National Testing Agency

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Paper I

Group Number :	1
Group Id :	416529121
Group Maximum Duration :	0
Group Minimum Duration :	180
Revisit allowed for view? :	No
Revisit allowed for edit? :	No
Break time:	0
Group Marks:	360

Physics

Section Id :	416529145
Section Number :	1
Section type :	Online
Mandatory or Optional:	Mandatory
Number of Questions:	30
Number of Questions to be attempted:	30
Section Marks:	120
Display Number Panel:	Yes
Group All Questions:	No

Sub-Section Number:	1
Sub-Section Id:	416529154
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 4165299686 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The least count of the main scale of a screw gauge is 1 mm. The minimum number of divisions on its circular scale required to measure 5 μm diameter of a wire is :

Options :

41652938202. 50

41652938203. 100

41652938204. 200

41652938205. 500

Question Number : 1 Question Id : 4165299686 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक पेंचमापी के मुख्य पैमाने का अल्पतमांक 1 mm है। 5 μm व्यास के तार का व्यास नापने के लिए इसके वृत्तीय पैमाने पर न्यूनतम भागों की संख्या होगी :

Options :

41652938202. 50

41652938203. 100

41652938204. 200

41652938205. 500

Question Number : 2 Question Id : 4165299687 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A person standing on an open ground hears the sound of a jet aeroplane coming from north at an angle 60° with ground level. But he finds the aeroplane right vertically above his position. If v is the speed of sound, speed of the plane is :

Options :

41652938206. v

41652938207. $\frac{v}{2}$

41652938208. $\frac{\sqrt{3}}{2}v$

41652938209. $\frac{2v}{\sqrt{3}}$

Question Number : 2 Question Id : 4165299687 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

खुले मैदान में खड़े एक व्यक्ति को उत्तर दिशा से आते हुए एक जेट एरोप्लेन की आवाज, धरती से 60° के कोण की दिशा से आती हुयी सुनाई देती है। लेकिन उसे यह हवाई जहाज अपने ठीक ऊपर दिखाई देता है। यदि ध्वनि की चाल v है तो हवाई जहाज की चाल होगी :

Options :

41652938206. v

41652938207. $\frac{v}{2}$

41652938208. $\frac{\sqrt{3}}{2}v$

41652938209. $\frac{2v}{\sqrt{3}}$

Question Number : 3 Question Id : 4165299688 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A passenger train of length 60 m travels at a speed of 80 km/hr. Another freight train of length 120 m travels at a speed of 30 km/hr. The ratio of times taken by the passenger train to completely cross the freight train when : (i) they are moving in the same direction, and (ii) in the oppposite directions is :

Options :

41652938210. $\frac{25}{11}$

41652938211. $\frac{11}{5}$

41652938212. $\frac{5}{2}$

41652938213. $\frac{3}{2}$

Question Number : 3 Question Id : 4165299688 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक 60 m लम्बी यात्री गाड़ी 80 km/hr की गति से चल रही है। 120 m लम्बाई की और एक माल गाड़ी 30 km/hr से चल रही है। ऐसे समयों का अनुपात जो यात्री गाड़ी को मालगाड़ी को पार करने में लगेंगे जब (i) गाड़ियाँ एक ही दिशा में जा रही हैं, और (ii) गाड़ियाँ विरोधी दिशाओं में जा रही हैं, होगा :

Options :

41652938210. $\frac{25}{11}$

41652938211. $\frac{11}{5}$

41652938212. $\frac{5}{2}$

41652938213. $\frac{3}{2}$

Question Number : 4 Question Id : 4165299689 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A simple pendulum, made of a string of length l and a bob of mass m, is released from a small angle θ_0. It strikes a block of mass M, kept on a horizontal surface at its lowest point of oscillations, elastically. It bounces back and goes up to an angle θ_1. Then M is given by :

Options :

41652938214. $\frac{m}{2}\left(\frac{\theta_0 - \theta_1}{\theta_0 + \theta_1}\right)$

41652938215. $\frac{m}{2}\left(\frac{\theta_0 + \theta_1}{\theta_0 - \theta_1}\right)$

41652938216. $m\left(\frac{\theta_0 + \theta_1}{\theta_0 - \theta_1}\right)$

41652938217. $m\left(\frac{\theta_0 - \theta_1}{\theta_0 + \theta_1}\right)$

Question Number : 4 Question Id : 4165299689 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक सरल दोलक, जो कि l लम्बाई की डोरी तथा m द्रव्यमान के गोलक से बना है, को एक छोटे कोण θ_0 से छोड़ा जाता है। यह गोलक एक द्रव्यमान M के गुटके को, जो कि क्षैतिज समतल पर रखा है, अपने दोलन के न्यूनतम बिन्दु पर प्रत्यास्थ संघट्ट करता है। गोलक संघट्ट कर कोण θ_1 तक जाता है। तो M का मान होगा :

Options :

41652938214. $\frac{m}{2}\left(\frac{\theta_0 - \theta_1}{\theta_0 + \theta_1}\right)$

41652938215. $\frac{m}{2}\left(\frac{\theta_0 + \theta_1}{\theta_0 - \theta_1}\right)$

41652938216. $m\left(\frac{\theta_0 + \theta_1}{\theta_0 - \theta_1}\right)$

41652938217. $m\left(\frac{\theta_0 - \theta_1}{\theta_0 + \theta_1}\right)$

Question Number : 5 Question Id : 4165299690 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A satellite of mass M is in a circular orbit of radius R about the centre of the earth. A meteorite of the same mass, falling towards the earth, collides with the satellite completely inelastically. The speeds of the satellite and the meteorite are the same, just before the collision. The subsequent motion of the combined body will be :

Options :

41652938218. in the same circular orbit of radius R

41652938219. in a circular orbit of a different radius

41652938220. in an elliptical orbit

41652938221. such that it escapes to infinity

Question Number : 5 Question Id : 4165299690 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

M द्रव्यमान का एक उपग्रह पृथ्वी के परित: R त्रिज्या की एक वृत्तीय कक्षा में घूर्णन कर रहा है। समान द्रव्यमान का एक धूमकेतू पृथ्वी की ओर गिरते हुए, इस उपग्रह के साथ पूर्णतया अप्रत्यास्थ संघट्ट करता है। उपग्रह तथा धूमकेतू की चालें संघट्ट से ठीक पहले बराबर हैं। संघट्ट के बाद संयुक्त पिण्ड की गति होगी :

Options :

41652938218. R त्रिज्या की उसी वृत्तीय कक्षा में

41652938219. भिन्न त्रिज्या की एक वृत्तीय कक्षा में

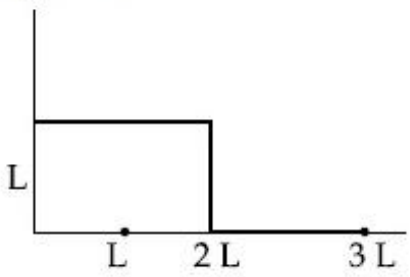
41652938220. दीर्घवृत्तीय कक्षा में

41652938221. इस प्रकार कि यह अनन्त में पलायन कर जायेगा

Question Number : 6 Question Id : 4165299691 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The position vector of the centre of mass $\vec{r}_{cm}$ of an asymmetric uniform bar of negligible area of cross-section as shown in figure is :



Options :

41652938222. $\vec{r}_{cm} = \frac{13}{8} L \hat{x} + \frac{5}{8} L \hat{y}$

41652938223. $\vec{r}_{cm} = \frac{5}{8} L \hat{x} + \frac{13}{8} L \hat{y}$

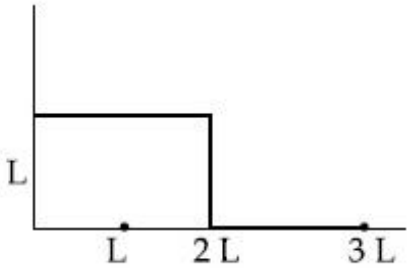
41652938224. $\vec{r}_{cm} = \frac{11}{8} L \hat{x} + \frac{3}{8} L \hat{y}$

41652938225. $\vec{r}_{cm} = \frac{3}{8} L \hat{x} + \frac{11}{8} L \hat{y}$

Question Number : 6 Question Id : 4165299691 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

चित्र में दिखायी गयी असममित किन्तु एकसमान छड़ जिसकी अनुप्रस्थ काट का क्षेत्रफल नगण्य है, के द्रव्यमान केन्द्र का स्थिति सदिश, $\vec{r}_{cm}$ होगा :



Options :

41652938222. $\vec{r}_{cm} = \frac{13}{8} L \hat{x} + \frac{5}{8} L \hat{y}$

41652938223. $\vec{r}_{cm} = \frac{5}{8} L \hat{x} + \frac{13}{8} L \hat{y}$

41652938224. $\vec{r}_{cm} = \frac{11}{8} L \hat{x} + \frac{3}{8} L \hat{y}$

41652938225. $\vec{r}_{cm} = \frac{3}{8} L \hat{x} + \frac{11}{8} L \hat{y}$

Question Number : 7 Question Id : 4165299692 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Let the moment of inertia of a hollow cylinder of length 30 cm (inner radius 10 cm and outer radius 20 cm), about its axis be I. The radius of a thin cylinder of the same mass such that its moment of inertia about its axis is also I, is :

Options :

41652938226. 14 cm

41652938227. 12 cm

41652938228. 18 cm

41652938229. 16 cm

Question Number : 7 Question Id : 4165299692 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

आंतरिक त्रिज्या 10 cm, बाह्य त्रिज्या 20 cm तथा लम्बाई 30 cm के एक खोखले बेलन का जड़त्व आघूर्ण, उसकी अक्ष के परित: I है। उसी द्रव्यमान के एक ऐसे खोखले एवं पतले बेलन की त्रिज्या, जिसका अपने अक्ष के परित: जड़त्व आघूर्ण I ही है, होगी :

Options :

41652938226. 14 cm

41652938227. 12 cm

41652938228. 18 cm

41652938229. 16 cm

Question Number : 8 Question Id : 4165299693 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A straight rod of length L extends from $x = a$ to $x = L + a$. The gravitational force it exerts on a point mass 'm' at $x = 0$, if the mass per unit length of the rod is $A + Bx^2$, is given by :

Options :

41652938230. $Gm\left[A\left(\frac{1}{a+L} - \frac{1}{a}\right) + BL\right]$

41652938231. $Gm\left[A\left(\frac{1}{a}-\frac{1}{a+L}\right)+BL\right]$

41652938232. $Gm\left[A\left(\frac{1}{a+L}-\frac{1}{a}\right)-BL\right]$

41652938233. $Gm\left[A\left(\frac{1}{a}-\frac{1}{a+L}\right)-BL\right]$

Question Number : 8 Question Id : 4165299693 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

लम्बाई L की एक छड़ $x=a$ तथा $x=L+a$ के मध्य रखी है। यदि इस छड़ का प्रति इकाई लम्बाई द्रव्यमान $A+Bx^2$ है, तो बिन्दु $x=0$ पर रखे हुए एक बिन्दु द्रव्यमान m पर, छड़ द्वारा लगाया गुरुत्वीय बल होगा :

Options :

41652938230. $Gm\left[A\left(\frac{1}{a+L}-\frac{1}{a}\right)+BL\right]$

41652938231. $Gm\left[A\left(\frac{1}{a}-\frac{1}{a+L}\right)+BL\right]$

41652938232. $Gm\left[A\left(\frac{1}{a+L}-\frac{1}{a}\right)-BL\right]$

41652938233. $Gm\left[A\left(\frac{1}{a}-\frac{1}{a+L}\right)-BL\right]$

Question Number : 9 Question Id : 4165299694 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A cylinder of radius R is surrounded by a cylindrical shell of inner radius R and outer radius 2R. The thermal conductivity of the material of the inner cylinder is K_1 and that of the outer cylinder is K_2. Assuming no loss of heat, the effective thermal conductivity of the system for heat flowing along the length of the cylinder is :

Options :

41652938234. $K_1 + K_2$

41652938235. $\frac{K_1 + K_2}{2}$

41652938236. $\frac{K_1 + 3K_2}{4}$

41652938237. $\frac{2K_1 + 3K_2}{5}$

Question Number : 9 Question Id : 4165299694 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

त्रिज्या R का एक बेलन एक बेलनाकार कोश, जिसकी आंतरिक त्रिज्या R तथा बाह्य त्रिज्या 2R है, से घिरा है। आंतरिक बेलन की ऊष्मा चालकता K_1 तथा बाह्य बेलन की ऊष्मा चालकता K_2 है। माना कि बेलनों से ऊष्मा क्षय शून्य है, तो इस निकाय की प्रभावी ऊष्मा चालकता, जबकि ऊष्मा का प्रवाह बेलन की लम्बाई के अनुदिश है, होगी :

Options :

41652938234. $K_1 + K_2$

41652938235. $\frac{K_1 + K_2}{2}$

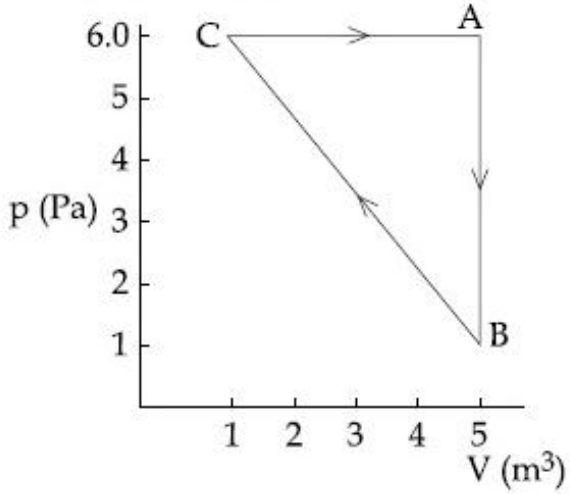
41652938236. $\frac{K_1 + 3K_2}{4}$

41652938237. $\frac{2K_1 + 3K_2}{5}$

Question Number : 10 Question Id : 4165299695 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

For the given cyclic process CAB as shown for a gas, the work done is :



Options :

41652938238. 30 J

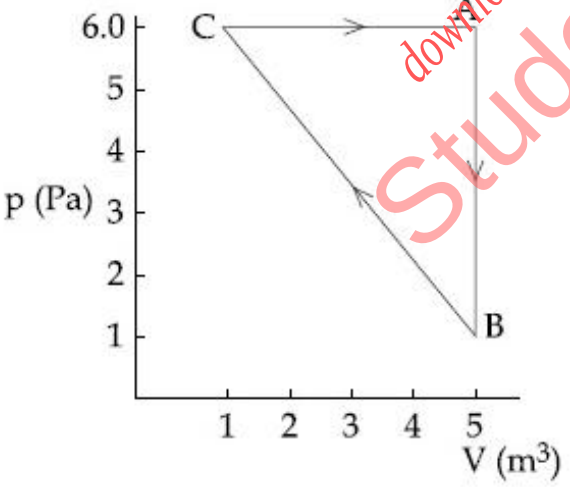
41652938239. 10 J

41652938240. 5 J

41652938241. 1 J

Question Number : 10 Question Id : 4165299695 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 4 Wrong Marks : 1

