub>2</sub> group is highly *meta*-directive

70819153732. -NO<sub>2</sub> substitution always takes place at *meta*-position

70819153733. Formation of anilinium ion

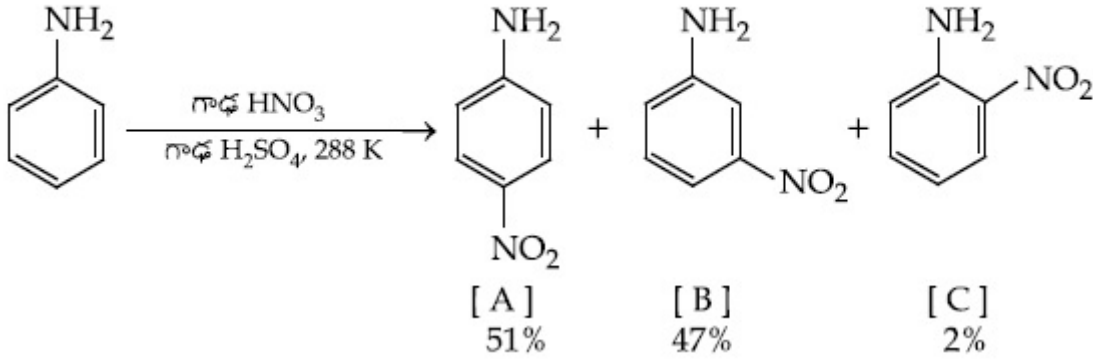


70819153734. low temperature

Question Number : 46 Question Id : 70819116189 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

క్రింది చర్యలో మెటా-నైట్రో క్రియాజన్యం ఏర్పడుటకు గల కారణము :



Options :

70819153731. -NH<sub>2</sub> అత్యంత మెటా-నిర్దేశక సమూహము

70819153732. -NO<sub>2</sub> ప్రతిక్షేపణము ఎల్లప్పుడు మెటా-స్థానంలో జరుగును

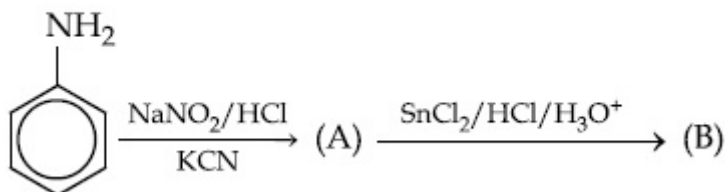
70819153733. ఎనిలినీయం అయాన్ ఏర్పడుట

70819153734. అల్ప ఉష్ణోగ్రత

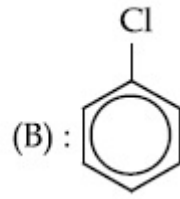
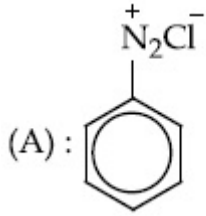
Question Number : 47 Question Id : 70819116190 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

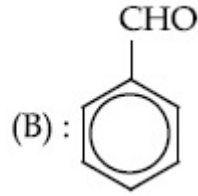
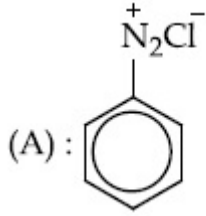
'A' and 'B' in the following reactions are :



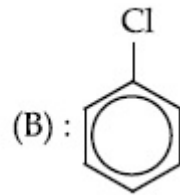
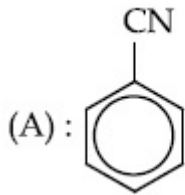
Options :



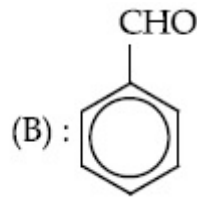
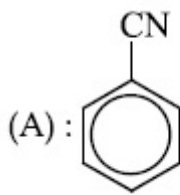
70819153735.



70819153736.



70819153737.



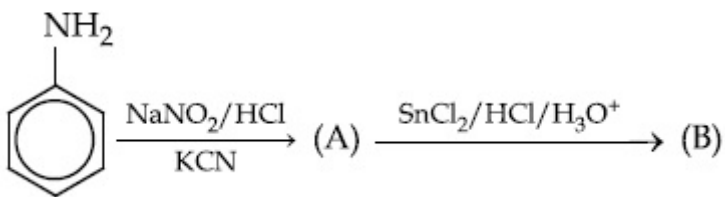
70819153738.

Question Number : 47 Question Id : 70819116190 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

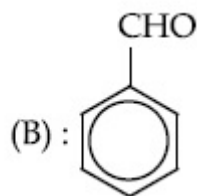
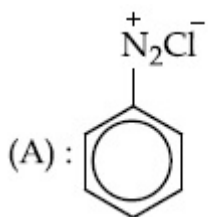
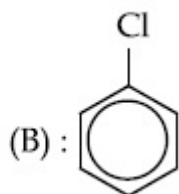
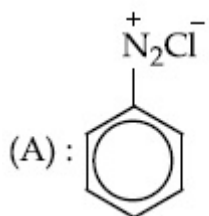
Correct Marks : 4 Wrong Marks : 1

క్రిందిచర్యలలో 'A' మరియు 'B' లు :

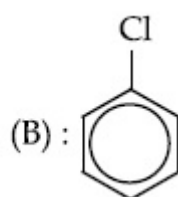
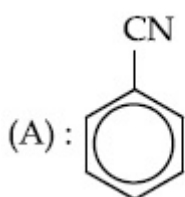


Options :

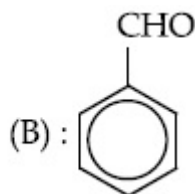
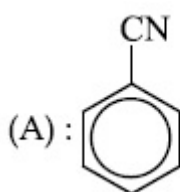
70819153735.



70819153736.



70819153737.



70819153738.

**Question Number : 48 Question Id : 70819116191 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

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

Match List I with List II.

**List I  
(Monomer Unit)**

**List II  
(Polymer)**

- |                            |                    |
|----------------------------|--------------------|
| (a) Caprolactum            | (i) Natural rubber |
| (b) 2-Chloro-1,3-butadiene | (ii) Buna-N        |
| (c) Isoprene               | (iii) Nylon 6      |
| (d) Acrylonitrile          | (iv) Neoprene      |

Choose the correct answer from the options given below :

**Options :**

70819153739. (a) → (i), (b) → (ii), (c) → (iii), (d) → (iv)

70819153740. (a) → (iv), (b) → (iii), (c) → (ii), (d) → (i)

70819153741. (a) → (ii), (b) → (i), (c) → (iv), (d) → (iii)

70819153742. (a) → (iii), (b) → (iv), (c) → (i), (d) → (ii)

**Question Number : 48 Question Id : 70819116191 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

జాబితా I ను II తో జతపరుచుము :

| జాబితా I                     | జాబితా II       |
|------------------------------|-----------------|
| (మోనోమర్ యూనిట్)             | (పాలిమర్)       |
| (a) కాప్రోలాక్టం             | (i) సహజ రబ్బర్  |
| (b) 2-క్లోరో-1,3-బ్యూటాడైఈన్ | (ii) బునా-N     |
| (c) ఐసోప్రీన్                | (iii) నైలాన్ 6  |
| (d) ఎక్రెలో నైట్రేట్         | (iv) నియోప్రిన్ |

క్రింది ఐచ్ఛికాల నుండి సరియైన జవాబును ఎన్నుకోండి :

**Options :**

70819153739. (a) → (i), (b) → (ii), (c) → (iii), (d) → (iv)

70819153740. (a) → (iv), (b) → (iii), (c) → (ii), (d) → (i)

70819153741. (a) → (ii), (b) → (i), (c) → (iv), (d) → (iii)

70819153742. (a) → (iii), (b) → (iv), (c) → (i), (d) → (ii)

**Question Number : 49 Question Id : 70819116192 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

Out of the following, which type of interaction is responsible for the stabilisation of  $\alpha$ -helix structure of proteins ?

