

National Testing Agency

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B TECH EM

Group Number :	1
Group Id :	708191181
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Show Attended Group? :	No
Edit Attended Group? :	No
Break time :	0
Group Marks :	300
Is this Group for Examiner? :	No

Physics Section A

Section Id :	708191664
Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	20
Number of Questions to be attempted :	20

Section Marks :	80
Mark As Answered Required? :	Yes
Sub-Section Number :	1
Sub-Section Id :	708191944
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 70819116864 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

The period of oscillation of a simple pendulum is $T = 2\pi\sqrt{\frac{L}{g}}$. Measured value of 'L' is 1.0 m from meter scale having a minimum division of 1 mm and time of one complete oscillation is 1.95 s measured from stopwatch of 0.01 s resolution. The percentage error in the determination of 'g' will be :

Options :

70819155741. 1.33%

70819155742. 1.03%

70819155743. 1.13%

70819155744. 1.30%

Question Number : 1 Question Id : 70819116864 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

एका साध्या दोलकाचा दोलनाचा काल $T = 2\pi\sqrt{\frac{L}{g}}$ आहे. कमीत कमी 1 mm भाग असलेल्या मीटर श्रेणीने

'L' चे मोजलेले मूल्य 1.0 m आहे व 0.01 सेकंद वियोजन असलेल्या रोखून ठेवणाऱ्या घड्याळ्याने मोजलेला एका दोलनाचा काल 1.95 सेकंद आहे. 'g' मोजतानाची टक्केवारीतील त्रुटी _____ असेल.

Options :

70819155741. 1.33 %

70819155742. 1.03 %

70819155743. 1.13 %

70819155744. 1.30 %

Question Number : 2 Question Id : 70819116865 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

A particle is projected with velocity v_0 along x -axis. A damping force is acting on the particle which is proportional to the square of the distance from the origin i.e. $ma = -\alpha x^2$. The distance at which the particle stops :

Options :

70819155745. $\left(\frac{2v_0^2}{3\alpha}\right)^{\frac{1}{2}}$

70819155746. $\left(\frac{3v_0^2}{2\alpha}\right)^{\frac{1}{2}}$

70819155747. $\left(\frac{3v_0^2}{2\alpha}\right)^{\frac{1}{3}}$

70819155748. $\left(\frac{2v_0}{3\alpha}\right)^{\frac{1}{3}}$

Question Number : 2 Question Id : 70819116865 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

एक कण x -अक्षावर v_0 वेगाने प्रक्षेपित केला आहे. कणावर होणारे अवमंदी बल मुळापासूनच्या अंतराच्या वर्गास समानुपाती आहे. म्हणजेच $ma = -\alpha x^2$. जेथे कण थांबतो तेथे अंतर _____ आहे.

Options :

70819155745. $\left(\frac{2v_0^2}{3\alpha}\right)^{\frac{1}{2}}$

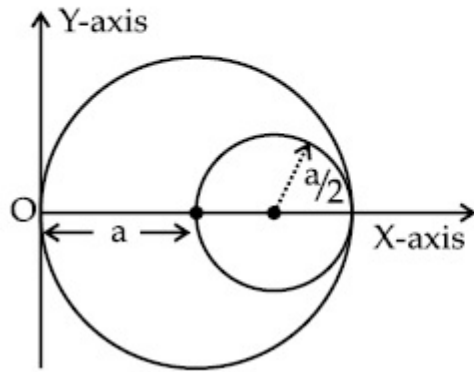
70819155746. $\left(\frac{3v_0^2}{2\alpha}\right)^{\frac{1}{2}}$

70819155747. $\left(\frac{3v_0^2}{2\alpha}\right)^{\frac{1}{3}}$

70819155748. $\left(\frac{2v_0}{3\alpha}\right)^{\frac{1}{3}}$

Question Number : 3 Question Id : 70819116866 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

A circular hole of radius $\left(\frac{a}{2}\right)$ is cut out of a circular disc of radius 'a' as shown in figure. The centroid of the remaining circular portion with respect to point 'O' will be :



Options :