एक गैस के लिए दिए गए चक्रीय प्रक्रम CAB में किया गया कार्य है :



Options :

41652938238. 30 J

41652938239. 10 J

41652938240. 5 J

41652938241. $1\,J$

Question Number : 11 Question Id : 4165299696 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

An ideal gas occupies a volume of $2\ m^3$ at a pressure of 3×10^6 Pa. The energy of the gas is :

Options :

41652938242. $10^8\,J$

41652938243. $3 \times 10^2\,J$

41652938244. $9 \times 10^6\,J$

41652938245. $6 \times 10^4\,J$

Question Number : 11 Question Id : 4165299696 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

3×10^6 Pa दाब पर एक आदर्श गैस $2\ m^3$ आयतन घेरती है। इस गैस की ऊर्जा होगी :

Options :

41652938242. $10^8\,J$

41652938243. $3 \times 10^2\,J$

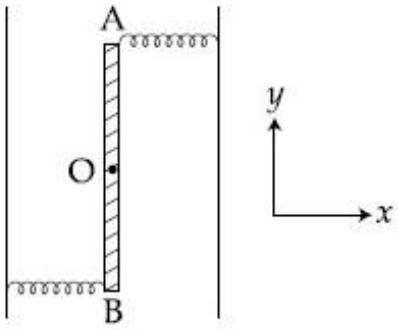
41652938244. $9 \times 10^6\,J$

41652938245. $6 \times 10^4\,J$

Question Number : 12 Question Id : 4165299697 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Two light identical springs of spring constant k are attached horizontally at the two ends of a uniform horizontal rod AB of length l and mass m. The rod is pivoted at its centre 'O' and can rotate freely in horizontal plane. The other ends of the two springs are fixed to rigid supports as shown in figure. The rod is gently pushed through a small angle and released. The frequency of resulting oscillation is :



Options :

41652938246. $\frac{1}{2\pi}\sqrt{\frac{2k}{m}}$

41652938247. $\frac{1}{2\pi}\sqrt{\frac{k}{m}}$

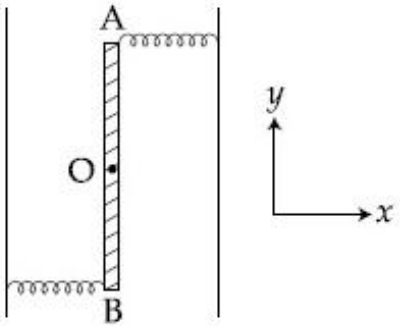
41652938248. $\frac{1}{2\pi}\sqrt{\frac{3k}{m}}$

41652938249. $\frac{1}{2\pi}\sqrt{\frac{6k}{m}}$

Question Number : 12 Question Id : 4165299697 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

द्रव्यमान m व लम्बाई l की एक एकसमान क्षैतिज छड़ AB के दो सिरों पर, चित्रानुसार, दो द्रव्यमान रहित समरूप कमानियों को जिनका स्प्रिंग नियतांक k है, क्षैतिज लगायी गयी हैं। छड़ अपने केन्द्र O पर धुराग्रस्त है तथा यह क्षैतिज समतल में घूर्णन के लिये स्वतंत्र है। दिखाये गये चित्रानुसार कमानियों के दूसरे सिरों को दो दृढ़ आधारों पर जोड़ा गया है। छड़ को हल्के से एक छोटे कोण से धकेल कर छोड़ दिया जाता है। छड़ के परिणामी दोलनों की आवृत्ति होगी :



Options :

41652938246. $\frac{1}{2\pi}\sqrt{\frac{2k}{m}}$

41652938247. $\frac{1}{2\pi}\sqrt{\frac{k}{m}}$

41652938248. $\frac{1}{2\pi}\sqrt{\frac{3k}{m}}$

41652938249. $\frac{1}{2\pi}\sqrt{\frac{6k}{m}}$

Question Number : 13 Question Id : 4165299698 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A travelling harmonic wave is represented by the equation $y(x, t) = 10^{-3}\sin(50t + 2x)$, where x and y are in meter and t is in seconds. Which of the following is a correct statement about the wave ?

Options :

41652938250. The wave is propagating along the positive x-axis with speed 25 ms^{-1}.

41652938251. The wave is propagating along the negative x-axis with speed 25 ms^{-1}.

41652938252. The wave is propagating along the positive x-axis with speed 100 ms^{-1}.

41652938253. The wave is propagating along the negative x-axis with speed 100 ms^{-1}.

Question Number : 13 Question Id : 4165299698 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक प्रगामी आवर्ती तरंग को समीकरण $y(x, t) = 10^{-3}\sin(50t + 2x)$ से निरूपित किया जाता है, जहाँ x तथा y मीटर में तथा t सेकण्ड में है। निम्न में से तरंग के लिए कौन सा कथन सत्य है?

Options :

41652938250. तरंग 25 ms^{-1} की वेग से धनात्मक x-दिशा में चल रही है।

41652938251. तरंग 25 ms^{-1} की वेग से ऋणात्मक x-दिशा में चल रही है।

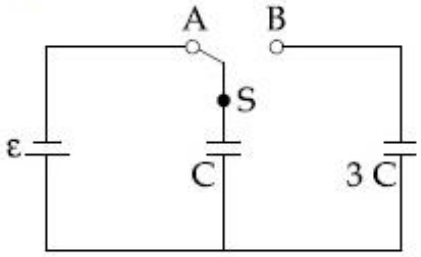
41652938252. तरंग 100 ms^{-1} की वेग से धनात्मक x-दिशा में चल रही है।

41652938253. तरंग 100 ms^{-1} की वेग से ऋणात्मक x-दिशा में चल रही है।

Question Number : 14 Question Id : 4165299699 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

In the figure shown, after the switch 'S' is turned from position 'A' to position 'B', the energy dissipated in the circuit in terms of capacitance 'C' and total charge 'Q' is :



Options :

41652938254. $\frac{3}{4}\frac{Q^2}{C}$

41652938255. $\frac{1}{8}\frac{Q^2}{C}$

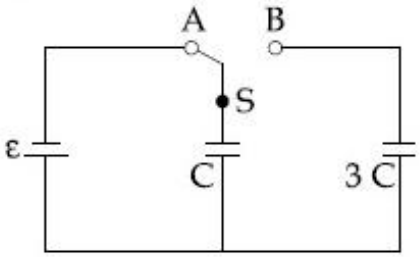
41652938256. $\frac{5}{8}\frac{Q^2}{C}$

41652938257. $\frac{3}{8}\frac{Q^2}{C}$

Question Number : 14 Question Id : 4165299699 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

चित्र में दिखाये गये परिपथ में जब स्विच 'S' को 'A' से 'B' स्थिति में लाते हैं तो, धारिता 'C' तथा कुल आवेश 'Q' के रूप में, परिपथ में क्षयित ऊर्जा का मान होगा :



Options :

41652938254. $\frac{3}{4}\frac{Q^2}{C}$

41652938255. $\frac{1}{8}\frac{Q^2}{C}$

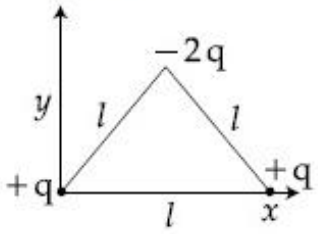
41652938256. $\frac{5}{8}\frac{Q^2}{C}$

41652938257. $\frac{3}{8}\frac{Q^2}{C}$

Question Number : 15 Question Id : 4165299700 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Determine the electric dipole moment of the system of three charges, placed on the vertices of an equilateral triangle, as shown in the figure :



Options :

41652938258. $(ql)\ \frac{\hat{i}+\hat{j}}{\sqrt{2}}$

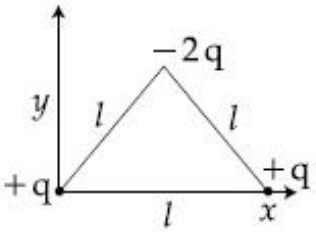
41652938259. $-\sqrt{3}\,ql\,\hat{j}$

41652938260. $2ql\,\hat{j}$

41652938261. $\sqrt{3}\,ql\,\frac{\hat{j}-\hat{i}}{\sqrt{2}}$

Question Number : 15 Question Id : 4165299700 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 4 Wrong Marks : 1

चित्र में दिये गये तीन आवेशों, जो एक समबाहु त्रिभुज के सिरों पर रखे हैं, के निकाय का विद्युत द्विध्रुव आघूर्ण ज्ञात कीजिए :



Options :

41652938258. $(ql)\ \frac{\hat{i}+\hat{j}}{\sqrt{2}}$

41652938259. $-\sqrt{3}\,ql\,\hat{j}$

41652938260. $2ql\,\hat{j}$

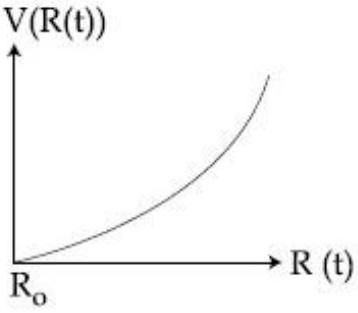
41652938261. $\sqrt{3}\, ql\, \frac{\hat{j} - \hat{i}}{\sqrt{2}}$

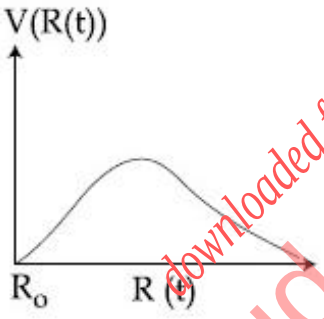
Question Number : 16 Question Id : 4165299701 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

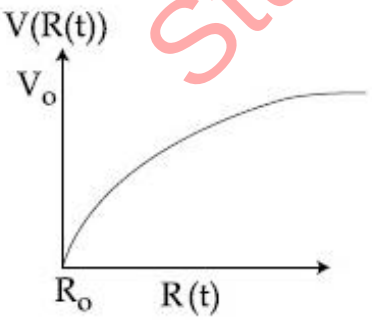
Correct Marks : 4 Wrong Marks : 1

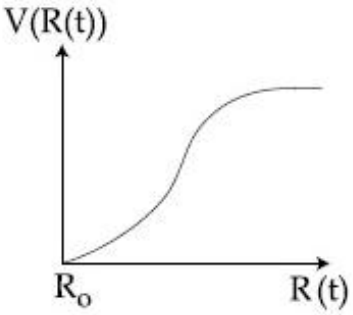
There is a uniform spherically symmetric surface charge density at a distance R_o from the origin. The charge distribution is initially at rest and starts expanding because of mutual repulsion. The figure that represents best the speed V(R(t)) of the distribution as a function of its instantaneous radius R(t) is :

Options :

41652938262. 

41652938263. 

41652938264. 



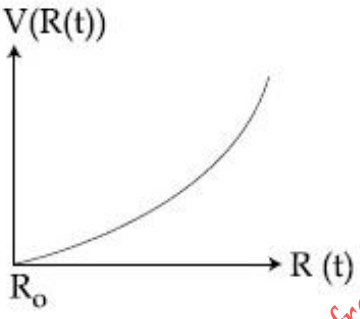
41652938265.

Question Number : 16 Question Id : 4165299701 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

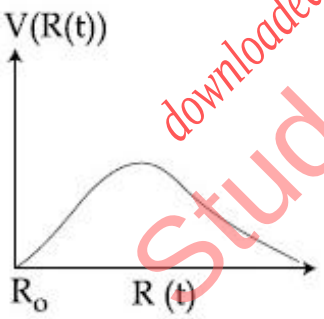
Correct Marks : 4 Wrong Marks : 1

मूल बिन्दु से R_o दूरी पर एक एकसमान गोलीय सममित पृष्ठ आवेश घनत्व हैं। आरम्भ में आवेश वितरण विराम अवस्था में है और यह अन्योन्य प्रतिकर्षण के कारण प्रसारण करना प्रारम्भ करता हैं। दिये गये ग्राफ में से कौन सा इस वितरण की गति V(R(t)) को तात्कालिक त्रिज्या, R(t) के साथ सबसे उत्तम दर्शाता है?

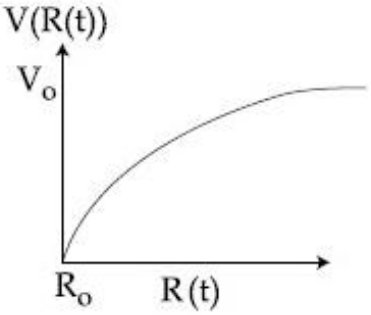
Options :



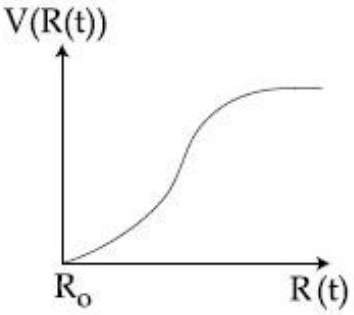
41652938262.



41652938263.



41652938264.

41652938265. 