**Options :**

70819153743. vander Waals forces

70819153744. Covalent bonding

70819153745. Ionic bonding

70819153746. Hydrogen bonding

**Question Number : 49 Question Id : 70819116192 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

క్రిందివాటిలో ఏ రకమైన అన్యోన్య చర్యలు ప్రొటీన్ల  $\alpha$ -హెలిక్స్ నిర్మాణ స్థిరీకరణానికి కారణము ?

**Options :**

70819153743. వాండర్ వాల్ బలాలు

70819153744. కోవాలెంట్ బంధము

70819153745. అయానిక బంధము

70819153746. హైడ్రోజన్ బంధము

**Question Number : 50 Question Id : 70819116193 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

Given below are two statements :

**Statement I :** Colourless cupric metaborate is reduced to cuprous metaborate in a luminous flame.

**Statement II :** Cuprous metaborate is obtained by heating boric anhydride and copper sulphate in a non-luminous flame.

In the light of the above statements, choose the most appropriate answer from the options given below.

**Options :**

70819153747. Both Statement I and Statement II are true

70819153748. Both Statement I and Statement II are false

70819153749. Statement I is true but Statement II is false

70819153750. Statement I is false but Statement II is true

**Question Number : 50 Question Id : 70819116193 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

క్రింద రెండు వివరణలు ఇవ్వబడినవి :

**వివరణ I :** రంగులేని కుప్రిక్ మెటాబోరేట్ ప్రకాశవంతమైన జ్వాలలో క్యూప్రస్ మెటాబో-రేట్ గా క్షయకరణం చెందును.

**వివరణ II :** బోరిక్ ఎన్ హైడ్రైడ్ మరియు కాపర్ సల్ఫేట్ లను ఒక ప్రకాశహీనమైన (non-luminous) జ్వాలలో వేడిచేసినప్పుడు క్యూప్రస్ మెటాబోరేట్ లభించును.

పై వివరణల ఆధారంగా, క్రింది ఐచ్ఛికాలలో సరియైన జవాబును ఎన్నుకోండి :

**Options :**

70819153747. వివరణ I మరియు వివరణ II లు సరియైనవి

70819153748. వివరణ I మరియు వివరణ II లు సరియైనవి కావు

70819153749. వివరణ I సరియైనది కాని వివరణ II సరియైనది కాదు

## Chemistry Section B

|                                       |           |
|---------------------------------------|-----------|
| Section Id :                          | 708191619 |
| Section Number :                      | 4         |
| Section type :                        | Online    |
| Mandatory or Optional :               | Mandatory |
| Number of Questions :                 | 10        |
| Number of Questions to be attempted : | 5         |
| Section Marks :                       | 20        |
| Mark As Answered Required? :          | Yes       |
| Sub-Section Number :                  | 1         |
| Sub-Section Id :                      | 708191899 |
| Question Shuffling Allowed :          | Yes       |

Question Number : 51 Question Id : 70819116194 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

4.5 g of compound A (MW=90) was used to make 250 mL of its aqueous solution. The molarity of the solution in M is  $x \times 10^{-1}$ . The value of  $x$  is \_\_\_\_\_. (Rounded off to the nearest integer)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

**Question Number : 51 Question Id : 70819116194 Question Type : SA**

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

4.5 g ల సమ్మేళం A (అణుభారం=90) ను దాని 250 mL జలద్రావణం తయారుచేయుటకు ఉపయోగించారు. ద్రావణపు మోలారిటీ M లో  $x \times 10^{-1}$ . x విలువ..... (దగ్గరి పూర్ణాంకము)

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.001

**Question Number : 52 Question Id : 70819116195 Question Type : SA**

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

The coordination number of an atom in a body-centered cubic structure is .....  
[Assume that the lattice is made up of atoms.]

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.001

**Question Number : 52 Question Id : 70819116195 Question Type : SA**

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

అంత: కేంద్రిత ఘనంలో పరమాణు సమన్వయ సంఖ్య .....  
[జాలకము పరమాణువులతో ఏర్పడినదని అనుకొనుము]

**Response Type : Numeric**

**Evaluation Required For SA : Yes**



**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 53 Question Id : 70819116196 Question Type : SA**

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

A proton and a  $\text{Li}^{3+}$  nucleus are accelerated by the same potential. If  $\lambda_{\text{Li}}$  and  $\lambda_{\text{p}}$  denote the de Broglie wavelengths of  $\text{Li}^{3+}$  and proton respectively, then the value of  $\frac{\lambda_{\text{Li}}}{\lambda_{\text{p}}}$  is  $x \times 10^{-1}$ .

The value of  $x$  is \_\_\_\_\_. (Rounded off to the nearest integer)

[Mass of  $\text{Li}^{3+} = 8.3$  mass of proton]

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 53 Question Id : 70819116196 Question Type : SA**

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

ఒక ప్రోటాన్ మరియు ఒక  $\text{Li}^{3+}$  కేంద్రకము సమాన శక్తి (potential) గుండా త్వరణం చెందబడ్డాయి (accelerated).  $\lambda_{\text{Li}}$  మరియు  $\lambda_{\text{p}}$  లు వరుసగా  $\text{Li}^{3+}$  మరియు ప్రోటాన్ల డిబ్రోగ్లీ తరంగదైర్ఘ్యాలు అయితే,  $\frac{\lambda_{\text{Li}}}{\lambda_{\text{p}}}$  విలువ  $x \times 10^{-1}$ .  $x$  విలువ \_\_\_\_\_. (దగ్గరి పూర్ణాంకము)

[ $\text{Li}^{3+}$  భారం = 8.3 ప్రోటాన్ భారం]

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 54 Question Id : 70819116197 Question Type : SA**

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

For the reaction  $A_{(g)} \rightarrow B_{(g)}$ , the value of the equilibrium constant at 300 K and 1 atm is equal to 100.0. The value of  $\Delta_r G$  for the reaction at 300 K and 1 atm in  $J mol^{-1}$  is  $-xR$ , where  $x$  is \_\_\_\_\_ . (Rounded off to the nearest integer)

[ $R=8.31 J mol^{-1}K^{-1}$  and  $\ln 10=2.3$ ]

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 54 Question Id : 70819116197 Question Type : SA**

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

300 K మరియు 1 atm వద్ద,  $A_{(g)} \rightarrow B_{(g)}$  చర్యకు సమతాస్థితి స్థిరాంకము 100.0. ఈ చర్యకు 300 K మరియు 1 atm వద్ద  $\Delta_r G$  విలువ  $J mol^{-1}$  లలో  $-xR$ . అయితే  $x$  విలువ \_\_\_\_\_ .