70819155749. $\frac{1}{6}a$

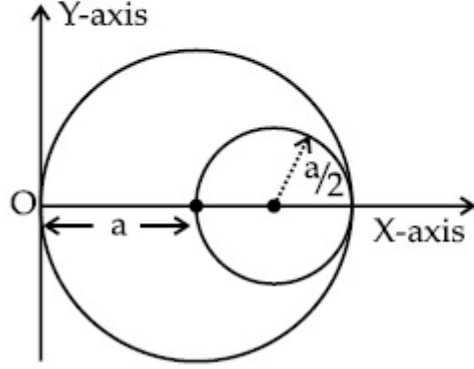
70819155750. $\frac{5}{6}a$

70819155751. $\frac{2}{3}a$

70819155752. $\frac{10}{11}a$

Question Number : 3 Question Id : 70819116866 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

आकृतीत दाखविल्याप्रमाणे, 'a' त्रिज्या असलेल्या वर्तुळाकार तबकडीतुन $\left(\frac{a}{2}\right)$ त्रिज्या असलेले वर्तुळाकार भोक कापले. 'O' बिंदू संदर्भात राहिलेल्या वर्तुळाकार भागाचा मध्य (centroid) _____ असेल.



Options :

70819155749. $\frac{1}{6}a$

70819155750. $\frac{5}{6}a$

70819155751. $\frac{2}{3}a$

70819155752. $\frac{10}{11}a$

Question Number : 4 Question Id : 70819116867 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

A body weighs 49 N on a spring balance at the north pole. What will be its weight recorded on the same weighing machine, if it is shifted to the equator ?

[Use $g = \frac{GM}{R^2} = 9.8 \text{ ms}^{-2}$ and radius of earth, $R = 6400 \text{ km}$.]

Options :

70819155753. 49.17 N

70819155754. 49 N

70819155755. 48.83 N

70819155756. 49.83 N

Question Number : 4 Question Id : 70819116867 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

उत्तर ध्रुवावर स्प्रिंग काट्यावर एका वस्तुचे वजन 49 N आहे. जर ते विषुववृत्तावर ठेवले तर त्याच वजन मोजणाऱ्या यंत्रावर दाखविलेले वजन किती असेल?

(वापरा : $g = \frac{GM}{R^2} = 9.8 \text{ ms}^{-2}$ व पृथ्वीची त्रिज्या $R = 6400 \text{ km}$)

Options :

70819155753. 49.17 N

70819155754. 49 N

70819155755. 48.83 N

70819155756. 49.83 N

Question Number : 5 Question Id : 70819116868 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
 Correct Marks : 4 Wrong Marks : 1

If one mole of an ideal gas at (P_1, V_1) is allowed to expand reversibly and isothermally (A to B) its pressure is reduced to one-half of the original pressure (see figure). This is followed by a constant volume cooling till its pressure is reduced to one-fourth of the initial value (B \rightarrow C). Then it is restored to its initial state by a reversible adiabatic compression (C to A). The net workdone by the gas is equal to :



Options :

70819155757. $RT \left(\ln 2 - \frac{1}{2(\gamma-1)} \right)$

70819155758. $-\frac{RT}{2(\gamma-1)}$

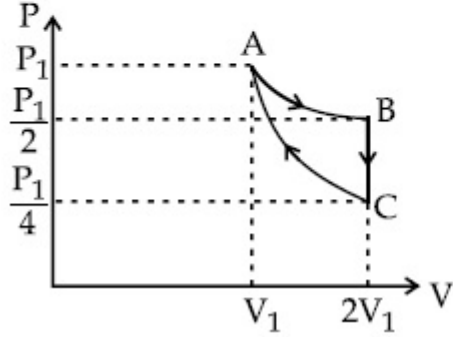
70819155759. $RT \ln 2$

70819155760. 0

Question Number : 5 Question Id : 70819116868 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

एक मोल आदर्श वायू (P_1, V_1) ला प्रतिक्रमी व समतापीने (A पासून B) प्रसरण पावण्यास अनुमती दिली तर मुळतल्या दाबापेक्षा अर्धा दाब कमी झाला (आकृती पहा) त्यानंतर स्थिर आकारमानात गार असे केले की त्याचा दाब सुरुवातीच्या मुल्यापेक्षा $1/4$ पर्यंत कमी झाला ($B \rightarrow C$). नंतर तो प्रतिक्रमी समोष्ण संपीडनाने (C पासून A) सुरुवातीच्या स्थिती पर्यंत पुनःस्थापन केले. वायूने केलेले निव्वळ कार्य _____ आहे.