Question Number : 17 Question Id : 4165299702 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

An ideal battery of 4 V and resistance R are connected in series in the primary circuit of a potentiometer of length 1 m and resistance 5 Ω. The value of R, to give a potential difference of 5 mV across 10 cm of potentiometer wire, is :

Options :

41652938266. 480 Ω

41652938267. 490 Ω

41652938268. 495 Ω

41652938269. 395 Ω

Question Number : 17 Question Id : 4165299702 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

1 m लम्बाई व 5 Ω प्रतिरोध के विभवमापी के प्राथमिक परिपथ में एक 4 V की आदर्श सेल तथा श्रेणीक्रम में प्रतिरोध R लगाते हैं। R का वह मान, जो विभवमापी की 10 cm लम्बाई पर 5 mV का विभवान्तर दिखाता है, होगा :

Options :

41652938266. 480 Ω

41652938267. 490 Ω

41652938268. 495 Ω

41652938269. 395 Ω

Question Number : 18 Question Id : 4165299703 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Two electric bulbs, rated at (25 W, 220 V) and (100 W, 220 V), are connected in series across a 220 V voltage source. If the 25 W and 100 W bulbs draw powers P_1 and P_2 respectively, then :

Options :

41652938270. $P_1 = 9\ W, P_2 = 16\ W$

41652938271. $P_1 = 16\ W, P_2 = 9\ W$

41652938272. $P_1 = 16\ W, P_2 = 4\ W$

41652938273. $P_1 = 4\ W, P_2 = 16\ W$

Question Number : 18 Question Id : 4165299703 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

(25 W, 220 V) तथा (100 W, 220 V) रेटिंग के दो बिजली के बल्बों को एक 220 V के स्रोत के साथ श्रेणीक्रम में लगाया गया है। यदि 25 W व 100 W के बल्ब द्वारा ली गयी शक्ति का मान क्रमशः P_1 व P_2 है तो :

Options :

41652938270. $P_1 = 9\ W, P_2 = 16\ W$

41652938271. $P_1 = 16\ W, P_2 = 9\ W$

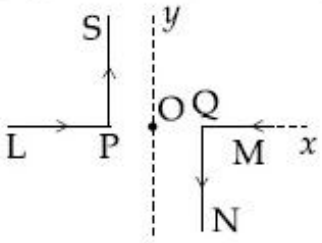
41652938272. $P_1 = 16\ W, P_2 = 4\ W$

41652938273. $P_1 = 4\ W, P_2 = 16\ W$

Question Number : 19 Question Id : 4165299704 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

As shown in the figure, two infinitely long, identical wires are bent by 90° and placed in such a way that the segments LP and QM are along the x-axis, while segments PS and QN are parallel to the y-axis. If OP = OQ = 4 cm, and the magnitude of the magnetic field at O is 10^{-4} T, and the two wires carry equal currents (see figure), the magnitude of the current in each wire and the direction of the magnetic field at O will be ($\mu_0 = 4\pi \times 10^{-7}$ NA^{-2}) :



Options :

41652938274. 20 A, perpendicular into the page

41652938275. 20 A, perpendicular out of the page

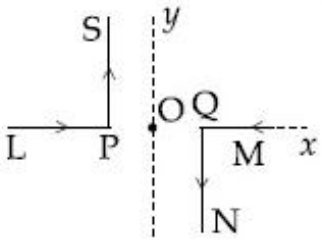
41652938276. 40 A, perpendicular into the page

41652938277. 40 A, perpendicular out of the page

Question Number : 19 Question Id : 4165299704 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

दो अनन्त लम्बाई के समरूप तारों को 90° से मोड़कर चित्रानुसार इस तरह रखा है कि उनके LP तथा QM भाग x-अक्ष पर हैं तथा PS व QN भाग y-अक्ष के समान्तर हैं। यदि OP = OQ = 4 cm, O पर चुम्बकीय क्षेत्र का मान 10^{-4} T है तथा दोनों तारों में बराबर धारा (चित्रानुसार) बह रही है तो प्रत्येक तार में धारा का मान तथा बिन्दु O पर चुम्बकीय क्षेत्र की दिशा होगी : ($\mu_0 = 4\pi \times 10^{-7}$ NA^{-2})



Options :

41652938274. 20 A, पेज के लम्बवत् अन्दर की ओर

41652938275. 20 A, पेज के लम्बवत् बाहर की ओर

41652938276. 40 A, पेज के लम्बवत् अन्दर की ओर

41652938277. 40 A, पेज के लम्बवत् बाहर की ओर

Question Number : 20 Question Id : 4165299705 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A proton and an α-particle (with their masses in the ratio of 1 : 4 and charges in the ratio of 1 : 2) are accelerated from rest through a potential difference V. If a uniform magnetic field (B) is set up perpendicular to their velocities, the ratio of the radii $r_p : r_\alpha$ of the circular paths described by them will be :

Options :

41652938278. $1 : 2$

41652938279. $1 : \sqrt{2}$

41652938280. $1 : 3$

41652938281. $1 : \sqrt{3}$

Question Number : 20 Question Id : 4165299705 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

विभवान्तर V से एक प्रोटॉन तथा एक α-कण (जिनके द्रव्यमान का अनुपात 1 : 4 तथा आवेशों का अनुपात 1 : 2 है) को स्थिरावस्था से त्वरित करते हैं। यदि उनके वेगों के लम्बवत् एक एकसमान चुम्बकीय क्षेत्र (B) लगाया जाये तो इन कणों के वृत्ताकार पथों की त्रिज्याओं का अनुपात $r_p : r_\alpha$ होगा :

Options :

41652938278. $1 : 2$

41652938279. $1 : \sqrt{2}$

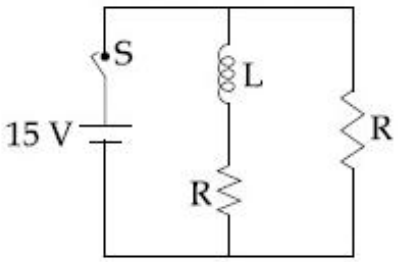
41652938280. $1 : 3$

41652938281. $1:\sqrt{3}$

Question Number : 21 Question Id : 4165299706 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

In the figure shown, a circuit contains two identical resistors with resistance $R = 5\ \Omega$ and an inductance with $L = 2\,mH$. An ideal battery of 15 V is connected in the circuit. What will be the current through the battery long after the switch is closed ?



Options :

41652938282. 5.5 A

41652938283. 7.5 A

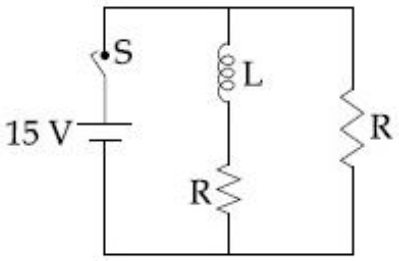
41652938284. 6 A

41652938285. 3 A

Question Number : 21 Question Id : 4165299706 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

चित्र में दिखाये गये परिपथ में दो समान प्रतिरोध हैं जिनका प्रतिरोध $R = 5\ \Omega$ है तथा एक प्रेरकत्व $L = 2\ mH$ है। 15 V की एक आदर्श बैटरी को परिपथ में जोड़ा गया हैं। स्विच को बन्द करने के लम्बे अन्तराल के बाद बैटरी से प्रवाहित धारा होगी :



Options :

41652938282. 5.5 A

41652938283. 7.5 A

41652938284. 6 A

41652938285. 3 A

Question Number : 22 Question Id : 4165299707 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A light wave is incident normally on a glass slab of refractive index 1.5. If 4% of light gets reflected and the amplitude of the electric field of the incident light is 30 V/m, then the amplitude of the electric field for the wave propogating in the glass medium will be :

Options :

41652938286. 10 V/m

41652938287. 24 V/m

41652938288. 6 V/m

41652938289. 30 V/m

Question Number : 22 Question Id : 4165299707 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

अपवर्तनांक 1.5 की एक काँच की पट्टी पर प्रकाश किरण अभिलम्बवत् आपतित होती है। यदि 4% प्रकाश परावर्तित होती है तथा आपतित प्रकाश के वैद्युत क्षेत्र का आयाम 30 V/m है तो, काँच के माध्यम में चलने वाली तरंग के विद्युतक्षेत्र का आयाम होगा :

Options :

41652938286. 10 V/m

41652938287. 24 V/m

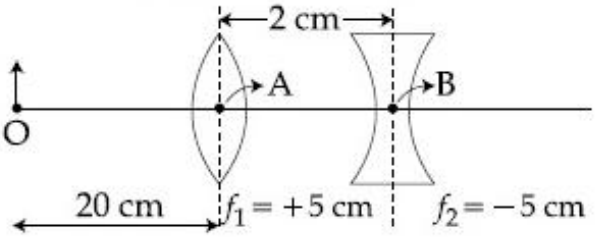
41652938288. 6 V/m

41652938289. 30 V/m

Question Number : 23 Question Id : 4165299708 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

What is the position and nature of image formed by lens combination shown in figure ? (f_1, f_2 are focal lengths)



Options :

41652938290. 40 cm from point B at right; real

41652938291. 70 cm from point B at left; virtual

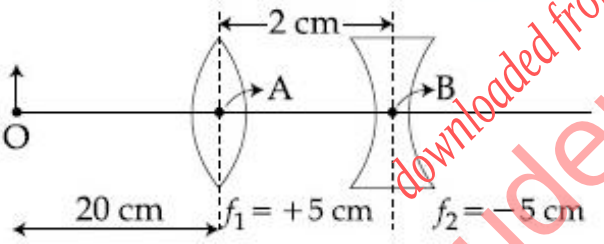
41652938292. 70 cm from point B at right; real

41652938293. $\frac{20}{3}$ cm from point B at right, real

Question Number : 23 Question Id : 4165299708 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

दिये गये चित्र में लेन्स संयोजन से बने प्रतिबिम्ब की स्थिति व प्रकृति होगी : (f_1, f_2 फोकस दूरियाँ हैं)



Options :

41652938290. बिन्दु B से 40 cm दाँयी ओर; वास्तविक

41652938291. बिन्दु B से 70 cm बाँयी ओर; आभासी

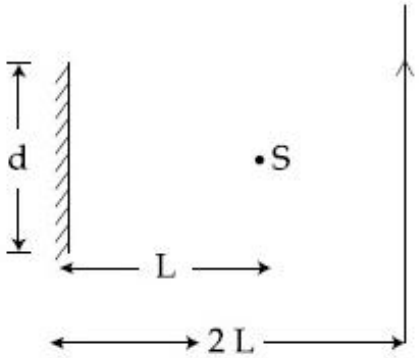
41652938292. बिन्दु B से 70 cm दाँयी ओर; वास्तविक

41652938293. बिन्दु B से $\frac{20}{3}$ cm दाँयी ओर; वास्तविक

Question Number : 24 Question Id : 4165299709 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A point source of light, S is placed at a distance L in front of the centre of plane mirror of width d which is hanging vertically on a wall. A man walks in front of the mirror along a line parallel to the mirror, at a distance 2L as shown below. The distance over which the man can see the image of the light source in the mirror is :



Options :

41652938294. $\frac{d}{2}$

41652938295. 3d

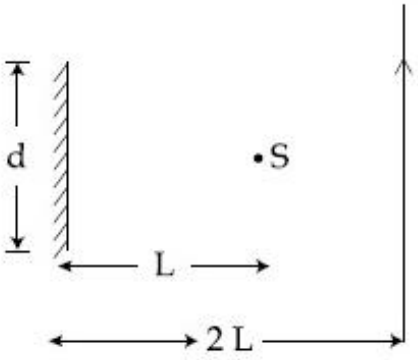
41652938296. 2d

41652938297. d

Question Number : 24 Question Id : 4165289709 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

दीवार पर ऊर्ध्वाधर टाँगे हुए d चौड़ाई के समतल दर्पण के सामने, उसके मध्य बिन्दु से L दूरी पर, प्रकाश का एक बिन्दु स्रोत S रखा हुआ है। दिखाये अनुसार दर्पण के सामने 2L दूरी पर, एक व्यक्ति दर्पण के समान्तर, एक रेखा में चलता है। वह दूरी, जहाँ तक व्यक्ति प्रकाश स्रोत का प्रतिबिम्ब देख सकता है, होगी :



Options :

41652938294. $\frac{d}{2}$

41652938295. 3d

41652938296. 2d

41652938297. d

Question Number : 25 Question Id : 4165299710 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A particle A of mass 'm' and charge 'q' is accelerated by a potential difference of 50 V. Another particle B of mass '4 m' and charge 'q' is accelerated by a potential difference of 2500 V. The ratio of de-Broglie wavelengths $\frac{\lambda_A}{\lambda_B}$ is close to :

Options :

41652938298. 4.47

41652938299. 10.00

41652938300. 0.07

41652938301. 14.14

Question Number : 25 Question Id : 4165299710 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

द्रव्यमान 'm' तथा आवेश 'q' के एक कण A को 50 V विभवान्तर से त्वरित करते हैं। द्रव्यमान '4 m' तथा आवेश 'q' के दूसरे कण B को 2500 V के विभवान्तर से त्वरित करते हैं। इन कणों की दे-ब्राग्ली तरंगदैर्ध्यों के अनुपात $\frac{\lambda_A}{\lambda_B}$ का सन्निकट मान है :

Options :

41652938298. 4.47

41652938299. 10.00

41652938300. 0.07

41652938301. 14.14

Question Number : 26 Question Id : 4165299711 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A particle of mass m moves in a circular orbit in a central potential field $U(r) = \frac{1}{2} kr^2$. If Bohr's quantization conditions are applied, radii of possible orbitls and energy levels vary with quantum number n as :

Options :

41652938302. $r_n \propto n^2, \quad E_n \propto \frac{1}{n^2}$

41652938303. $r_n \propto n, \quad E_n \propto n$

41652938304. $r_n \propto \sqrt{n}, \quad E_n \propto \frac{1}{n}$

41652938305. $r_n \propto \sqrt{n}, \quad E_n \propto n$

Question Number : 26 Question Id : 4165299711 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

m द्रव्यमान का एक कण, $U(r) = \frac{1}{2} kr^2$ के केन्द्रीय विभव क्षेत्र के अन्तर्गत एक वृत्तीय कक्षा में घूम रहा है। यदि बोर के क्वांटमीकरण प्रतिबंध का उपयोग करें तो सम्भव कक्षाओं की त्रिज्या और ऊर्जा स्तरों का क्वांटम संख्या, n के साथ सम्बन्ध होगा :

Options :

41652938302. $r_n \propto n^2, \quad E_n \propto \frac{1}{n^2}$

41652938303. $r_n \propto n, \quad E_n \propto n$

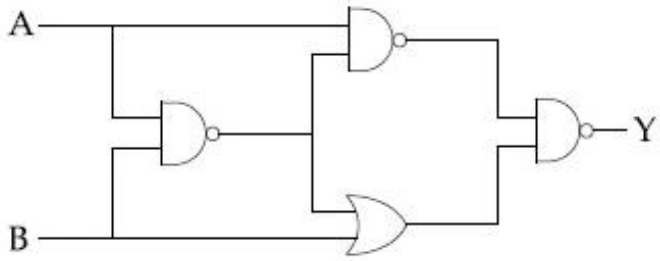
41652938304. $r_n \propto \sqrt{n}, \quad E_n \propto \frac{1}{n}$

41652938305. $r_n \propto \sqrt{n}, \quad E_n \propto n$

Question Number : 27 Question Id : 4165299712 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The output of the given logic circuit is :



Options :

41652938306. $A\overline{B} + \overline{A}B$

41652938307. $A\overline{B}$

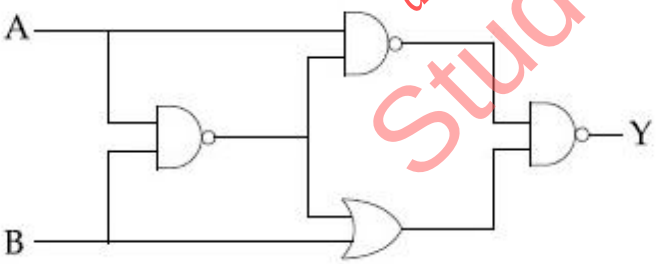
41652938308. $\overline{AB}$

41652938309. $AB + \overline{AB}$

Question Number : 27 Question Id : 4165299712 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

दिये गये लॉजिक गेट का निर्गम है :



Options :

41652938306. $A\overline{B} + \overline{A}B$

41652938307. $A\overline{B}$

41652938308. $\overline{AB}$

41652938309. $AB + \overline{AB}$

Question Number : 28 Question Id : 4165299713 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A 100 V carrier wave is made to vary between 160 V and 40 V by a modulating signal. What is the modulation index ?