(దగ్గరి పూర్ణాంకము)

[ $R=8.31 J mol^{-1}K^{-1}$  and  $\ln 10=2.3$ ]

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 55 Question Id : 70819116198 Question Type : SA**

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

When 9.45 g of  $\text{ClCH}_2\text{COOH}$  is added to 500 mL of water, its freezing point drops by  $0.5^\circ\text{C}$ . The dissociation constant of  $\text{ClCH}_2\text{COOH}$  is  $x \times 10^{-3}$ . The value of  $x$  is \_\_\_\_\_. (Rounded off to the nearest integer)

$[\text{K}_f(\text{H}_2\text{O}) = 1.86 \text{ K kg mol}^{-1}]$

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.001

**Question Number : 55 Question Id : 70819116198 Question Type : SA**

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

9.45 g ల  $\text{ClCH}_2\text{COOH}$  ను 500 mL ల నీటికి కలిపినపుడు దాని ఘనీభవన స్థానం  $0.5^\circ\text{C}$  తగ్గింది.  $\text{ClCH}_2\text{COOH}$  యొక్క వియోజన స్థిరాంకము  $x \times 10^{-3}$ . అయితే  $x$  విలువ \_\_\_\_\_.

(దగ్గరి పూర్ణాంకము)

$[\text{K}_f(\text{H}_2\text{O}) = 1.86 \text{ K kg mol}^{-1}]$

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.001

**Question Number : 56 Question Id : 70819116199 Question Type : SA**

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

At 1990 K and 1 atm pressure, there are equal number of  $\text{Cl}_2$  molecules and Cl atoms in the reaction mixture. The value of  $K_p$  for the reaction  $\text{Cl}_{2(g)} \rightleftharpoons 2\text{Cl}_{(g)}$  under the above conditions is  $x \times 10^{-1}$ . The value of  $x$  is \_\_\_\_\_. (Rounded off to the nearest integer)

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 56 **Question Id :** 70819116199 **Question Type :** SA

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

1990 K మరియు 1 atm పీడనం వద్ద ఒక చర్య మిశ్రమంలో సమాన సంఖ్యగల  $\text{Cl}_2$  అణువులు మరియు Cl పరమాణువులు ఉన్నాయి. పై పరిస్థితులలో,  $\text{Cl}_{2(g)} \rightleftharpoons 2\text{Cl}_{(g)}$  చర్యకు  $K_p$  విలువ  $x \times 10^{-1}$  అయితే  $x$  విలువ \_\_\_\_\_. (దగ్గరి పూర్ణాంకము)

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

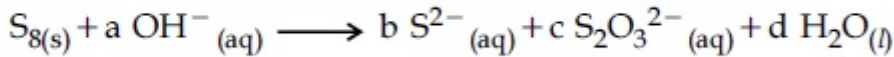
**Possible Answers :**

5 to 5.001

**Question Number :** 57 **Question Id :** 70819116200 **Question Type :** SA

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

The reaction of sulphur in alkaline medium is given below :



The values of 'a' is \_\_\_\_\_. (Integer answer)

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

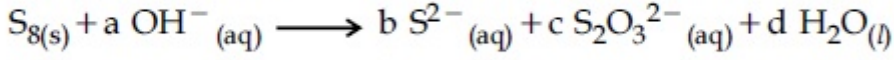
**Possible Answers :**

5 to 5.001

**Question Number : 57 Question Id : 70819116200 Question Type : SA**

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

క్షార యానకంలో జరిగే సల్ఫర్ చర్య క్రింద ఇవ్వబడింది :



'a' విలువ \_\_\_\_\_. (పూర్ణాంక జవాబు)

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 58 Question Id : 70819116201 Question Type : SA**

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

Gaseous cyclobutene isomerizes to butadiene in a first order process which has a 'K' value of  $3.3 \times 10^{-4} \text{ s}^{-1}$  at  $153^\circ\text{C}$ . The time in minutes it takes for the isomerization to proceed 40% to completion at this temperature is \_\_\_\_\_. (Rounded off to the nearest integer)

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 58 Question Id : 70819116201 Question Type : SA**

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

వాయు సైక్లోబ్యూటీన్, బ్యూటాడైఈన్ గా సదృశకరణం చెందుట ఒక మొదటి క్రమాంక ప్రక్రియ.  $153^{\circ}\text{C}$  వద్ద ఈ ప్రక్రియ 'k' విలువ  $3.3 \times 10^{-4} \text{s}^{-1}$ . ఇదే ఉష్ణోగ్రత వద్ద 40% సదృశీకరణం (isomerization) పూర్తి కావడానికి పట్టుకాలము \_\_\_\_\_ నిమిషాలు. (దగ్గరి పూర్ణాంకానికి సరిచేయండి)

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.001

**Question Number : 59 Question Id : 70819116202 Question Type : SA**

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

Number of amphoteric compounds among the following is \_\_\_\_\_.

(A) BeO (B) BaO (C) Be(OH)<sub>2</sub> (D) Sr(OH)<sub>2</sub>

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.001

**Question Number : 59 Question Id : 70819116202 Question Type : SA**

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

ఈ క్రింది వానిలో ద్విస్వభావయుత సమ్మేళనాల సంఖ్య \_\_\_\_\_.

(A) BeO (B) BaO (C) Be(OH)<sub>2</sub> (D) Sr(OH)<sub>2</sub>

**Response Type : Numeric**

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

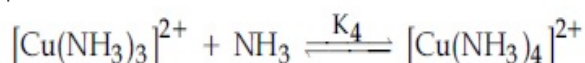
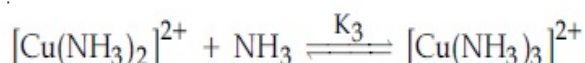
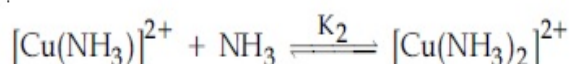
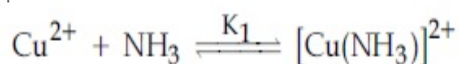
**Possible Answers :**

5 to 5.001

**Question Number :** 60 **Question Id :** 70819116203 **Question Type :** SA

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

The stepwise formation of  $[\text{Cu}(\text{NH}_3)_4]^{2+}$  is given below :