Options :

70819155757. $RT \left(\ln 2 - \frac{1}{2(\gamma-1)} \right)$

70819155758. $-\frac{RT}{2(\gamma-1)}$

70819155759. $RT \ln 2$

70819155760. 0

Question Number : 6 Question Id : 70819116869 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

On the basis of kinetic theory of gases, the gas exerts pressure because its molecules :

Options :

70819155761. continuously lose their energy till it reaches wall.
70819155762. continuously stick to the walls of container.
70819155763. are attracted by the walls of container.
70819155764. suffer change in momentum when impinge on the walls of container.

Question Number : 6 Question Id : 70819116869 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

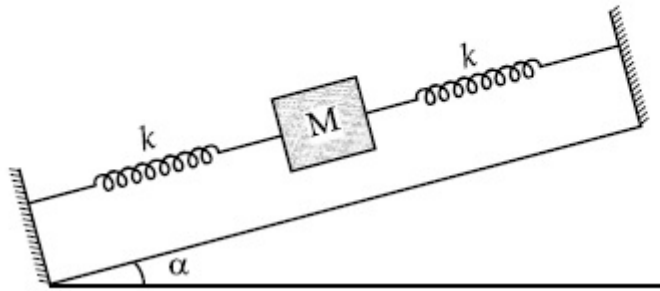
वायूच्या गतिज सिद्धांताच्या आधारे, वायू दाब देतात कारण त्याचे रेणू :

Options :

70819155761. सतत त्यांची ऊर्जा गमावतात.
70819155762. भांड्याच्या भिंतीला सतत चिकटतात.
70819155763. भांड्याच्या भिंती आकर्षून घेतात.
70819155764. भांड्याच्या भिंतीवर जेव्हा आपटतात तेव्हा संवेगांत बदल होतो.

Question Number : 7 Question Id : 70819116870 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

In the given figure, a body of mass M is held between two massless springs, on a smooth inclined plane. The free ends of the springs are attached to firm supports. If each spring has spring constant k , the frequency of oscillation of given body is :



Options :

70819155765. $\frac{1}{2\pi} \sqrt{\frac{k}{Mg \sin\alpha}}$

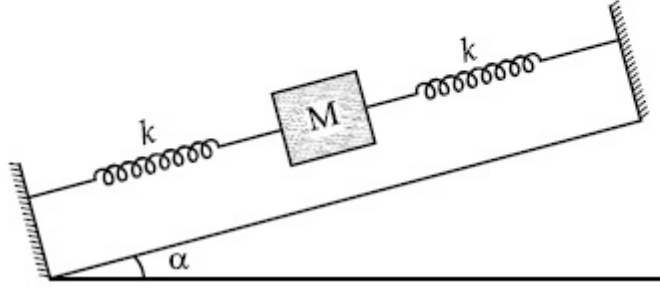
70819155766. $\frac{1}{2\pi} \sqrt{\frac{2k}{Mg \sin\alpha}}$

70819155767. $\frac{1}{2\pi} \sqrt{\frac{2k}{M}}$

70819155768. $\frac{1}{2\pi} \sqrt{\frac{k}{2M}}$

Question Number : 7 Question Id : 70819116870 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

दिलेल्या आकृतीत, गुळगुळीत आनत प्रतलावर दोन वजनविरहीत स्प्रिंगमध्ये M वस्तुमानाची वस्तू ठेवलेली आहे. स्प्रिंगची मोकळी टोके घट्ट आधारास जोडलेली आहेत. जर प्रत्येक स्प्रिंगचा बल स्थिरांक k आहे, दिलेल्या वस्तुची दोलनांची वारंवारता _____ आहे.



Options :

70819155765. $\frac{1}{2\pi} \sqrt{\frac{k}{Mg \sin \alpha}}$

70819155766. $\frac{1}{2\pi} \sqrt{\frac{2k}{Mg \sin \alpha}}$

70819155767. $\frac{1}{2\pi} \sqrt{\frac{2k}{M}}$

70819155768. $\frac{1}{2\pi} \sqrt{\frac{k}{2M}}$

Question Number : 8 Question Id : 70819116871 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

When a particle executes SHM, the nature of graphical representation of velocity as a function of displacement is :

Options :

70819155769. circular

70819155770. elliptical

70819155771. parabolic

70819155772. straight line

Question Number : 8 Question Id : 70819116871 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

जेव्हा कण सरल आवर्त गतीत जातो, तेव्हा वेग व विस्थापन यामधील आलेखाचे स्वरूप _____ आहे.