Options :

41652938310. 0.3

41652938311. 0.6

41652938312. 0.5

41652938313. 0.4

Question Number : 28 Question Id : 4165299713 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक माडुलन सिग्नल के द्वारा 100 V की वाहक तरंग को 160 V तथा 40 V के बीच परिवर्तित करते हैं। माडुलन सूचकांक क्या होगा ?

Options :

41652938310. 0.3

41652938311. 0.6

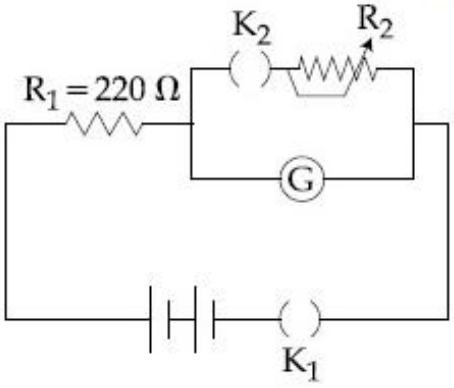
41652938312. 0.5

41652938313. 0.4

Question Number : 29 Question Id : 4165299714 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The galvanometer deflection, when key K_1 is closed but K_2 is open, equals θ_0 (see figure). On closing K_2 also and adjusting R_2 to 5 Ω, the deflection in galvanometer becomes $\frac{\theta_0}{5}$. The resistance of the galvanometer is, then, given by [Neglect the internal resistance of battery] :



Options :

41652938314. 22 Ω

41652938315. 12 Ω

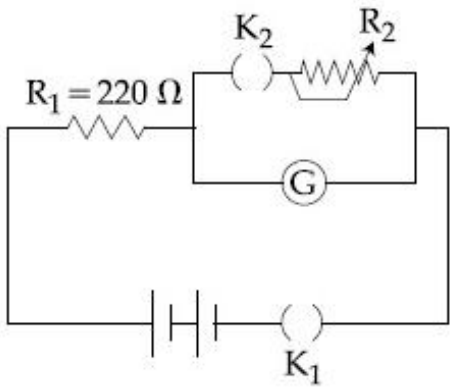
41652938316. 5 Ω

41652938317. 25 Ω

Question Number : 29 Question Id : 4165299714 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

जब कुंजी K_1 बन्द है तथा कुंजी K_2 खुली है तो गैल्वैनोमापी में विक्षेप θ_0 है (चित्र देखिये)। K_2 को बन्द करके R_2 को 5 Ω रखने पर गैल्वैनोमापी में विक्षेप $\frac{\theta_0}{5}$ हो जाता है। गैल्वैनोमापी का प्रतिरोध होगा (बैटरी का आन्तरिक प्रतिरोध नगण्य है) :



Options :

41652938314. $22\ \Omega$

41652938315. $12\ \Omega$

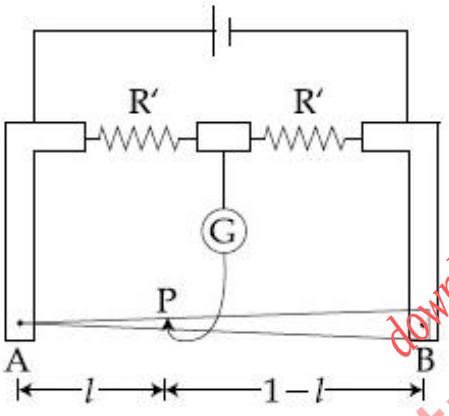
41652938316. $5\ \Omega$

41652938317. $25\ \Omega$

Question Number : 30 Question Id : 4165299715 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

In a meter bridge, the wire of length 1 m has a non-uniform cross-section such that, the variation $\frac{dR}{dl}$ of its resistance R with length l is $\frac{dR}{dl} \propto \frac{1}{\sqrt{l}}$. Two equal resistances are connected as shown in the figure. The galvanometer has zero deflection when the jockey is at point P. What is the length AP?



Options :

41652938318. 0.2 m

41652938319. 0.25 m

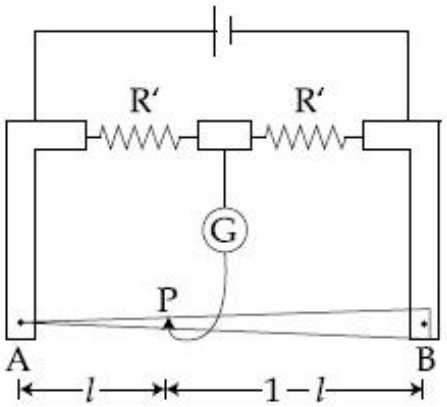
41652938320. 0.3 m

41652938321. 0.35 m

Question Number : 30 Question Id : 4165299715 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक मीटर सेतु में, 1 मी. लम्बाई के तार का असमान अनुप्रस्थ काट इस प्रकार है कि, इसके प्रतिरोध R का लम्बाई l के साथ परिवर्तन $\frac{dR}{dl}$ को $\frac{dR}{dl} \propto \frac{1}{\sqrt{l}}$ से दिया जाता है। दिखाये गये चित्रानुसार दो बराबर प्रतिरोधों को जोड़ा गया हैं। जब जॉकी बिन्दु P पर है तो गैल्वैनोमापी में शून्य विक्षेप है। लम्बाई AP क्या होगी ?



Options :

41652938318. 0.2 m

41652938319. 0.25 m

41652938320. 0.3 m

41652938321. 0.35 m

Chemistry

Section Id :	416529146
Section Number :	2
Section type :	Online
Mandatory or Optional:	Mandatory
Number of Questions:	30
Number of Questions to be attempted:	30
Section Marks:	120
Display Number Panel:	Yes
Group All Questions:	No

Sub-Section Number:	1
Sub-Section Id:	416529155
Question Shuffling Allowed :	Yes

Question Number : 31 Question Id : 4165299716 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Poly-β-hydroxybutyrate-co-β-hydroxyvalerate(PHBV) is a copolymer of _____.

Options :

41652938322. 2-hydroxybutanoic acid and 3-hydroxypentanoic acid

41652938323. 3-hydroxybutanoic acid and 3-hydroxypentanoic acid

41652938324. 3-hydroxybutanoic acid and 2-hydroxypentanoic acid

41652938325. 3-hydroxybutanoic acid and 4-hydroxypentanoic acid

Question Number : 31 Question Id : 4165299716 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

पॉली-β-हाइड्रॉक्सीब्यूटीरेट-co-β-हाइड्रॉक्सीवैलिरेट (PHBV) जिसका सह बहुलक है, वे हैं :

Options :

41652938322. 2-हाइड्रॉक्सीब्यूटेनोइक एसिड तथा 3-हाइड्रॉक्सीपेन्टेनोइक एसिड

41652938323. 3-हाइड्रॉक्सीब्यूटेनोइक एसिड तथा 3-हाइड्रॉक्सीपेन्टेनोइक एसिड

41652938324. 3-हाइड्रॉक्सीब्यूटेनोइक एसिड तथा 2-हाइड्रॉक्सीपेन्टेनोइक एसिड

41652938325. 3-हाइड्रॉक्सीब्यूटेनोइक एसिड तथा 4-हाइड्रॉक्सीपेन्टेनोइक एसिड

Question Number : 32 Question Id : 4165299717 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

In the following reaction

$$\text{Aldehyde} + \text{Alcohol} \xrightarrow{HCl} \text{Acetal}$$

Aldehyde	Alcohol
HCHO	^{t}BuOH
CH_3CHO	MeOH

The best combination is :

Options :

41652938326. HCHO and MeOH

41652938327. HCHO and ^{t}BuOH

41652938328. CH_3CHO and ^{t}BuOH

41652938329. CH_3CHO and MeOH

Question Number : 32 Question Id : 4165299717 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

निम्न अभिक्रिया में

ऐल्डिहाइड + ऐल्कोहॉल $\xrightarrow{HCl}$ ऐसिटल

ऐल्डिहाइड	ऐल्कोहॉल
HCHO	^{t}BuOH
CH_3CHO	MeOH

सर्वोत्तम संयोजन है :

Options :

41652938326. HCHO तथा MeOH

41652938327. HCHO तथा ^{t}BuOH

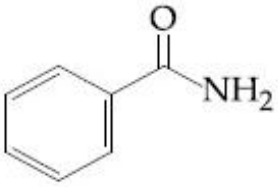
41652938328. CH_3CHO तथा ^{t}BuOH

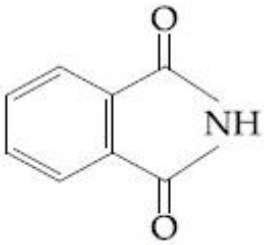
41652938329. CH_3CHO तथा MeOH

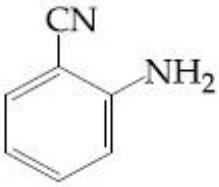
Question Number : 33 Question Id : 4165299718 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

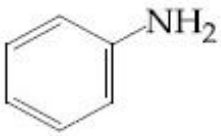
Correct Marks : 4 Wrong Marks : 1

The increasing order of reactivity of the following compounds towards reaction with alkyl halides directly is :


(A)


(B)


(C)


(D)

Options :

41652938330. (B)<(A)<(D)<(C)

41652938331. (A)<(B)<(C)<(D)

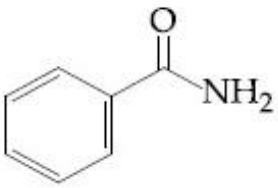
41652938332. (A)<(C)<(D)<(B)

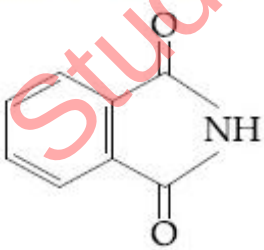
41652938333. (B)<(A)<(C)<(D)

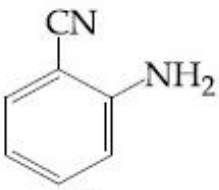
Question Number : 33 Question Id : 4165299718 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

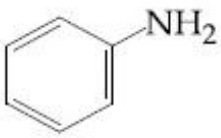
Correct Marks : 4 Wrong Marks : 1

निम्न यौगिकों की ऐल्किल हैलाइड के साथ सीधी अभिक्रिया की अभिक्रियाशीलता का बढ़ता क्रम है :


(A)


(B)


(C)


(D)

Options :

41652938330. (B)<(A)<(D)<(C)

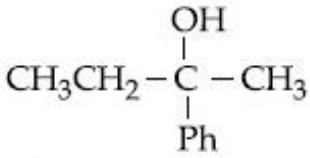
41652938331. (A)<(B)<(C)<(D)

41652938332. (A)<(C)<(D)<(B)

41652938333. (B)<(A)<(C)<(D)

Question Number : 34 Question Id : 4165299719 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

 cannot be prepared by :

Options :

41652938334. $PhCOCH_3 + CH_3CH_2MgX$

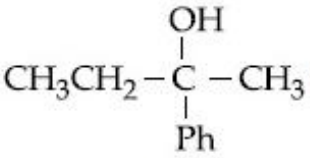
41652938335. $CH_3CH_2COCH_3 + PhMgX$

41652938336. $PhCOCH_2CH_3 + CH_3MgX$

41652938337. $HCHO + PhCH(CH_3)CH_2MgX$

Question Number : 34 Question Id : 4165299719 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

 निम्न में से किसके द्वारा नहीं बनाया जा सकता है ?

Options :

41652938334. $PhCOCH_3 + CH_3CH_2MgX$

41652938335. $CH_3CH_2COCH_3 + PhMgX$

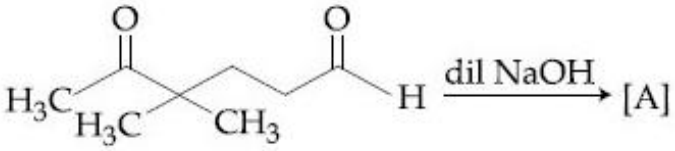
41652938336. $PhCOCH_2CH_3 + CH_3MgX$

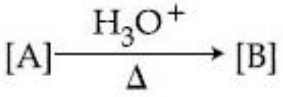
41652938337. $HCHO + PhCH(CH_3)CH_2MgX$

Question Number : 35 Question Id : 4165299720 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

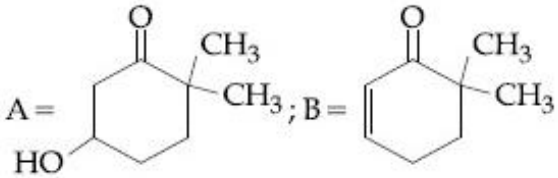
In the following reactions, products A and B are :



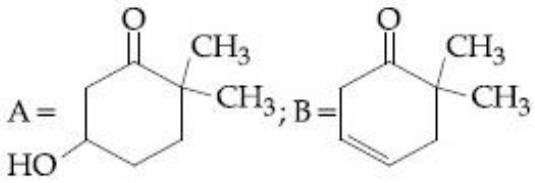


Options :

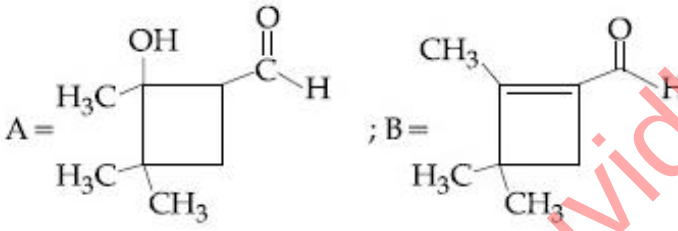
41652938338.



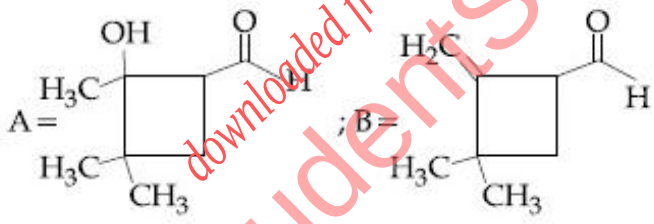
41652938339.



41652938340.



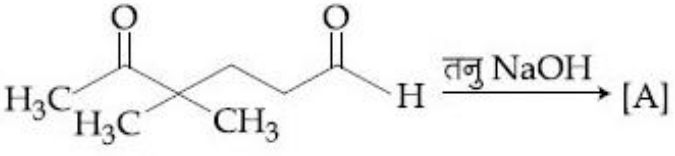
41652938341.