The value of stability constants  $K_1$ ,  $K_2$ ,  $K_3$  and  $K_4$  are  $10^4$ ,  $1.58 \times 10^3$ ,  $5 \times 10^2$  and  $10^2$  respectively. The overall equilibrium constants for dissociation of  $[\text{Cu}(\text{NH}_3)_4]^{2+}$  is  $x \times 10^{-12}$ . The value of  $x$  is \_\_\_\_\_. (Rounded off to the nearest integer)

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

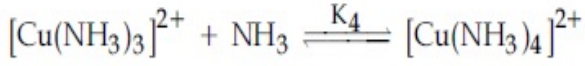
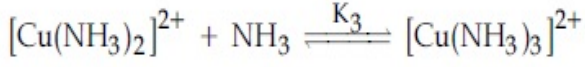
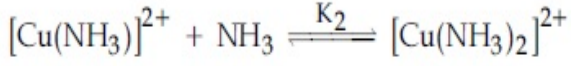
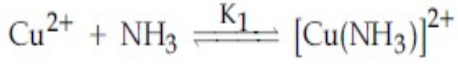
**Possible Answers :**

5 to 5.001

**Question Number :** 60 **Question Id :** 70819116203 **Question Type :** SA

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

$[\text{Cu}(\text{NH}_3)_4]^{2+}$  ఏర్పడటాన్ని అంచెల పరంగా క్రింద ఇవ్వబడింది :



స్థిరత్వ స్థిరాంకాల  $K_1, K_2, K_3$  మరియు  $K_4$  ల విలువలు వరుసగా  $10^4, 1.58 \times 10^3, 5 \times 10^2$  మరియు  $10^2$   $[\text{Cu}(\text{NH}_3)_4]^{2+}$  వియోగానికి మొత్తం చర్య స్థిరత్వ స్థిరాంకము  $x \times 10^{-12}$  అయితే  $x$  విలువ \_\_\_\_\_.  
(దగ్గరి పూర్ణాంకము)

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

## Mathematics Section A

|  |           |
|--|-----------|
| <b>Section Id :</b>                          | 708191620 |
| <b>Section Number :</b>                      | 5         |
| <b>Section type :</b>                        | Online    |
| <b>Mandatory or Optional :</b>               | Mandatory |
| <b>Number of Questions :</b>                 | 20        |
| <b>Number of Questions to be attempted :</b> | 20        |
| <b>Section Marks :</b>                       | 80        |
| <b>Mark As Answered Required? :</b>          | Yes       |
| <b>Sub-Section Number :</b>                  | 1         |
| <b>Sub-Section Id :</b>                      | 708191900 |
| <b>Question Shuffling Allowed :</b>          | Yes       |



Question Number : 61 Question Id : 70819116204 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let  $f: \mathbb{R} \rightarrow \mathbb{R}$  be defined as  $f(x) = 2x - 1$  and  $g: \mathbb{R} - \{1\} \rightarrow \mathbb{R}$  be defined as  $g(x) = \frac{x - \frac{1}{2}}{x - 1}$ .

Then the composition function  $f(g(x))$  is :

Options :

70819153761. one-one but not onto

70819153762. onto but not one-one

70819153763. neither one-one nor onto

70819153764. both one-one and onto

Question Number : 61 Question Id : 70819116204 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$f: \mathbb{R} \rightarrow \mathbb{R}$  ను  $f(x) = 2x - 1$  గా,  $g: \mathbb{R} - \{1\} \rightarrow \mathbb{R}$  ను  $g(x) = \frac{x - \frac{1}{2}}{x - 1}$  గా నిర్వచితం అనుకోండి. అప్పుడు

సంయుక్త ప్రమేయం  $f(g(x))$  అనేది :

Options :

70819153761. అన్వేకం అవుతుంది కాని సంగ్రస్తం కాదు

70819153762. సంగ్రస్తమే కాని అన్వేకం కాదు

70819153763. అన్వేకమూ కాదు సంగ్రస్తమూ కాదు

70819153764. అన్వేకం మరియు సంగ్రస్తం రెండూను

**Question Number : 62 Question Id : 70819116205 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

Let p and q be two positive numbers such that  $p + q = 2$  and  $p^4 + q^4 = 272$ . Then p and q are roots of the equation :

**Options :**

70819153765.  $x^2 - 2x + 136 = 0$

70819153766.  $x^2 - 2x + 16 = 0$

70819153767.  $x^2 - 2x + 8 = 0$

70819153768.  $x^2 - 2x + 2 = 0$

**Question Number : 62 Question Id : 70819116205 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

రెండు ధనసంఖ్యలు p, q లు  $p + q = 2$  మరియు  $p^4 + q^4 = 272$  అయ్యేట్లున్నాయనుకోండి. అప్పుడు p మరియు q లు మూలాలుగా గల సమీకరణం :

**Options :**

70819153765.  $x^2 - 2x + 136 = 0$

70819153766.  $x^2 - 2x + 16 = 0$

70819153767.  $x^2 - 2x + 8 = 0$

70819153768.  $x^2 - 2x + 2 = 0$

**Question Number : 63 Question Id : 70819116206 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

The system of linear equations

$$3x - 2y - kz = 10$$

$$2x - 4y - 2z = 6$$

$$x + 2y - z = 5m$$

is inconsistent if :

**Options :**

70819153769.  $k \neq 3, m \neq \frac{4}{5}$

70819153770.  $k = 3, m = \frac{4}{5}$

70819153771.  $k = 3, m \neq \frac{4}{5}$

70819153772.  $k \neq 3, m \in \mathbb{R}$

**Question Number : 63 Question Id : 70819116206 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

రేఖీయ సమీకరణాల వ్యవస్థ

$$3x - 2y - kz = 10$$

$$2x - 4y - 2z = 6$$

$$x + 2y - z = 5m$$

అసంగతమగుటకు కావలసినది :

**Options :**

70819153769.  $k \neq 3, m \neq \frac{4}{5}$

70819153770.  $k = 3, m = \frac{4}{5}$

70819153771.  $k = 3, m \neq \frac{4}{5}$

70819153772.  $k \neq 3, m \in \mathbb{R}$

**Question Number : 64 Question Id : 70819116207 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

The value of

$$-{}^{15}C_1 + 2 \cdot {}^{15}C_2 - 3 \cdot {}^{15}C_3 + \dots - 15 \cdot {}^{15}C_{15} + {}^{14}C_1 + {}^{14}C_3 + {}^{14}C_5 + \dots + {}^{14}C_{11} \text{ is :}$$

**Options :**

70819153773.  $2^{16} - 1$

70819153774.  $2^{13} - 14$

70819153775.  $2^{13} - 13$

70819153776.  $2^{14}$

**Question Number : 64 Question Id : 70819116207 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

$-{}^{15}C_1 + 2 \cdot {}^{15}C_2 - 3 \cdot {}^{15}C_3 + \dots - 15 \cdot {}^{15}C_{15} + {}^{14}C_1 + {}^{14}C_3 + {}^{14}C_5 + \dots + {}^{14}C_{11}$  యొక్క విలువ :