Options :

70819155769. वर्तुळाकार

70819155770. विवृत्तीय

70819155771. पॅरोबोलिक

70819155772. सरळ रेषा

Question Number : 9 Question Id : 70819116872 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Which of the following equations represents a travelling wave ?

Options :

70819155773. $y = Ae^x \cos(\omega t - \theta)$

70819155774. $y = Ae^{-x^2} (vt + \theta)$

70819155775. $y = A \sin(15x - 2t)$

70819155776. $y = A \sin x \cos \omega t$

Question Number : 9 Question Id : 70819116872 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

खालीलपैकी कोणते समीकरण प्रगामी तरंग दर्शविते?

Options :

70819155773. $y = Ae^x \cos(\omega t - \theta)$

70819155774. $y = Ae^{-x^2} (vt + \theta)$

70819155775. $y = A \sin(15x - 2t)$

70819155776. $y = A \sin x \cos \omega t$

Question Number : 10 Question Id : 70819116873 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Two electrons each are fixed at a distance '2d'. A third charge proton placed at the midpoint is displaced slightly by a distance x ($x \ll d$) perpendicular to the line joining the two fixed charges. Proton will execute simple harmonic motion having angular frequency : (m = mass of charged particle)

Options :

70819155777. $\left(\frac{q^2}{2\pi\epsilon_0 md^3} \right)^{\frac{1}{2}}$

70819155778. $\left(\frac{2q^2}{\pi\epsilon_0 md^3} \right)^{\frac{1}{2}}$

70819155779. $\left(\frac{\pi\epsilon_0 md^3}{2q^2} \right)^{\frac{1}{2}}$

70819155780. $\left(\frac{2\pi\epsilon_0 md^3}{q^2} \right)^{\frac{1}{2}}$

Question Number : 10 Question Id : 70819116873 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

दोन इलेक्ट्रॉन एकमेकांपासून '2d' अंतरावर ठेवले आहेत. तिसरा प्रभार प्रोटॉन, मध्यबिंदूवर ठेवला व दोन प्रभार जोडणाऱ्या रेषेला लंबरूप x ($x \ll d$) अंतरातून थोडासा हलविला. प्रोटॉन सरल आवर्त गतीत जाईल व त्याची कोनीय वारंवारता _____ असेल. (m = mass of charged particle)

Options :

70819155777. $\left(\frac{q^2}{2\pi\epsilon_0 md^3}\right)^{\frac{1}{2}}$

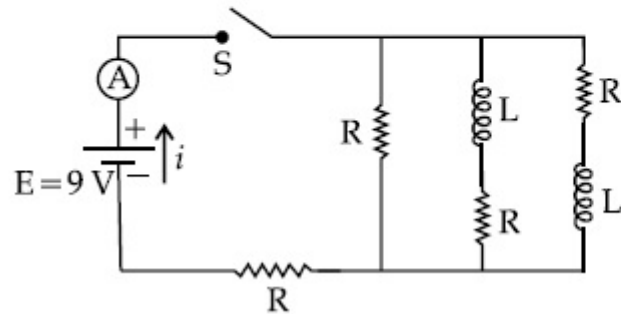
70819155778. $\left(\frac{2q^2}{\pi\epsilon_0 md^3}\right)^{\frac{1}{2}}$

70819155779. $\left(\frac{\pi\epsilon_0 md^3}{2q^2}\right)^{\frac{1}{2}}$

70819155780. $\left(\frac{2\pi\epsilon_0 md^3}{q^2}\right)^{\frac{1}{2}}$

Question Number : 11 Question Id : 70819116874 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Figure shows a circuit that contains four identical resistors with resistance $R = 2.0 \Omega$, two identical inductors with inductance $L = 2.0 \text{ mH}$ and an ideal battery with *emf* $E = 9 \text{ V}$. The current ' i ' just after the switch ' S ' is closed will be :



Options :