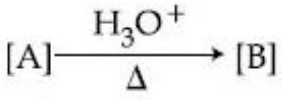


Question Number : 35 Question Id : 4165299720 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

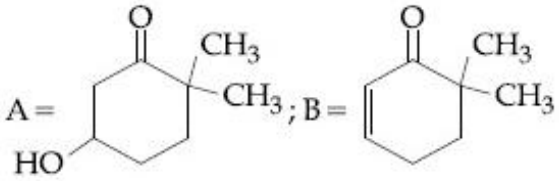
Correct Marks : 4 Wrong Marks : 1

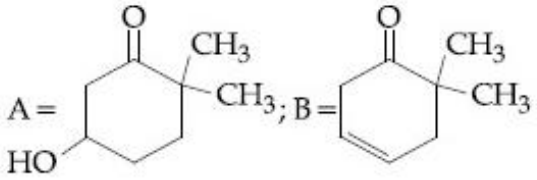
निम्न अभिक्रियाओं में उत्पाद A तथा B हैं :

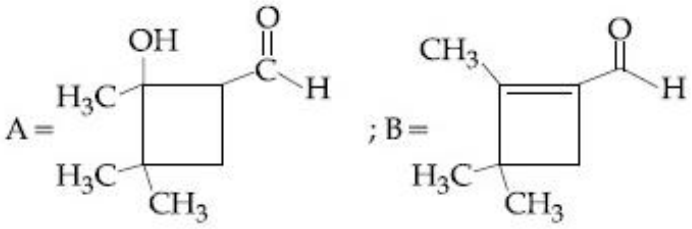


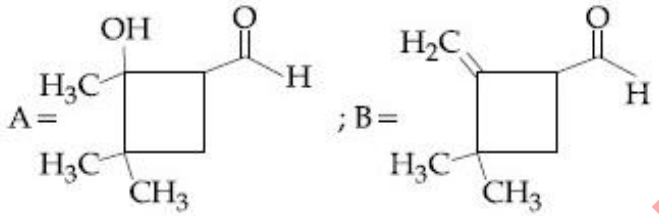


Options :

41652938338. 

41652938339. 

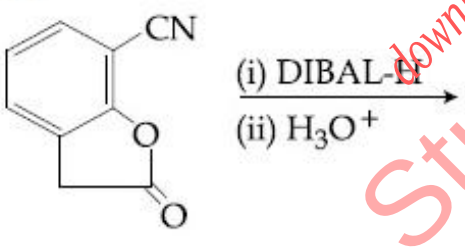
41652938340. 

41652938341. 

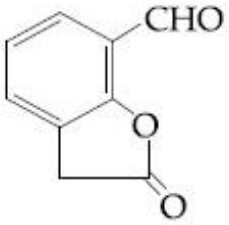
Question Number : 36 Question Id : 4165299721 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

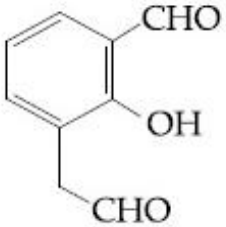
Correct Marks : 4 Wrong Marks : 1

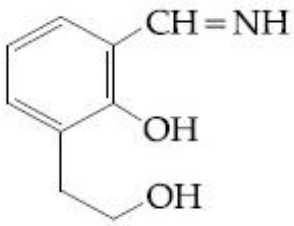
The major product of the following reaction is :

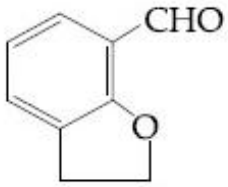


Options :

41652938342. 

41652938343. 

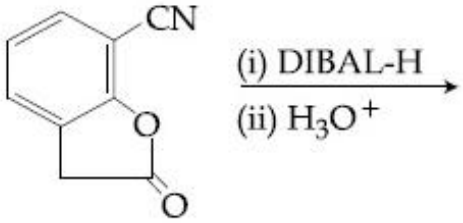
41652938344. 

41652938345. 

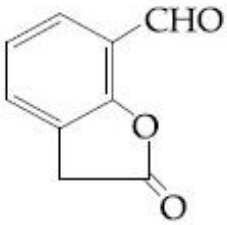
Question Number : 36 Question Id : 4165299721 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

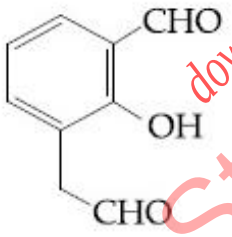
Correct Marks : 4 Wrong Marks : 1

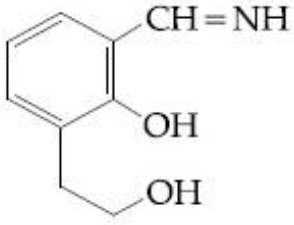
निम्न अभिक्रिया का मुख्य उत्पाद है :

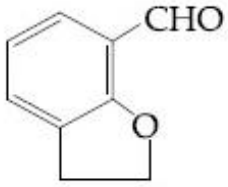


Options :

41652938342. 

41652938343. 

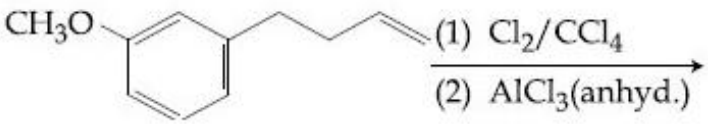
41652938344. 

41652938345. 

Question Number : 37 Question Id : 4165299722 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

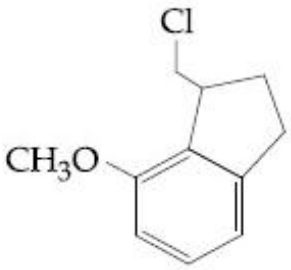
Correct Marks : 4 Wrong Marks : 1

The major product of the following reaction is :

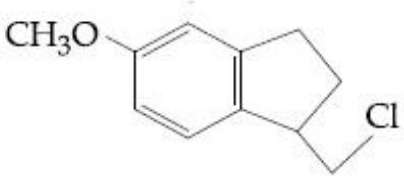


Options :

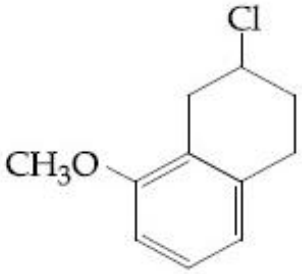
41652938346.



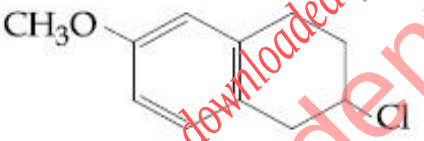
41652938347.



41652938348.



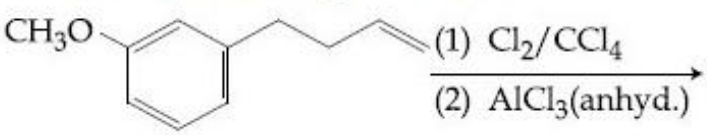
41652938349.



Question Number : 37 Question Id : 4165299722 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

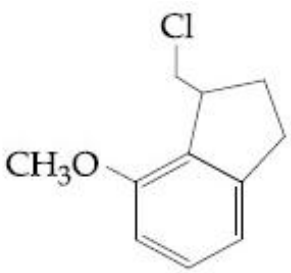
Correct Marks : 4 Wrong Marks : 1

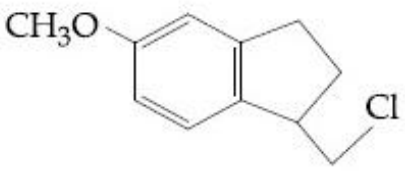
निम्न अभिक्रिया का मुख्य उत्पाद है :

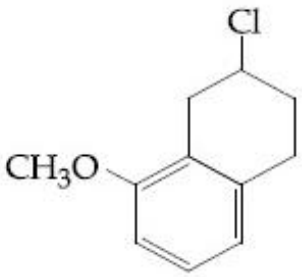


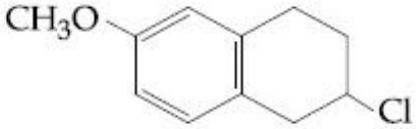
Options :

41652938346.



41652938347. 

41652938348. 

41652938349. 

Question Number : 38 Question Id : 4165299723 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Among the following compounds most basic amino acid is :

Options :

41652938350. Histidine

41652938351. Serine

41652938352. Lysine

41652938353. Asparagine

Question Number : 38 Question Id : 4165299723 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

निम्न यौगिकों में से सबसे ज्यादा क्षारीय ऐमीनों अम्ल है :

Options :

41652938350. हिस्टीडीन

41652938351. सेरीन

41652938352. लाइसीन

41652938353. ऐस्पेराजीन

Question Number : 39 Question Id : 4165299724 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The correct order for acid strength of compounds

$CH \equiv CH$, $CH_3-C \equiv CH$ and $CH_2=CH_2$

is as follows :

Options :

41652938354. $HC \equiv CH > CH_3-C \equiv CH > CH_2=CH_2$

41652938355. $CH_3-C \equiv CH > CH \equiv CH > CH_2=CH_2$

41652938356. $CH_3-C \equiv CH > CH_2=CH_2 > HC \equiv CH$

41652938357. $CH \equiv CH > CH_2=CH_2 > CH_3-C \equiv CH$

Question Number : 39 Question Id : 4165299724 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

$CH \equiv CH$, $CH_3-C \equiv CH$ तथा $CH_2=CH_2$

यौगिकों के अम्लीय सामर्थ्य का सही क्रम है :

Options :

41652938354. $HC \equiv CH > CH_3-C \equiv CH > CH_2=CH_2$

41652938355. $CH_3-C \equiv CH > CH \equiv CH > CH_2=CH_2$

41652938356. $CH_3-C \equiv CH > CH_2=CH_2 > HC \equiv CH$

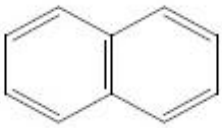
41652938357. $CH \equiv CH > CH_2=CH_2 > CH_3-C \equiv CH$

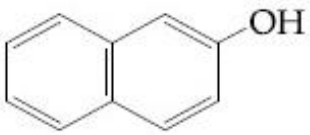
Question Number : 40 Question Id : 4165299725 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

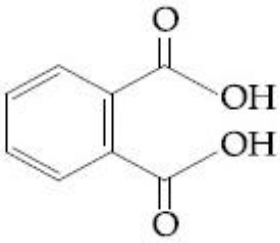
Correct Marks : 4 Wrong Marks : 1

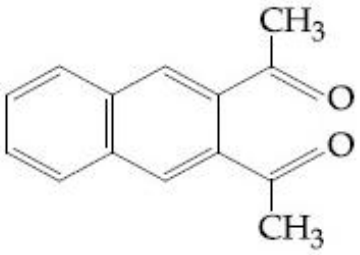
Among the following four aromatic compounds, which one will have the lowest melting point ?

Options :

41652938358. 

41652938359. 

41652938360. 

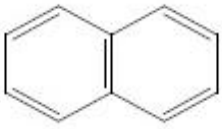
41652938361. 

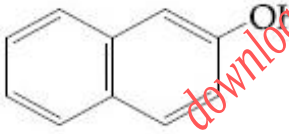
Question Number : 40 Question Id : 4165299725 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

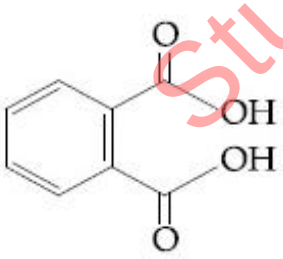
Correct Marks : 4 Wrong Marks : 1

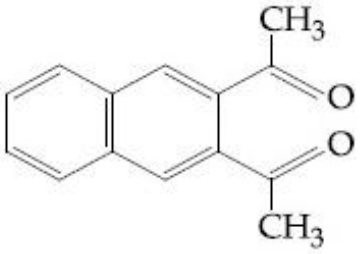
निम्न चार एरोमैटिक यौगिकों में से किसका गलनांक निम्नतम होगा ?

Options :

41652938358. 

41652938359. 

41652938360. 

41652938361. 

Question Number : 41 Question Id : 4165299726 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The element with $Z = 120$ (not yet discovered) will be an/a :

Options :

41652938362. alkali metal

41652938363. alkaline earth metal

41652938364. transition metal

41652938365. inner-transition metal

Question Number : 41 Question Id : 4165299726 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

वह तत्व जिसका $Z = 120$ है (जिसकी खोज अभी तक नहीं हुई है) होगा :

Options :

41652938362. क्षार धातु

41652938363. क्षारीय मृदा धातु

41652938364. संक्रमण धातु

41652938365. आंतर संक्रमण धातु

Question Number : 42 Question Id : 4165299727 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

In the Hall-Heroult process, aluminium is formed at the cathode. The cathode is made out of :

Options :

41652938366. Platinum

41652938367. Pure aluminium

41652938368. Copper

41652938369. Carbon

Question Number : 42 Question Id : 4165299727 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

हाल-हेराल्ट प्रक्रम में एलुमिनियम कैथोड पर बनता है। कैथोड जिसका बनता है, वह है :

Options :

41652938366. प्लेटिनम

41652938367. शुद्ध एलुमिनियम

41652938368. ताँबा

41652938369. कार्बन

Question Number : 43 Question Id : 4165299728 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The hardness of a water sample (in terms of equivalents of $CaCO_3$) containing 10^{-3} M $CaSO_4$ is :

(molar mass of $CaSO_4 = 136\ g\ mol^{-1}$)

Options :

41652938370. 90 ppm

41652938371. 100 ppm

41652938372. 10 ppm

41652938373. 50 ppm

Question Number : 43 Question Id : 4165299728 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

पानी के उस प्रतिदर्श की कठोरता ($CaCO_3$ के समतुल्य के सापेक्ष) जिसमें 10^{-3} M $CaSO_4$ है, होगी :

($CaSO_4$ का मोलर द्रव्यमान $= 136\ g\ mol^{-1}$)

Options :

41652938370. 90 ppm

41652938371. 100 ppm

41652938372. 10 ppm

41652938373. 50 ppm

Question Number : 44 Question Id : 4165299729 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A metal on combustion in excess air forms X. X upon hydrolysis with water yields H_2O_2 and O_2 along with another product. The metal is :

Options :

41652938374. Li

41652938375. Na

41652938376. Rb

41652938377. Mg

Question Number : 44 Question Id : 4165299729 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक धातु, वायु के आधिक्य में, दहन होने पर X बनाती है। X जल के साथ जल अपघटित होकर H_2O_2 तथा O_2 और कुछ अन्य उत्पाद देता है। धातु है :

Options :

41652938374. Li

41652938375. Na

41652938376. Rb

41652938377. Mg

Question Number : 45 Question Id : 4165299730 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Iodine reacts with concentrated HNO_3 to yield Y along with other products. The oxidation state of iodine in Y, is :

Options :

41652938378. 1

41652938379. 3

41652938380. 5

41652938381. 7

Question Number : 45 Question Id : 4165299730 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