**Options :**

70819153773.  $2^{16} - 1$

70819153774.  $2^{13} - 14$

70819153775.  $2^{13} - 13$

70819153776.  $2^{14}$

**Question Number : 65 Question Id : 70819116208 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

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

If  $e^{(\cos^2 x + \cos^4 x + \cos^6 x + \dots) \log_e 2}$  satisfies the equation  $t^2 - 9t + 8 = 0$ , then the value of

$\frac{2 \sin x}{\sin x + \sqrt{3} \cos x} \left( 0 < x < \frac{\pi}{2} \right)$  is :

**Options :**

70819153777.  $\frac{1}{2}$

70819153778.  $\sqrt{3}$

70819153779.  $\frac{3}{2}$

70819153780.  $2\sqrt{3}$

**Question Number : 65 Question Id : 70819116208 Question Type : MCQ O**

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$e^{(\cos^2 x + \cos^4 x + \cos^6 x + \dots) \log_e 2}$  అనేది సమీకరణం  $t^2 - 9t + 8 = 0$  ను తృప్తిపరిచే,  $\frac{2 \sin x}{\sin x + \sqrt{3} \cos x} \left( 0 < x < \frac{\pi}{2} \right)$

యొక్క విలువ :

Options :

70819153777.  $\frac{1}{2}$

70819153778.  $\sqrt{3}$

70819153779.  $\frac{3}{2}$

70819153780.  $2\sqrt{3}$

Question Number : 66 Question Id : 70819116209 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$\lim_{x \rightarrow 0} \frac{\int_0^{x^2} (\sin \sqrt{t}) dt}{x^3}$  is equal to :

Options :

70819153781.  $\frac{2}{3}$

70819153782.  $\frac{3}{2}$

70819153783.  $\frac{1}{15}$

70819153784. 0

Question Number : 66 Question Id : 70819116209 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$$\lim_{x \rightarrow 0} \frac{\int_0^{x^2} (\sin \sqrt{t}) dt}{x^3} = :$$

Options :

70819153781.  $\frac{2}{3}$

70819153782.  $\frac{3}{2}$

70819153783.  $\frac{1}{15}$

70819153784. 0

Question Number : 67 Question Id : 70819116210 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The function  $f(x) = \frac{4x^3 - 3x^2}{6} - 2 \sin x + (2x - 1) \cos x$  :

Options :

70819153785. increases in  $\left[ \frac{1}{2}, \infty \right)$

70819153786. decreases in  $\left[\frac{1}{2}, \infty\right)$

70819153787. increases in  $\left(-\infty, \frac{1}{2}\right]$

70819153788. decreases in  $\left(-\infty, \frac{1}{2}\right]$

**Question Number : 67 Question Id : 70819116210 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

ప్రమేయం  $f(x) = \frac{4x^3 - 3x^2}{6} - 2 \sin x + (2x - 1) \cos x$  :

**Options :**

70819153785.  $\left[\frac{1}{2}, \infty\right)$  పై ఆరోహణం చెందును

70819153786.  $\left[\frac{1}{2}, \infty\right)$  పై అవరోహణం చెందును

70819153787.  $\left(-\infty, \frac{1}{2}\right]$  పై ఆరోహణం చెందును

70819153788.  $\left(-\infty, \frac{1}{2}\right]$  పై అవరోహణం చెందును

**Question Number : 68 Question Id : 70819116211 Question Type : MCQ O  
Is Question Mandatory : No**



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

A scientific committee is to be formed from 6 Indians and 8 foreigners, which includes at least 2 Indians and double the number of foreigners as Indians. Then the number of ways, the committee can be formed, is :

**Options :**

70819153789. 1050

70819153790. 1625

70819153791. 560

70819153792. 575

**Question Number : 68 Question Id : 70819116211 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

6 గురు భారతీయులు మరియు 8 మంది విదేశీయుల నుండి కనీసం ఇద్దరు భారతీయులు ఉండేట్లు మరియు భారతీయుల సంఖ్య విదేశీయుల సంఖ్యకు రెట్టింపు ఉండేట్లుగా ఒక వైజ్ఞానిక కమిటీని ఏర్పాటు చేయవలసి ఉంది. అలా కమిటీ ఏర్పాటు చేయగల విధాల సంఖ్య :

**Options :**

70819153789. 1050

70819153790. 1625

70819153791. 560

70819153792. 575

**Question Number : 69 Question Id : 70819116212 Question Type : MCQ O**

**Is Question Mandatory : No**

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

If  $f: \mathbb{R} \rightarrow \mathbb{R}$  is a function defined by  $f(x) = [x-1] \cos\left(\frac{2x-1}{2}\right)\pi$ , where  $[ \cdot ]$  denotes the greatest integer function, then  $f$  is :

**Options :**

70819153793. discontinuous only at  $x=1$

70819153794. discontinuous at all integral values of  $x$  except at  $x=1$

70819153795. continuous only at  $x=1$

70819153796. continuous for every real  $x$

**Question Number : 69 Question Id : 70819116212 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

$[ \cdot ]$  అనేది గరిష్ట పూర్ణాంక ప్రమేయాన్ని సూచిస్తే,  $f(x) = [x-1] \cos\left(\frac{2x-1}{2}\right)\pi$  చే నిర్వచితమైన ప్రమేయం  $f: \mathbb{R} \rightarrow \mathbb{R}$  అనేది :

**Options :**

70819153793.  $x=1$  వద్ద మాత్రమే విచ్ఛిన్నము

70819153794.  $x=1$  వద్ద తప్ప మిగతా అన్ని  $x$  యొక్క పూర్ణాంక విలువల వద్ద విచ్ఛిన్నము

70819153795.  $x=1$  వద్ద మాత్రమే అవిచ్ఛిన్నము

70819153796. ప్రతీవాస్తవ సంఖ్య  $x$  వద్ద అవిచ్ఛిన్నము

Question Number : 70 Question Id : 70819116213 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If  $\int \frac{\cos x - \sin x}{\sqrt{8 - \sin 2x}} dx = a \sin^{-1} \left( \frac{\sin x + \cos x}{b} \right) + c$ , where  $c$  is a constant of integration, then

the ordered pair  $(a, b)$  is equal to :

Options :

70819153797. (3, 1)

70819153798. (1, 3)

70819153799. (-1, 3)

70819153800. (1, -3)

Question Number : 70 Question Id : 70819116213 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$\int \frac{\cos x - \sin x}{\sqrt{8 - \sin 2x}} dx = a \sin^{-1} \left( \frac{\sin x + \cos x}{b} \right) + c$ , (ఇక్కడ  $c$  సమాకలన స్థిరాంకం) అయితే క్రమయుగ్మం

$(a, b) = :$

Options :

70819153797. (3, 1)

70819153798. (1, 3)

70819153799. (-1, 3)

70819153800. (1, -3)

Question Number : 71 Question Id : 70819116214 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The area (in sq. units) of the part of the circle  $x^2 + y^2 = 36$ , which is outside the parabola  $y^2 = 9x$ , is :

Options :

70819153801.  $24\pi + 3\sqrt{3}$

70819153802.  $24\pi - 3\sqrt{3}$

70819153803.  $12\pi + 3\sqrt{3}$

70819153804.  $12\pi - 3\sqrt{3}$

Question Number : 71 Question Id : 70819116214 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

పరావలయం  $y^2 = 9x$  కు వెలుపల ఉన్న  $x^2 + y^2 = 36$  అనే వృత్తం యొక్క భాగం వైశాల్యం (చ.యూనిట్లలో) :

Options :

70819153801.  $24\pi + 3\sqrt{3}$

70819153802.  $24\pi - 3\sqrt{3}$

70819153803.  $12\pi + 3\sqrt{3}$

70819153804.  $12\pi - 3\sqrt{3}$

Question Number : 72 Question Id : 70819116215 Question Type : MCQ O

**Is Question Mandatory : No**

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

The population  $P = P(t)$  at time 't' of a certain species follows the differential equation

$$\frac{dP}{dt} = 0.5P - 450. \text{ If } P(0) = 850, \text{ then the time at which population becomes zero is :}$$

**Options :**

70819153805.  $\log_e 9$

70819153806.  $\frac{1}{2} \log_e 18$

70819153807.  $\log_e 18$

70819153808.  $2 \log_e 18$

**Question Number : 72 Question Id : 70819116215 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

ఒక తెగ యొక్క జనాభా సమయం 't' వద్ద  $P = P(t)$  అనేది అవకలన సమీకరణం  $\frac{dP}{dt} = 0.5P - 450$ . ను

అనుసరిస్తుంది.  $P(0) = 850$  అయితే ఏ సమయంలో ఆ తెగ జనాభా సున్నా అవుతుంది :

**Options :**

70819153805.  $\log_e 9$

70819153806.  $\frac{1}{2} \log_e 18$

70819153807.  $\log_e 18$

70819153808.  $2\log_e 18$

**Question Number : 73 Question Id : 70819116216 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

A man is walking on a straight line. The arithmetic mean of the reciprocals of the intercepts of this line on the coordinate axes is  $\frac{1}{4}$ . Three stones A, B and C are placed at the points (1, 1), (2, 2) and (4, 4) respectively. Then which of these stones is/are on the path of the man ?

**Options :**

70819153809. A only

70819153810. B only

70819153811. C only

70819153812. All the three

**Question Number : 73 Question Id : 70819116216 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

ఒక మనిషి ఒక సరళరేఖపై నడుస్తున్నాడు. ఈ సరళరేఖ నిరూపకాక్షాలపై ఏర్పరచే అంతర ఖండాల వ్యుత్థమాల అంకమధ్యమము  $\frac{1}{4}$ . A, B, C అనే మూడు రాళ్ళు వరుసగా బిందువులు (1, 1), (2, 2), (4, 4) వద్ద ఉంచారు. ఈ రాళ్ళలో ఏది (లేదా ఏవి) ఆ మనిషి నడుస్తున్న దారిలో ఉన్నాయి ?

**Options :**

70819153809. A మాత్రమే

70819153810.

B మాత్రమే

70819153811. C మాత్రమే

70819153812. మూడుకూడా

**Question Number : 74 Question Id : 70819116217 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

The locus of the mid-point of the line segment joining the focus of the parabola  $y^2 = 4ax$  to a moving point of the parabola, is another parabola whose directrix is :

**Options :**

70819153813.  $x = a$

70819153814.  $x = -\frac{a}{2}$

70819153815.  $x = 0$

70819153816.  $x = \frac{a}{2}$

**Question Number : 74 Question Id : 70819116217 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

$y^2 = 4ax$  పై ఒక చరబిందువును మరియు నాభిని కలిపే రేఖాఖండం మధ్య బిందువు బిందుపథం ఒక పరావలయం అవుతుంటే, దాని నియతరేఖ :

**Options :**

70819153813.  $x = a$

70819153814.  $x = -\frac{a}{2}$

70819153815.  $x = 0$

70819153816.  $x = \frac{a}{2}$

**Question Number : 75 Question Id : 70819116218 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

If the tangent to the curve  $y = x^3$  at the point  $P(t, t^3)$  meets the curve again at  $Q$ , then the ordinate of the point which divides  $PQ$  internally in the ratio  $1 : 2$  is :

**Options :**

70819153817.  $0$

70819153818.  $2t^3$

70819153819.  $-t^3$

70819153820.  $-2t^3$

**Question Number : 75 Question Id : 70819116218 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

వక్రం  $y = x^3$  పై  $P(t, t^3)$  అనే బిందువు వద్ద స్పర్శరేఖ ఆ వక్రాన్ని మళ్ళీ  $Q$  వద్ద కలిస్తే,  $PQ$  ని అంతరంగా  $1 : 2$  నిష్పత్తిలో విభజించే బిందువు యొక్క  $y$  నిరూపకం :

**Options :**

70819153817.  $0$



70819153818.  $2t^3$

70819153819.  $-t^3$

70819153820.  $-2t^3$

**Question Number : 76 Question Id : 70819116219 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

The equation of the plane passing through the point  $(1, 2, -3)$  and perpendicular to the planes  $3x + y - 2z = 5$  and  $2x - 5y - z = 7$ , is :

**Options :**

70819153821.  $6x - 5y + 2z + 10 = 0$

70819153822.  $11x + y + 17z + 38 = 0$

70819153823.  $6x - 5y - 2z - 2 = 0$

70819153824.  $3x - 10y - 2z + 11 = 0$

**Question Number : 76 Question Id : 70819116219 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

$3x + y - 2z = 5$  మరియు  $2x - 5y - z = 7$  అనే తలలకు లంబంగా ఉంటూ  $(1, 2, -3)$  బిందువు గుండా పోయే తలం సమీకరణం :

**Options :**

70819153821.  $6x - 5y + 2z + 10 = 0$

70819153822.  $11x + y + 17z + 38 = 0$

70819153823.  $6x - 5y - 2z - 2 = 0$

70819153824.  $3x - 10y - 2z + 11 = 0$

**Question Number : 77 Question Id : 70819116220 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

The distance of the point (1, 1, 9) from the point of intersection of the line

$\frac{x-3}{1} = \frac{y-4}{2} = \frac{z-5}{2}$  and the plane  $x+y+z=17$  is :

**Options :**

70819153825.  $2\sqrt{19}$

70819153826.  $19\sqrt{2}$

70819153827.  $\sqrt{38}$

70819153828. 38

**Question Number : 77 Question Id : 70819116220 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

సరళరేఖ  $\frac{x-3}{1} = \frac{y-4}{2} = \frac{z-5}{2}$  మరియు తలం  $x+y+z=17$  ల ఖండన బిందువు నుండి (1, 1, 9)

అనే బిందువుకు దూరం :