आयोडीन सान्द्र HNO_3 के साथ अभिक्रिया करके अन्य उत्पादों के साथ Y पैदा करती है। Y में आयोडीन की ऑक्सीकरण संख्या है :

Options :

41652938378. 1

41652938379. 3

41652938380. 5

41652938381. 7

Question Number : 46 Question Id : 4165299731 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The pair of metal ions that can give a spin-only magnetic moment of 3.9 BM for the complex $[M(H_2O)_6]Cl_2$, is :

Options :

41652938382. Cr^{2+} and Mn^{2+}

41652938383. V^{2+} and Fe^{2+}

41652938384. V^{2+} and Co^{2+}

41652938385. Co^{2+} and Fe^{2+}

Question Number : 46 Question Id : 4165299731 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

संकुल $[M(H_2O)_6]Cl_2$ के लिए धातु आयनों का युग्म जो 3.9 BM का एक स्पिन मात्र चुम्बकीय आघूर्ण देता है, होगा :

Options :

41652938382. Cr^{2+} तथा Mn^{2+}

41652938383. V^{2+} तथा Fe^{2+}

41652938384. V^{2+} तथा Co^{2+}

41652938385. Co^{2+} तथा Fe^{2+}

Question Number : 47 Question Id : 4165299732 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The metal d-orbitals that are directly facing the ligands in $K_3[Co(CN)_6]$ are :

Options :

41652938386. d_{xy} and $d_{x^2-y^2}$

41652938387. d_{xy}, d_{xz} and d_{yz}

41652938388. d_{xz}, d_{yz} and d_{z^2}

41652938389. $d_{x^2-y^2}$ and d_{z^2}

Question Number : 47 Question Id : 4165299732 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

धातु के d-कक्षक जो $K_3[Co(CN)_6]$ में लिगन्ड के सीधे सामने पड़ते हैं, हैं :

Options :

41652938386. d_{xy} तथा $d_{x^2-y^2}$

41652938387. d_{xy}, d_{xz} तथा d_{yz}

41652938388. d_{xz}, d_{yz} तथा d_{z^2}

41652938389. $d_{x^2-y^2}$ तथा d_{z^2}

Question Number : 48 Question Id : 4165299733 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

$Mn_2(CO)_{10}$ is an organometallic compound due to the presence of :

Options :

41652938390. Mn – C bond

41652938391. Mn – Mn bond

41652938392. C – O bond

41652938393. Mn – O bond

Question Number : 48 Question Id : 4165299733 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

जिसकी उपस्थिति के कारण $Mn_2(CO)_{10}$ एक कार्बधात्विक यौगिक है, वह है :

Options :

41652938390. Mn – C आबन्ध

41652938391. Mn – Mn आबन्ध

41652938392. C – O आबन्ध

41652938393. Mn – O आबन्ध

Question Number : 49 Question Id : 4165299734 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Water samples with BOD values of 4 ppm and 18 ppm, respectively, are

Options :

41652938394. Clean and Clean

41652938395. Highly polluted and Clean

41652938396. Clean and Highly polluted

41652938397. Highly polluted and Highly polluted

Question Number : 49 Question Id : 4165299734 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

4 ppm तथा 18 ppm BOD (बी.ओ.डी.) मान वाले जल के नमूने क्रमश: होंगे :

Options :

41652938394. स्वच्छ तथा स्वच्छ

41652938395. अत्यधिक प्रदूषित तथा स्वच्छ

41652938396. स्वच्छ तथा अत्यधिक प्रदूषित

41652938397. अत्यधिक प्रदूषित तथा अत्यधिक प्रदूषित

Question Number : 50 Question Id : 4165299735 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The molecule that has minimum/no role in the formation of photochemical smog, is :

Options :

41652938398. O_3

41652938399. N_2

41652938400. NO

41652938401. $CH_2=O$

Question Number : 50 Question Id : 4165299735 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

उस अणु को बताइये जिसकी प्रकाश रासायनिक धूमकुहा के बनने में कम से कम/कुछ नहीं भूमिका होती है, :

Options :

41652938398. O_3

41652938399. N_2

41652938400. NO

41652938401. $CH_2=O$

Question Number : 51 Question Id : 4165299736 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

50 mL of 0.5 M oxalic acid is needed to neutralize 25 mL of sodium hydroxide solution. The amount of NaOH in 50 mL of the given sodium hydroxide solution is :

Options :

41652938402. 20 g

41652938403. 40 g

41652938404. 80 g

41652938405. 10 g

Question Number : 51 Question Id : 4165299736 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

25 mL सोडियम हाइड्रॉक्साइड विलयन के उदासीनीकरण के लिए 0.5 M आक्जेलिक अम्ल के 50 mL की आवश्यकता होती है। दिये गये सोडियम हाइड्रॉक्साइड विलयन के 50 mL में NaOH की मात्रा होगी :

Options :

41652938402. 20 g

41652938403. 40 g

41652938404. 80 g

41652938405. 10 g

Question Number : 52 Question Id : 4165299737 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The volume of gas A is twice than that of gas B. The compressibility factor of gas A is thrice than that of gas B at same temperature. The pressures of the gases for equal number of moles are :

Options :

41652938406. $P_A = 2P_B$

41652938407. $P_A = 3P_B$

41652938408. $2P_A = 3P_B$

41652938409. $3P_A = 2P_B$

Question Number : 52 Question Id : 4165299737 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

गैस A का आयतन गैस B के आयतन का दो गुना है। एक ही ताप पर गैस A का संपीड्यता गुणांक गैस B के संपीड्यता गुणांक की तुलना में तीन गुना है। मोलों की समान संख्या के लिए गैसों का दाब होगा :

Options :

41652938406. $P_A = 2P_B$

41652938407. $P_A = 3P_B$

41652938408. $2P_A = 3P_B$

41652938409. $3P_A = 2P_B$

Question Number : 53 Question Id : 4165299738 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

What is the work function of the metal if the light of wavelength 4000Å generates photoelectrons of velocity 6×10^5 ms^{-1} from it ?

(Mass of electron $= 9 \times 10^{-31}$ kg

Velocity of light $= 3 \times 10^8$ ms^{-1}

Planck's constant $= 6.626 \times 10^{-34}$ Js

Charge of electron $= 1.6 \times 10^{-19}$ JeV^{-1})

Options :

41652938410. 4.0 eV

41652938411. 2.1 eV

41652938412. 0.9 eV

41652938413. 3.1 eV

Question Number : 53 Question Id : 4165299738 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

धातु का कार्यफलन क्या होगा, यदि 4000Å तरंगदैर्ध्य का प्रकाश इससे $6 \times 10^5\ ms^{-1}$ वेग के फोटोइलेक्ट्रानों को उत्पन्न करता है?

(इलेक्ट्रॉन की संहति $= 9 \times 10^{-31}$ kg

प्रकाश का वेग $= 3 \times 10^8\ ms^{-1}$

प्लैंक स्थिरांक $= 6.626 \times 10^{-34}$ Js

तथा इलेक्ट्रॉन का आवेश $= 1.6 \times 10^{-19}\ JeV^{-1}$)

Options :

41652938410. 4.0 eV

41652938411. 2.1 eV

41652938412. 0.9 eV

41652938413. 3.1 eV

Question Number : 54 Question Id : 4165299739 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Two solids dissociate as follows

$A(s) \rightleftharpoons B(g) + C(g); K_{P_1} = x\ atm^2$

$D(s) \rightleftharpoons C(g) + E(g); K_{P_2} = y\ atm^2$

The total pressure when both the solids dissociate simultaneously is :

Options :

41652938414. $\sqrt{x+y}$ atm

41652938415. $(x+y)$ atm

41652938416. $2\left(\sqrt{x+y}\right)$ atm

41652938417. $x^2 + y^2$ atm

Question Number : 54 Question Id : 4165299739 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

दो ठोस निम्न प्रकार वियोजित होते हैं

$A(s) \rightleftharpoons B(g) + C(g); K_{p_1} = x \text{ atm}^2$

$D(s) \rightleftharpoons C(g) + E(g); K_{p_2} = y \text{ atm}^2$

जब दोनों ठोस एक ही साथ वियोजित हों तो कुल दाब होगा :

Options :

41652938414. $\sqrt{x+y}$ atm

41652938415. $(x+y)$ atm

41652938416. $2\left(\sqrt{x+y}\right)$ atm

41652938417. x^2+y^2 atm

Question Number : 55 Question Id : 4165299740 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

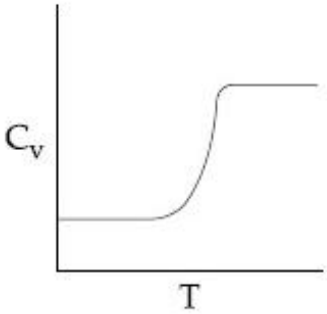
Correct Marks : 4 Wrong Marks : 1

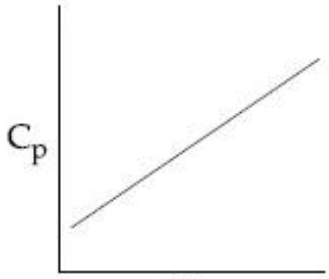
For a diatomic ideal gas in a closed system, which of the following plots does not correctly describe the relation between various thermodynamic quantities ?

Options :

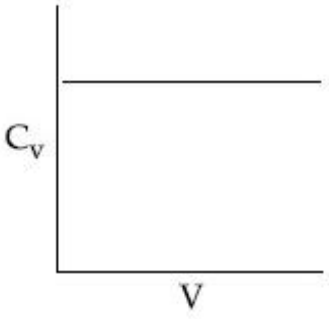
41652938418.

41652938419.





41652938420.



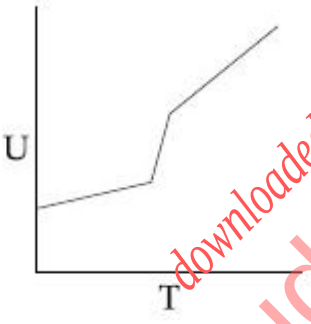
41652938421.

Question Number : 55 Question Id : 4165299740 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

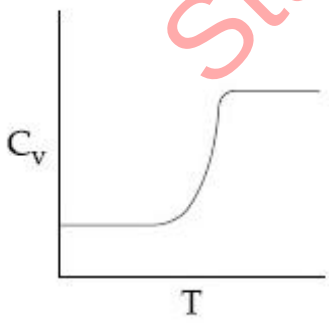
Correct Marks : 4 Wrong Marks : 1

एक बंद निकाय में एक द्विपरमाणुक आदर्श गैस के लिए निम्न में से कौन सा एक प्लाट विभिन्न ऊष्मागतिक परिमाणों के मध्य सम्बन्धों को सही-सही नहीं बताता ?

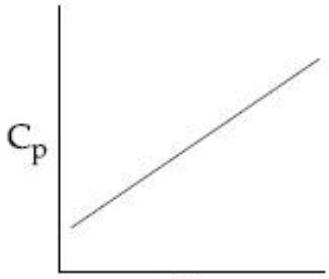
Options :



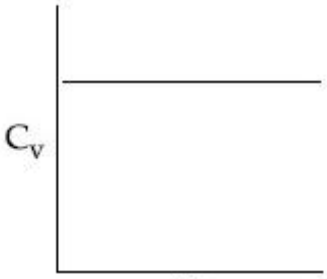
41652938418.



41652938419.



41652938420.



41652938421.

Question Number : 56 Question Id : 4165299741 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Freezing point of a 4% aqueous solution of X is equal to freezing point of 12% aqueous solution of Y. If molecular weight of X is A, then molecular weight of Y is :

Options :

41652938422. A

41652938423. 2A

41652938424. 3A

41652938425. 4A

Question Number : 56 Question Id : 4165299741 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

X के 4% जलीय विलयन का हिमांक, Y के 12% जलीय विलयन के हिमांक के बराबर है। यदि X का अणुभार A है तो Y का अणुभार होगा :

Options :

41652938422. A

41652938423. 2A

41652938424. 3A

41652938425. $4A$

Question Number : 57 Question Id : 4165299742 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

In a chemical reaction, $A+2B \overset{K}{\rightleftharpoons} 2C+D$, the initial concentration of B was 1.5 times of the concentration of A, but the equilibrium concentrations of A and B were found to be equal. The equilibrium constant(K) for the aforesaid chemical reaction is :

Options :

41652938426. $\frac{1}{4}$

41652938427. 4

41652938428. 1

41652938429. 16

Question Number : 57 Question Id : 4165299742 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक रासायनिक अभिक्रिया, $A+2B \overset{K}{\rightleftharpoons} 2C+D$ में, B की प्रारम्भिक सान्द्रता A की सान्द्रता की 1.5 गुना थी लेकिन A तथा B साम्य सान्द्रताएँ बराबर पाई गईं। उपरोक्त अभिक्रिया के लिए साम्य स्थिरांक (K) होगा :

Options :

41652938426. $\frac{1}{4}$

41652938427. 4

41652938428. 1

41652938429. 16

Question Number : 58 Question Id : 4165299743 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The standard electrode potential $E^{\ominus}$ and its temperature coefficient $\left(\frac{dE^{\ominus}}{dT}\right)$ for a cell are 2 V and $-5\times10^{-4}\ VK^{-1}$ at 300 K respectively. The cell reaction is

$Zn(s)+Cu^{2+}(aq)\rightarrow Zn^{2+}(aq)+Cu(s)$

The standard reaction enthalpy ($\Delta_rH^{\ominus}$) at 300 K in kJ mol^{-1} is,

[Use $R=8\ JK^{-1}mol^{-1}$ and $F=96{,}000\ Cmol^{-1}$]

Options :

41652938430. -412.8

41652938431. 206.4

41652938432. -384.0

41652938433. 192.0

Question Number : 58 Question Id : 4165299743 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक सेल के लिए मानक इलेक्ट्रोड विभव $E^{\ominus}$ तथा उसका ताप गुणांक $\left(\frac{dE^{\ominus}}{dT}\right)$ 300 K पर क्रमशः 2 V तथा $-5\times10^{-4}\ VK^{-1}$ हैं। सेल अभिक्रिया है,

$Zn(s)+Cu^{2+}(aq)\rightarrow Zn^{2+}(aq)+Cu(s)$

300 K पर मानक अभिक्रिया एन्थैल्पी ($\Delta_rH^{\ominus}$), kJ mol^{-1} में होगी :

[$R=8\ JK^{-1}mol^{-1}$ तथा $F=96{,}000\ Cmol^{-1}$]

Options :

41652938430. -412.8

41652938431. 206.4

41652938432. -384.0

41652938433. 192.0

Question Number : 59 Question Id : 4165299744 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Decomposition of X exhibits a rate constant of 0.05 μg/year. How many years are required for the decomposition of 5 μg of X into 2.5 μg ?