**Options :**

70819153825.  $2\sqrt{19}$

70819153826.  $19\sqrt{2}$

70819153827.  $\sqrt{38}$

70819153828. 38

**Question Number : 78 Question Id : 70819116221 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

An ordinary dice is rolled for a certain number of times. If the probability of getting an odd number 2 times is equal to the probability of getting an even number 3 times, then the probability of getting an odd number for odd number of times is :

**Options :**

70819153829.  $\frac{1}{32}$

70819153830.  $\frac{3}{16}$

70819153831.  $\frac{5}{16}$

70819153832.  $\frac{1}{2}$

**Question Number : 78 Question Id : 70819116221 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

ఒక సాధారణ పాచికను కొన్నిసార్లు దొర్లించిరి. బేసి సంఖ్య రెండు సార్లు వచ్చుటకు సంభావ్యత అనేది సరిసంఖ్య మూడుసార్లు వచ్చే సంభావ్యతకు సమానమైతే, బేసిసంఖ్య బేసిసార్లు వచ్చుటకు సంభావ్యత :

**Options :**

70819153829.  $\frac{1}{32}$

70819153830.  $\frac{3}{16}$

70819153831.  $\frac{5}{16}$

70819153832.  $\frac{1}{2}$

**Question Number : 79 Question Id : 70819116222 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

Two vertical poles are 150 m apart and the height of one is three times that of the other. If from the middle point of the line joining their feet, an observer finds the angles of elevation of their tops to be complementary, then the height of the shorter pole (in meters) is :

**Options :**

70819153833. 25

70819153834. 30

70819153835.  $20\sqrt{3}$

70819153836.  $25\sqrt{3}$

**Question Number : 79 Question Id : 70819116222 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

రెండు నిలువు స్తంభాలు 150 మీ. ఎడంగా ఉన్నాయి, మరియు వాటిలో ఒక దాని ఎత్తు మరొక దాని కన్న మూడు రెట్లు. వాటి పాదాలను కలిపే రేఖ మధ్యబిందువు నుండి ఒక పరిశీలకుడు ఆ స్తంభాల శీర్షాల ఊర్ధ్వకోణాలు పూరకాలు అని కనుగొంటే, వాటిలో చిన్న స్తంభం పొడవు (మీటర్లలో) :

**Options :**

70819153833. 25

70819153834. 30

70819153835.  $20\sqrt{3}$

70819153836.  $25\sqrt{3}$

**Question Number : 80 Question Id : 70819116223 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

The statement among the following that is a tautology is :

**Options :**

70819153837.  $A \wedge (A \vee B)$

70819153838.  $A \vee (A \wedge B)$

70819153839.  $[ A \wedge (A \rightarrow B) ] \rightarrow B$

70819153840.  $B \rightarrow [ A \wedge (A \rightarrow B) ]$

**Question Number : 80 Question Id : 70819116223 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

క్రింది వాటిలోని నిత్యసత్య ప్రవచనం :

**Options :**

70819153837.  $A \wedge (A \vee B)$

70819153838.  $A \vee (A \wedge B)$

70819153839.  $[ A \wedge (A \rightarrow B) ] \rightarrow B$

70819153840.  $B \rightarrow [ A \wedge (A \rightarrow B) ]$

## Mathematics Section B

|                                       |           |
|---------------------------------------|-----------|
| Section Id :                          | 708191621 |
| Section Number :                      | 6         |
| Section type :                        | Online    |
| Mandatory or Optional :               | Mandatory |
| Number of Questions :                 | 10        |
| Number of Questions to be attempted : | 5         |
| Section Marks :                       | 20        |
| Mark As Answered Required? :          | Yes       |
| Sub-Section Number :                  | 1         |
| Sub-Section Id :                      | 708191901 |
| Question Shuffling Allowed :          | Yes       |

**Question Number : 81 Question Id : 70819116224 Question Type : SA**

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

If the least and the largest real values of  $\alpha$ , for which the equation  $z + \alpha|z - 1| + 2i = 0$  ( $z \in \mathbb{C}$  and  $i = \sqrt{-1}$ ) has a solution, are  $p$  and  $q$  respectively; then  $4(p^2 + q^2)$  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 5.001

**Question Number : 81 Question Id : 70819116224 Question Type : SA**

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

సమీకరణం  $z + \alpha|z-1| + 2i = 0$  ( $z \in \mathbb{C}$  and  $i = \sqrt{-1}$ ) కు ఒక సాధన వ్యవస్థితమయ్యేట్లు  $\alpha$  యొక్క కనిష్ఠ, గరిష్ఠ విలువలు వరుసగా  $p, q$  అయితే  $4(p^2 + q^2) = \underline{\hspace{2cm}}$ .

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 82 Question Id : 70819116225 Question Type : SA**

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

Let  $B_i$  ( $i=1, 2, 3$ ) be three independent events in a sample space. The probability that only  $B_1$  occur is  $\alpha$ , only  $B_2$  occurs is  $\beta$  and only  $B_3$  occurs is  $\gamma$ . Let  $p$  be the probability that none of the events  $B_i$  occurs and these 4 probabilities satisfy the equations  $(\alpha - 2\beta) p = \alpha\beta$  and  $(\beta - 3\gamma) p = 2\beta\gamma$  (All the probabilities are assumed to lie in the interval  $(0, 1)$ ). Then  $\frac{P(B_1)}{P(B_3)}$  is equal to  $\underline{\hspace{2cm}}$ .

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 82 **Question Id :** 70819116225 **Question Type :** SA

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

ఒక శాంపిల్ ఆవరణలో  $B_i (i=1, 2, 3)$  లు మూడు స్వతంత్ర ఘటనలు అనుకోండి.  $B_1$  మాత్రమే సంభవించుటకు సంభావ్యత  $\alpha$ ,  $B_2$  మాత్రమే సంభవించుటకు సంభావ్యత  $\beta$  మరియు  $B_3$  మాత్రమే సంభవించుటకు సంభావ్యత  $\gamma$ . ఈ ఘటనల్లో ఏవీ సంభవించకుండుటకు సంభావ్యత  $p$  మరియు ఈ నాలుగు సంభావ్యతలు  $(\alpha - 2\beta) p = \alpha\beta$  మరియు  $(\beta - 3\gamma) p = 2\beta\gamma$  సమీకరణాలను తృప్తి పరిచేట్లుంటే, (ఇక్కడ అన్ని సంభావ్యతలు

$(0, 1)$  అంతరంలో ఉంటాయనుకోండి), అప్పుడు  $\frac{P(B_1)}{P(B_3)} = \dots$ .

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 83 **Question Id :** 70819116226 **Question Type :** SA

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

Let  $P = \begin{bmatrix} 3 & -1 & -2 \\ 2 & 0 & \alpha \\ 3 & -5 & 0 \end{bmatrix}$ , where  $\alpha \in \mathbb{R}$ . Suppose  $Q = [q_{ij}]$  is a matrix satisfying  $PQ = kI_3$  for

some non-zero  $k \in \mathbb{R}$ . If  $q_{23} = -\frac{k}{8}$  and  $|Q| = \frac{k^2}{2}$ , then  $\alpha^2 + k^2$  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 5.001

**Question Number : 83 Question Id : 70819116226 Question Type : SA**

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

$\alpha \in \mathbb{R}$ ,  $P = \begin{bmatrix} 3 & -1 & -2 \\ 2 & 0 & \alpha \\ 3 & -5 & 0 \end{bmatrix}$ , అనుకోండి. ఒకానొక  $k \in \mathbb{R}$  కు  $PQ = kI_3$  ను తృప్తిపరిచేట్లున్న మాత్రిక  $Q = [q_{ij}]$

అనుకోండి.  $q_{23} = -\frac{k}{8}$  మరియు  $|Q| = \frac{k^2}{2}$  అయితే  $\alpha^2 + k^2 = \underline{\hspace{2cm}}$ .

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 84 Question Id : 70819116227 Question Type : SA**

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

Let  $M$  be any  $3 \times 3$  matrix with entries from the set  $\{0, 1, 2\}$ . The maximum number of such matrices, for which the sum of diagonal elements of  $M^T M$  is seven, is  $\underline{\hspace{2cm}}$ .

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 84 Question Id : 70819116227 Question Type : SA**

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

సమితి  $\{0, 1, 2\}$  లోని మూలకాలను మూలకాలుగా కలిగిన ఏదేని ఒక  $3 \times 3$  మాత్రిక  $M$  అనుకోండి.  $M^T M$  లోని ప్రధాన వికర్ణం లోని మూలకాల మొత్తం ఏడు అయ్యేవిధంగా ఏర్పరచగల మాత్రికల గరిష్ఠ సంఖ్య \_\_\_\_\_.

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Range**

**Text Areas : PlainText**

**Possible Answers :**

5 to 5.001

**Question Number : 85 Question Id : 70819116228 Question Type : SA**

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

Let  $A = \{n \in \mathbb{N} : n \text{ is a 3-digit number}\}$

$B = \{9k+2 : k \in \mathbb{N}\}$

and  $C = \{9k+l : k \in \mathbb{N}\}$  for some  $l$  ( $0 < l < 9$ )

If the sum of all the elements of the set  $A \cap (B \cup C)$  is  $274 \times 400$ , then  $l$  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 5.001

**Question Number : 85 Question Id : 70819116228 Question Type : SA**

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

$A = \{ n \in \mathbb{N} : n \text{ ఒక } 3\text{-అంకెల సంఖ్య} \}$

$B = \{ 9k+2 : k \in \mathbb{N} \}$  మరియు ఒకానొక

$l (0 < l < 9)$  కు  $C = \{ 9k+l : k \in \mathbb{N} \}$  అనుకోండి.

$A \cap (B \cup C)$  అనే సమితిలోని మూలకాలన్నింటి మొత్తం  $274 \times 400$  అయితే  $l = \underline{\hspace{2cm}}$ .

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 86 **Question Id :** 70819116229 **Question Type :** SA

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

The minimum value of  $\alpha$  for which the equation  $\frac{4}{\sin x} + \frac{1}{1 - \sin x} = \alpha$  has at least one solution in  $\left(0, \frac{\pi}{2}\right)$  is  $\underline{\hspace{2cm}}$ .

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 86 **Question Id :** 70819116229 **Question Type :** SA

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

సమీకరణం  $\frac{4}{\sin x} + \frac{1}{1 - \sin x} = \alpha$  కు కనీసం ఒక సాధన  $\left(0, \frac{\pi}{2}\right)$  లో ఉండేట్లు  $\alpha$  యొక్క కనిష్ట విలువ  $\underline{\hspace{2cm}}$ .

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 87 Question Id : 70819116230 Question Type : SA**

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

If  $\int_{-a}^a (|x| + |x - 2|) dx = 22$ , ( $a > 2$ ) and  $[x]$  denotes the greatest integer  $\leq x$ ,  
then  $\int_a^{-a} (x + [x]) dx$  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 5.001

**Question Number : 87 Question Id : 70819116230 Question Type : SA**

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

$x$  ను దాటని గరిష్ట పూర్ణాంకంను  $[x]$  తో సూచిస్తూ, ( $a > 2$ ) అయి  $\int_{-a}^a (|x| + |x - 2|) dx = 22$ , అయినపుడు  
 $\int_a^{-a} (x + [x]) dx =$  \_\_\_\_\_.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 88 **Question Id :** 70819116231 **Question Type :** SA

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

If one of the diameters of the circle  $x^2 + y^2 - 2x - 6y + 6 = 0$  is a chord of another circle 'C', whose center is at (2, 1), then its radius is \_\_\_\_\_.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 88 **Question Id :** 70819116231 **Question Type :** SA

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

$x^2 + y^2 - 2x - 6y + 6 = 0$  అనే వృత్తపు ఒకానొక వ్యాసం అనేది (2, 1) కేంద్రంగా మరో వృత్తం C కు జ్యా అయితే దీని వ్యాసార్థం \_\_\_\_\_.

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

Question Number : 89 Question Id : 70819116232 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let three vectors  $\vec{a}$ ,  $\vec{b}$  and  $\vec{c}$  be such that  $\vec{c}$  is coplanar with  $\vec{a}$  and  $\vec{b}$ ,  $\vec{a} \cdot \vec{c} = 7$  and  $\vec{b}$  is perpendicular to  $\vec{c}$ , where  $\vec{a} = -\hat{i} + \hat{j} + \hat{k}$  and  $\vec{b} = 2\hat{i} + \hat{k}$ , then the value of  $2|\vec{a} + \vec{b} + \vec{c}|^2$  is \_\_\_\_\_.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 89 Question Id : 70819116232 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$\vec{a}$ ,  $\vec{b}$  మరియు  $\vec{c}$  అనే సదిశలు  $\vec{a} = -\hat{i} + \hat{j} + \hat{k}$ ,  $\vec{b} = 2\hat{i} + \hat{k}$  అవుతూ,  $\vec{a}$  మరియు  $\vec{b}$  లకు సతలీయంగా  $\vec{c}$  ఉంటూ,  $\vec{a} \cdot \vec{c} = 7$  అవుతూ మరియు  $\vec{c}$  కు లంబంగా  $\vec{b}$  ఉండేట్లున్నాయి అనుకోండి. అప్పుడు  $2|\vec{a} + \vec{b} + \vec{c}|^2$  యొక్క విలువ \_\_\_\_\_.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 90 Question Id : 70819116233 Question Type : SA

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

$$\lim_{n \rightarrow \infty} \tan \left\{ \sum_{r=1}^n \tan^{-1} \left( \frac{1}{1+r+r^2} \right) \right\} \text{ is equal to } \underline{\hspace{2cm}}.$$

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number : 90 Question Id : 70819116233 Question Type : SA**

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

$$\lim_{n \rightarrow \infty} \tan \left\{ \sum_{r=1}^n \tan^{-1} \left( \frac{1}{1+r+r^2} \right) \right\} = \underline{\hspace{2cm}}.$$

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001