Options :

41652938434. 20

41652938435. 50

41652938436. 25

41652938437. 40

Question Number : 59 Question Id : 4165299744 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

X का विघटन 0.05 μg/वर्ष का दर नियतांक प्रदर्शित करता है। X के 5 μg को विघटित होकर 2.5 μg होने में कितने वर्ष लगेंगे ?

Options :

41652938434. 20

41652938435. 50

41652938436. 25

41652938437. 40

Question Number : 60 Question Id : 4165299745 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Given

Gas	H_2	CH_4	CO_2	SO_2
Critical Temperature/K	33	190	304	630

On the basis of data given above, predict which of the following gases shows least adsorption on a definite amount of charcoal ?

Options :

41652938438. SO_2

41652938439. CO_2

41652938440. CH_4

41652938441. H_2

Question Number : 60 Question Id : 4165299745 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

दिया गया है

गैस	H_2	CH_4	CO_2	SO_2
क्रांतिक ताप/K	33	190	304	630

ऊपर दिये गये आँकड़ों के आधार पर प्रागुक्ति कीजिए कि निम्न में से कौन सी गैस चारकोल की एक निश्चित मात्रा पर न्यूनतम अधिशोषण प्रदर्शित करेगी?

Options :

41652938438. SO_2

41652938439. CO_2

41652938440. CH_4

41652938441. H_2

Mathematics

Section Id :	416529147
Section Number :	3
Section type :	Online
Mandatory or Optional:	Mandatory
Number of Questions:	30
Number of Questions to be attempted:	30
Section Marks:	120
Display Number Panel:	Yes
Group All Questions:	No

Sub-Section Number:	1
Sub-Section Id:	416529156
Question Shuffling Allowed :	Yes

Question Number : 61 Question Id : 4165299746 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Let $S = \{1, 2, 3, \ldots, 100\}$. The number of non-empty subsets A of S such that the product of elements in A is even is :

Options :

41652938442. $2^{100}-1$

41652938443. $2^{50}-1$

41652938444. $2^{50}(2^{50}-1)$

41652938445. $2^{50}+1$

Question Number : 61 Question Id : 4165299746 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

माना $S=\{1,2,3,\ldots,100\}$, तो S के उन सभी अरिक्त (non-empty) उपसमुच्चयों A जिनके अवयवों का गुणनफल सम है, की संख्या है :

Options :

41652938442. $2^{100}-1$

41652938443. $2^{50}-1$

41652938444. $2^{50}(2^{50}-1)$

41652938445. $2^{50}+1$

Question Number : 62 Question Id : 4165299747 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

If $\frac{z-\alpha}{z+\alpha}$ $(\alpha \in R)$ is a purely imaginary number and $|z|=2$, then a value of α is :

Options :

41652938446. $\frac{1}{2}$

41652938447. 2

41652938448. $\sqrt{2}$

41652938449. 1

Question Number : 62 Question Id : 4165299747 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

यदि $\frac{z-\alpha}{z+\alpha}$ $(\alpha \epsilon R)$ एक शुद्ध रूप से काल्पनिक संख्या है, तथा $|z|=2$ है, तो α का एक मान है :

Options :

41652938446. $\frac{1}{2}$

41652938447. 2

41652938448. $\sqrt{2}$

41652938449. 1

Question Number : 63 Question Id : 4165299748 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

If λ be the ratio of the roots of the quadratic equation in x, $3m^2x^2+m(m-4)x+2=0$, then the least value of m for which $\lambda+\frac{1}{\lambda}=1$, is :

Options :

41652938450. $4-3\sqrt{2}$

41652938451. $4-2\sqrt{3}$

41652938452. $2-\sqrt{3}$

41652938453. $-2+\sqrt{2}$

Question Number : 63 Question Id : 4165299748 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

यदि x में द्विघात समीकरण $3m^2x^2+m(m-4)x+2=0$ के मूलों का अनुपात λ है, तो m का वह न्यूनतम मान जिसके लिए $\lambda+\frac{1}{\lambda}=1$ है, है :

Options :

41652938450. $4-3\sqrt{2}$

41652938451. $4-2\sqrt{3}$

41652938452. $2-\sqrt{3}$

41652938453. $-2+\sqrt{2}$

Question Number : 64 Question Id : 4165299749 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Let $P=\begin{bmatrix}1 & 0 & 0\\ 3 & 1 & 0\\ 9 & 3 & 1\end{bmatrix}$ and $Q=[q_{ij}]$ be two 3×3 matrices such that $Q-P^5=I_3$. Then $\frac{q_{21}+q_{31}}{q_{32}}$ is equal to :

Options :

41652938454. 9

41652938455. 10

41652938456. 15

41652938457. 135

Question Number : 64 Question Id : 4165299749 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

यदि $P=\begin{bmatrix}1 & 0 & 0\\ 3 & 1 & 0\\ 9 & 3 & 1\end{bmatrix}$ तथा $Q=[q_{ij}]$ दो ऐसे 3×3 आव्यूह हैं, कि $Q-P^5=I_3$ है, तो $\frac{q_{21}+q_{31}}{q_{32}}$ बराबर है :

Options :

41652938454. 9

41652938455. 10

41652938456. 15

41652938457. 135

Question Number : 65 Question Id : 4165299750 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

An ordered pair (α, β) for which the system of linear equations

$(1+\alpha)x+\beta y+z=2$

$\alpha x+(1+\beta)y+z=3$

$\alpha x+\beta y+2z=2$

has a unique solution, is :

Options :

41652938458. $(1,-3)$

41652938459. $(-3,1)$

41652938460. $(-4,2)$

41652938461. $(2,4)$

Question Number : 65 Question Id : 4165299750 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक ऐसा क्रमित युग्म (α, β) जिसके लिए रैखिक समीकरण निकाय

$(1+\alpha)x+\beta y+z=2$

$\alpha x+(1+\beta)y+z=3$

$\alpha x+\beta y+2z=2$

का एकमात्र एक हल है, है :

Options :

41652938458. $(1,-3)$

41652938459. $(-3,1)$

41652938460. $(-4,2)$

41652938461. $(2,4)$

Question Number : 66 Question Id : 4165299751 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Consider three boxes, each containing 10 balls labelled 1, 2, ... , 10. Suppose one ball is randomly drawn from each of the boxes. Denote by n_i, the label of the ball drawn from the i^{th} box, $(i=1, 2, 3)$. Then, the number of ways in which the balls can be chosen such that $n_1 < n_2 < n_3$ is :

Options :

41652938462. 120

41652938463. 164

41652938464. 82

41652938465. 240

Question Number : 66 Question Id : 4165299751 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

तीन ऐसे डिब्बों पर विचार कीजिए जिनमें प्रत्येक में 1, 2, ... , 10 तक संख्याओं से अंकित 10 गेंदें हैं। माना कि प्रत्येक डिब्बे में से यादृच्छया एक गेंद निकाली गई। यदि i वें $(i=1, 2, 3)$ डिब्बे में से निकाली गई गेंद पर अंकित संख्या को n_i से प्रदर्शित किया जाए, तो जितने तरीकों से यह गेंदें निकाली जा सकती हैं, ताकि $n_1 < n_2 < n_3$ है, हैं :

Options :

41652938462. 120

41652938463. 164

41652938464. 82

41652938465. 240

Question Number : 67 Question Id : 4165299752 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A ratio of the 5^{th} term from the beginning to the 5^{th} term from the end in the binomial expansion of $\left(2^{1/3} + \frac{1}{2(3)^{1/3}}\right)^{10}$ is :

Options :

41652938466. $1 : 2(6)^{\frac{1}{3}}$

41652938467. $2(36)^{\frac{1}{3}} : 1$

41652938468. $4(36)^{\frac{1}{3}} : 1$

41652938469. $1 : 4(16)^{\frac{1}{3}}$

Question Number : 67 Question Id : 4165299752 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

$\left(2^{1/3} + \frac{1}{2(3)^{1/3}}\right)^{10}$ के द्विपद प्रसार में आरम्भ से 5वें तथा अंत से (प्रथम की ओर) 5 वें पदों का एक अनुपात है :

Options :

41652938466. $1 : 2(6)^{\frac{1}{3}}$

41652938467. $2(36)^{\frac{1}{3}} : 1$

41652938468. $4(36)^{\frac{1}{3}} : 1$

41652938469. $1 : 4(16)^{\frac{1}{3}}$

Question Number : 68 Question Id : 4165299753 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The product of three consecutive terms of a G.P. is 512. If 4 is added to each of the first and the second of these terms, the three terms now form an A.P. Then the sum of the original three terms of the given G.P. is :

Options :

41652938470. 36

41652938471. 32

41652938472. 28

41652938473. 24

Question Number : 68 Question Id : 4165299753 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक गुणोत्तर श्रेढ़ी के तीन क्रमागत (consecutive) पदों का गुणनफल 512 है। यदि इसके पहले तथा दूसरे प्रत्येक पद में 4 जोड़ दें, तो यह तीन संख्याएँ एक समांतर श्रेढ़ी बनाती हैं। तो दी हुई गुणोत्तर श्रेढ़ी के तीनों पदों का योग है :

Options :

41652938470. 36

41652938471. 32

41652938472. 28

41652938473. 24

Question Number : 69 Question Id : 4165299754 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Let $S_k = \frac{1+2+3+....+k}{k}$. If

$S_1^2 + S_2^2 + \cdots + S_{10}^2 = \frac{5}{12}A$, then A is equal to :

Options :

41652938474. 156

41652938475. 283

41652938476. 301

41652938477. 303

Question Number : 69 Question Id : 4165299754 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

माना $S_k = \frac{1+2+3+....+k}{k}$ है। यदि

$S_1^2 + S_2^2 + \cdots + S_{10}^2 = \frac{5}{12}$ A है, तो A

बराबर है :

Options :

41652938474. 156

41652938475. 283

41652938476. 301

41652938477. 303

Question Number : 70 Question Id : 4165299755 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

$\lim\limits_{x \to \pi/4} \frac{\cot^3 x - \tan x}{\cos\left(x + \pi/4\right)}$ is :

Options :

41652938478. $4\sqrt{2}$

41652938479. 4

41652938480. $8\sqrt{2}$

41652938481. 8

Question Number : 70 Question Id : 4165299755 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

$\lim\limits_{x \to \pi/4} \frac{\cot^3 x - \tan x}{\cos\left(x + \pi/4\right)}$ बराबर है :

Options :

41652938478. $4\sqrt{2}$

41652938479. 4

41652938480. $8\sqrt{2}$

41652938481. 8

Question Number : 71 Question Id : 4165299756 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

For $x > 1$, if $(2x)^{2y} = 4e^{2x-2y}$, then

$(1 + \log_e 2x)^2 \frac{dy}{dx}$ is equal to :

Options :

41652938482. $\frac{x \log_e 2x + \log_e 2}{x}$

41652938483. $\log_e 2x$

41652938484. $\frac{x \log_e 2x - \log_e 2}{x}$

41652938485. $x \log_e 2x$

Question Number : 71 Question Id : 4165299756 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

यदि $x > 1$ के लिए $(2x)^{2y} = 4e^{2x-2y}$ है, तो

$(1 + \log_e 2x)^2 \frac{dy}{dx}$ बराबर है :

Options :

41652938482. $\frac{x \log_e 2x + \log_e 2}{x}$

41652938483. $\log_e 2x$

41652938484. $\frac{x \log_e 2x - \log_e 2}{x}$

41652938485. $x \log_e 2x$

Question Number : 72 Question Id : 4165299757 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Let S be the set of all points in $(-\pi, \pi)$ at which the function, $f(x) = \min\{\sin x, \cos x\}$ is not differentiable. Then S is a subset of which of the following ?

Options :

41652938486. $\left\{-\frac{\pi}{2}, -\frac{\pi}{4}, \frac{\pi}{4}, \frac{\pi}{2}\right\}$

41652938487. $\left\{-\frac{3\pi}{4}, -\frac{\pi}{4}, \frac{3\pi}{4}, \frac{\pi}{4}\right\}$

41652938488. $\left\{-\frac{3\pi}{4}, -\frac{\pi}{2}, \frac{\pi}{2}, \frac{3\pi}{4}\right\}$

41652938489. $\left\{-\frac{\pi}{4}, 0, \frac{\pi}{4}\right\}$

Question Number : 72 Question Id : 4165299757 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

माना S, अंतराल $(-\pi, \pi)$ के बीच में स्थित ऐसे सभी बिंदुओं का समुच्चय है, जिन पर फलन, $f(x) = \min\{\sin x, \cos x\}$ अवकलनीय नहीं है, तो S निम्न में से किसका उपसमुच्चय है?

Options :

41652938486. $\left\{-\frac{\pi}{2}, -\frac{\pi}{4}, \frac{\pi}{4}, \frac{\pi}{2}\right\}$

41652938487. $\left\{-\frac{3\pi}{4}, -\frac{\pi}{4}, \frac{3\pi}{4}, \frac{\pi}{4}\right\}$

41652938488. $\left\{-\frac{3\pi}{4}, -\frac{\pi}{2}, \frac{\pi}{2}, \frac{3\pi}{4}\right\}$

41652938489. $\left\{-\frac{\pi}{4}, 0, \frac{\pi}{4}\right\}$

Question Number : 73 Question Id : 4165299758 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The maximum area (in sq. units) of a rectangle having its base on the x-axis and its other two vertices on the parabola, $y=12-x^2$ such that the rectangle lies inside the parabola, is :

Options :

41652938490. 36

41652938491. 32

41652938492. $20\sqrt{2}$

41652938493. $18\sqrt{3}$

Question Number : 73 Question Id : 4165299758 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक ऐसी आयत, जिसका आधार x-अक्ष पर है तथा अन्य दो शीर्ष परवलय $y=12-x^2$ पर इस प्रकार स्थित हैं कि आयत, परवलय के अन्त: भाग में है, का अधिकतम क्षेत्रफल (वर्ग इकाइयों में) है :

Options :

41652938490. 36

41652938491. 32

41652938492. $20\sqrt{2}$

41652938493. $18\sqrt{3}$

Question Number : 74 Question Id : 4165299759 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The integral $\int\cos(\log_e x)\,dx$ is equal to :

(where C is a constant of integration)

Options :

41652938494. $x\left[\cos(\log_e x)+\sin(\log_e x)\right]+C$

41652938495. $x\left[\cos(\log_e x)-\sin(\log_e x)\right]+C$

41652938496. $\frac{x}{2}\left[\sin(\log_e x)-\cos(\log_e x)\right]+C$

41652938497. $\frac{x}{2}\left[\cos(\log_e x) + \sin(\log_e x)\right] + C$

Question Number : 74 Question Id : 4165299759 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

समाकल $\int \cos(\log_e x)\, dx$ बराबर है :

(जहाँ C एक समाकलन अचर है)

Options :

41652938494. $x\left[\cos(\log_e x) + \sin(\log_e x)\right] + C$

41652938495. $x\left[\cos(\log_e x) - \sin(\log_e x)\right] + C$

41652938496. $\frac{x}{2}\left[\sin(\log_e x) - \cos(\log_e x)\right] + C$

41652938497. $\frac{x}{2}\left[\cos(\log_e x) + \sin(\log_e x)\right] + C$

Question Number : 75 Question Id : 4165299760 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Let f and g be continuous functions on $[0, a]$ such that $f(x) = f(a - x)$ and $g(x) + g(a - x) = 4$, then $\int_0^a f(x)\, g(x)\, dx$ is equal to :

Options :

41652938498. $\int_0^a f(x)\, dx$

41652938499. $2\int_0^a f(x)\, dx$

41652938500. $4\int_0^a f(x)\, dx$

41652938501. $-3\int_0^a f(x)\, dx$

Question Number : 75 Question Id : 4165299760 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

माना f तथा g, $[0, a]$ पर ऐसे संतत फलन हैं कि $f(x)=f(a-x)$ तथा $g(x)+g(a-x)=4$ है, तो

$\int_0^a f(x)\, g(x)\, dx$ बराबर है :

Options :

41652938498. $\int_0^a f(x)\, dx$

41652938499. $2\int_0^a f(x)\, dx$

41652938500. $4\int_0^a f(x)\, dx$

41652938501. $-3\int_0^a f(x)\, dx$

Question Number : 76 Question Id : 4165299761 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The area (in sq. units) of the region bounded by the parabola, $y=x^2+2$ and the lines, $y=x+1$, $x=0$ and $x=3$, is :

Options :

41652938502. $\frac{15}{2}$

41652938503. $\frac{21}{2}$

41652938504. $\frac{17}{4}$

41652938505. $\frac{15}{4}$

Question Number : 76 Question Id : 4165299761 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

परवलय $y=x^2+2$ तथा रेखाओं $y=x+1$, $x=0$ और $x=3$ द्वारा घिरे हुए क्षेत्र का क्षेत्रफल (वर्ग इकाइयों में) है :

Options :

41652938502. $\frac{15}{2}$

41652938503. $\frac{21}{2}$

41652938504. $\frac{17}{4}$

41652938505. $\frac{15}{4}$

Question Number : 77 Question Id : 4165299762 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Let $y=y(x)$ be the solution of the differential equation, $x\frac{dy}{dx}+y=x\log_e x$, $(x>1)$. If $2y(2)=\log_e 4-1$, then $y(e)$ is equal to :

Options :

41652938506. $\frac{e}{4}$

41652938507. $\frac{e^2}{4}$

41652938508. $-\frac{e}{2}$

41652938509. $-\frac{e^2}{2}$

Question Number : 77 Question Id : 4165299762 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

माना $y=y(x)$, अवकल समीकरण $x\frac{dy}{dx}+y=x\log_e x$, $(x>1)$ का हल है। यदि $2y(2)=\log_e 4-1$ है, तो $y(e)$ बराबर है :

Options :

41652938506. $\frac{e}{4}$

41652938507. $\frac{e^2}{4}$

41652938508. $-\frac{e}{2}$

41652938509. $-\frac{e^2}{2}$

Question Number : 78 Question Id : 4165299763 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

If the straight line, $2x-3y+17=0$ is perpendicular to the line passing through the points (7, 17) and (15, β), then β equals :

Options :

41652938510. -5

41652938511. $\frac{35}{3}$

41652938512. 5

41652938513. $-\frac{35}{3}$

Question Number : 78 Question Id : 4165299763 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

यदि सरल रेखा $2x-3y+17=0$, बिन्दुओं (7, 17) तथा (15, β) से होकर जाने वाली रेखा के लंबवत है, तो β बराबर है :

Options :

41652938510. -5

41652938511. $\frac{35}{3}$

41652938512. 5

41652938513. $-\frac{35}{3}$

Question Number : 79 Question Id : 4165299764 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

If a variable line, $3x+4y-\lambda=0$ is such that the two circles $x^2+y^2-2x-2y+1=0$ and $x^2+y^2-18x-2y+78=0$ are on its opposite sides, then the set of all values of λ is the interval :

Options :

41652938514. (23, 31)

41652938515. (2, 17)

41652938516. [13, 23]

41652938517. [12, 21]

Question Number : 79 Question Id : 4165299764 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

यदि एक चर रेखा $3x+4y-\lambda=0$ इस प्रकार है कि दो वृत्त $x^2+y^2-2x-2y+1=0$ तथा $x^2+y^2-18x-2y+78=0$ इसके दोनों ओर (opposite sides) हैं, तो λ के सभी मानों का समुच्चय निम्न में से कौनसा अन्तराल है?

Options :

41652938514. (23, 31)

41652938515. (2, 17)

41652938516. [13, 23]

41652938517. [12, 21]

Question Number : 80 Question Id : 4165299765 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Let C_1 and C_2 be the centres of the circles $x^2+y^2-2x-2y-2=0$ and $x^2+y^2-6x-6y+14=0$ respectively. If P and Q are the points of intersection of these circles, then the area (in sq. units) of the quadrilateral PC_1QC_2 is :

Options :

41652938518. 4

41652938519. 6

41652938520. 8

41652938521. 9

Question Number : 80 Question Id : 4165299765 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

माना C_1 तथा C_2 क्रमशः वृत्तों $x^2+y^2-2x-2y-2=0$ तथा $x^2+y^2-6x-6y+14=0$ के केंद्र हैं। यदि P तथा Q इन वृत्तों के प्रतिच्छेदन बिंदु हैं, तो चतुर्भुज PC_1QC_2 का क्षेत्रफल (वर्ग इकाइयों में) है :

Options :

41652938518. 4

41652938519. 6

41652938520. 8

41652938521. 9

Question Number : 81 Question Id : 4165299766 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Let P(4, −4) and Q(9, 6) be two points on the parabola, $y^2=4x$ and let X be any point on the arc POQ of this parabola, where O is the vertex of this parabola, such that the area of ΔPXQ is maximum. Then this maximum area (in sq. units) is :

Options :

41652938522. $\frac{125}{2}$

41652938523. $\frac{625}{4}$

41652938524. $\frac{125}{4}$

41652938525. $\frac{75}{2}$

Question Number : 81 Question Id : 4165299766 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

माना $P(4, -4)$ तथा $Q(9, 6)$ परवलय $y^2 = 4x$ पर स्थित दो बिंदु हैं। O इस परवलय का शीर्ष बिंदु है तथा X इस परवलय की चाप POQ का कोई ऐसा बिंदु है, जिसके लिए ΔPXQ का क्षेत्रफल अधिकतम है, तो यह अधिकतम क्षेत्रफल (वर्ग इकाइयों में) है :

Options :

41652938522. $\frac{125}{2}$

41652938523. $\frac{625}{4}$

41652938524. $\frac{125}{4}$

41652938525. $\frac{75}{2}$

Question Number : 82 Question Id : 4165299767 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

If the vertices of a hyperbola be at $(-2, 0)$ and $(2, 0)$ and one of its foci be at $(-3, 0)$, then which one of the following points does not lie on this hyperbola ?

Options :

41652938526. $\left(4, \sqrt{15}\right)$

41652938527. $\left(2\sqrt{6}, 5\right)$

41652938528. $(6, 5\sqrt{2})$

41652938529. $(-6, 2\sqrt{10})$

Question Number : 82 Question Id : 4165299767 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

यदि एक अतिपरवलय के शीर्ष $(-2, 0)$ तथा $(2, 0)$ पर हैं तथा इसकी एक नाभि $(-3, 0)$ पर है, तो निम्न में से कौन सा बिंदु इस अतिपरवलय पर स्थित **नहीं** है?

Options :

41652938526. $(4, \sqrt{15})$

41652938527. $(2\sqrt{6}, 5)$

41652938528. $(6, 5\sqrt{2})$

41652938529. $(-6, 2\sqrt{10})$

Question Number : 83 Question Id : 4165299768 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The perpendicular distance from the origin to the plane containing the two lines,

$\frac{x+2}{3} = \frac{y-2}{5} = \frac{z+5}{7}$ and

$\frac{x-1}{1} = \frac{y-4}{4} = \frac{z+4}{7}$, is :

Options :

41652938530. 11

41652938531. $11\sqrt{6}$

41652938532. $11/\sqrt{6}$

41652938533. $6\sqrt{11}$

Question Number : 83 Question Id : 4165299768 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

दो रेखाओं $\frac{x+2}{3}=\frac{y-2}{5}=\frac{z+5}{7}$ तथा

$\frac{x-1}{1}=\frac{y-4}{4}=\frac{z+4}{7}$ को अंतर्विष्ट करने वाले समतल की मूलबिंदु से लंबवत दूरी है :

Options :

41652938530. 11

41652938531. $11\sqrt{6}$

41652938532. $11/\sqrt{6}$

41652938533. $6\sqrt{11}$

Question Number : 84 Question Id : 4165299769 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

A tetrahedron has vertices P(1, 2, 1), Q(2, 1, 3), R(−1, 1, 2) and O(0, 0, 0). The angle between the faces OPQ and PQR is :

Options :

41652938534. $\cos^{-1}\left(\frac{19}{35}\right)$

41652938535. $\cos^{-1}\left(\frac{17}{31}\right)$

41652938536. $\cos^{-1}\left(\frac{9}{35}\right)$

41652938537. $\cos^{-1}\left(\frac{7}{31}\right)$

Question Number : 84 Question Id : 4165299769 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक चतुष्फलक (tetrahedron) के शीर्ष P(1, 2, 1), Q(2, 1, 3), R(−1, 1, 2) तथा O(0, 0, 0) हैं। फलक OPQ तथा PQR के बीच का कोण है :

Options :

41652938534. $\cos^{-1}\left(\frac{19}{35}\right)$

41652938535. $\cos^{-1}\left(\frac{17}{31}\right)$

41652938536. $\cos^{-1}\left(\frac{9}{35}\right)$

41652938537. $\cos^{-1}\left(\frac{7}{31}\right)$

Question Number : 85 Question Id : 4165299770 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The sum of the distinct real values of μ, for which the vectors, $\mu\hat{i} + \hat{j} + \hat{k}$, $\hat{i} + \mu\hat{j} + \hat{k}$, $\hat{i} + \hat{j} + \mu\hat{k}$ are co-planar, is :

Options :

41652938538. 0

41652938539. -1

41652938540. 1

41652938541. 2

Question Number : 85 Question Id : 4165299770 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

μ के उन भिन्न वास्तविक मानों का योग, जिनके लिए सदिश $\mu\hat{i} + \hat{j} + \hat{k}$, $\hat{i} + \mu\hat{j} + \hat{k}$ तथा $\hat{i} + \hat{j} + \mu\hat{k}$ सहतलीय (co-planar) हैं, है :

Options :

41652938538. 0

41652938539. -1

41652938540. 1

41652938541. 2

Question Number : 86 Question Id : 4165299771 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

If the sum of the deviations of 50 observations from 30 is 50, then the mean of these observations is :

Options :

41652938542. 50

41652938543. 51

41652938544. 30

41652938545. 31

Question Number : 86 Question Id : 4165299771 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

यदि 50 प्रेक्षणों के 30 से विचलनों (deviations) का योग 50 है, तो इन प्रेक्षणों का माध्य है :

Options :

41652938542. 50

41652938543. 51

41652938544. 30

41652938545. 31

Question Number : 87 Question Id : 4165299772 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

In a random experiment, a fair die is rolled until two fours are obtained in succession. The probability that the experiment will end in the fifth throw of the die is equal to :

Options :

41652938546. $\frac{200}{6^5}$

41652938547. $\frac{150}{6^5}$

41652938548. $\frac{225}{6^5}$

41652938549. $\frac{175}{6^5}$

Question Number : 87 Question Id : 4165299772 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

एक यादृच्छिक प्रयोग में, एक अनभिनत (Fair) पासे को तब तक उछाला जाता है जब तक कि लगातार दो बार 4 न आए। तो इस प्रयोग के पाँचवी बार पासे के उछाल (throw) तक समाप्त होने की प्रायिकता है :

Options :

41652938546. $\frac{200}{6^5}$

41652938547. $\frac{150}{6^5}$

41652938548. $\frac{225}{6^5}$

41652938549. $\frac{175}{6^5}$

Question Number : 88 Question Id : 4165299773 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The maximum value of $3\cos\theta + 5\sin\left(\theta - \frac{\pi}{6}\right)$ for any real value of θ is :

Options :

41652938550. $\frac{\sqrt{79}}{2}$

41652938551. $\sqrt{19}$

41652938552. $\sqrt{31}$

41652938553. $\sqrt{34}$

Question Number : 88 Question Id : 4165299773 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

$3\cos\theta + 5\sin\left(\theta - \frac{\pi}{6}\right)$ का θ के किसी भी वास्तविक मान के लिए अधिकतम मान है :

Options :

41652938550. $\frac{\sqrt{79}}{2}$

41652938551. $\sqrt{19}$

41652938552. $\sqrt{31}$

41652938553. $\sqrt{34}$

Question Number : 89 Question Id : 4165299774 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

Considering only the principal values of inverse functions, the set

$$A = \left\{x \geq 0 : \tan^{-1}(2x) + \tan^{-1}(3x) = \frac{\pi}{4}\right\}$$

Options :

41652938554. is an empty set

41652938555. is a singleton

41652938556. contains two elements

41652938557. contains more than two elements

Question Number : 89 Question Id : 4165299774 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

प्रतिलोम फलनों (inverse functions) के केवल मुख्य मान (principal values) लेते हुए, समुच्चय

$$A = \left\{ x \geq 0 : \tan^{-1}(2x) + \tan^{-1}(3x) = \frac{\pi}{4} \right\}$$

Options :

41652938554. एक रिक्त समुच्चय है।

41652938555. एक एकल समुच्चय है।

41652938556. में दो अवयव हैं।

41652938557. दो से अधिक अवयव हैं।

Question Number : 90 Question Id : 4165299775 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

The Boolean expression $((p \wedge q) \vee (p \vee \sim q)) \wedge (\sim p \wedge \sim q)$ is equivalent to :

Options :

41652938558. $p \wedge (\sim q)$

41652938559. $p \vee (\sim q)$

41652938560. $(\sim p) \wedge (\sim q)$

41652938561. $p \wedge q$

Question Number : 90 Question Id : 4165299775 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 4 Wrong Marks : 1

बूलीय व्यंजक (Boolean expression) $((p \wedge q) \vee (p \vee \sim q)) \wedge (\sim p \wedge \sim q)$ निम्न में जिसके तुल्य है, वह है :

Options :

41652938558. $p \wedge (\sim q)$

41652938559. $p \vee (\sim q)$

41652938560. $(\sim p) \wedge (\sim q)$

41652938561. $p \wedge q$