70819155781. 2.25 A

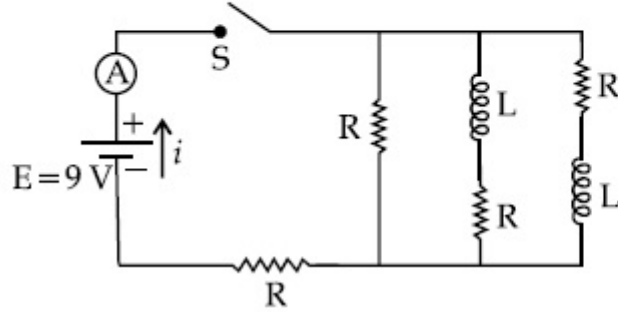
70819155782. 3.0 A

70819155783. 3.37 A

70819155784. 9 A

Question Number : 11 Question Id : 70819116874 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

आकृतीतील परिपथात $R = 2.0 \Omega$ असलेले चार एकसारखे रोध, $L = 2.0 \text{ mH}$ प्रेरितता असलेले दोन एकसारखे प्रेरित्र व $E = 9 \text{ V}$ विद्युत गामक बल असलेली बॅटरी आहे. नंतर नुकतीच कळ 'S' बंद केली तर धारा 'i' _____ असेल.



Options :

70819155781. 2.25 A
70819155782. 3.0 A
70819155783. 3.37 A
70819155784. 9 A

Question Number : 12 Question Id : 70819116875 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

A soft ferromagnetic material is placed in an external magnetic field. The magnetic domains :

Options :

70819155785. increase in size but no change in orientation.
70819155786. decrease in size and changes orientation.

70819155787. may increase or decrease in size and change its orientation.

70819155788. have no relation with external magnetic field.

Question Number : 12 Question Id : 70819116875 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

एक मऊ फेरीचुंबकीय पदार्थ बाह्य चुंबकीय क्षेत्रात ठेवला. चुंबकीय अभिक्षेत्राचा :

Options :

70819155785. आकार वाढतो पण दिशानिदेशनात बदल होत नाही.

70819155786. आकार कमी होतो व दिशानिदेशन बदलते.

70819155787. आकार वाढेल किंवा कमी होईल व दिशानिदेशन बदलेल.

70819155788. बाह्य चुंबकीय क्षेत्राशी काहीही संबंध नाही.

Question Number : 13 Question Id : 70819116876 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Match List - I with List - II.

List - I

- (a) Source of microwave frequency
- (b) Source of infrared frequency
- (c) Source of Gamma Rays
- (d) Source of X-rays

List - II

- (i) Radioactive decay of nucleus
- (ii) Magnetron
- (iii) Inner shell electrons
- (iv) Vibration of atoms and molecules
- (v) LASER
- (vi) RC circuit

Choose the correct answer from the options given below :

Options :

70819155789. (a)-(vi), (b)-(v), (c)-(i), (d)-(iv)

70819155790. (a)-(vi), (b)-(iv), (c)-(i), (d)-(v)

70819155791. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

70819155792. (a)-(ii), (b)-(iv), (c)-(vi), (d)-(iii)

Question Number : 13 Question Id : 70819116876 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

यादी – I ची यादी – II बरोबर जोड्या जुळवा.

यादी – I

- (a) सूक्ष्मतरंग वारंवारतेचा उद्गम
- (b) अवरक्त वारंवारतेचा उद्गम
- (c) गॅमा किरणांचा उद्गम
- (d) X-किरणांचा उद्गम

यादी – II

- (i) केंद्रकाचा किरणोत्सारी ऱ्हास
- (ii) मॅग्नेट्रॉन
- (iii) आंतरकवच इलेक्ट्रॉन
- (iv) अणू व रेणूंची कंपने
- (v) लेसर
- (vi) RC परिपथ

खाली दिलेल्या पर्यायांतून योग्य उत्तर निवडा :

Options :

70819155789. (a)-(vi), (b)-(v), (c)-(i), (d)-(iv)

70819155790. (a)-(vi), (b)-(iv), (c)-(i), (d)-(v)

70819155791. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

70819155792. (a)-(ii), (b)-(iv), (c)-(vi), (d)-(iii)

Question Number : 14 Question Id : 70819116877 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

If the source of light used in a Young's double slit experiment is changed from red to violet :

Options :

70819155793. the fringes will become brighter.
70819155794. consecutive fringe lines will come closer.
70819155795. the intensity of minima will increase.
70819155796. the central bright fringe will become a dark fringe.

Question Number : 14 Question Id : 70819116877 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

जर यंगच्या दोन फटींच्या प्रयोगात प्रकाशाचा उद्गम लाल पासून जांभळा बदलला,

Options :

70819155793. झल्लरी द्युतिमान होतील
70819155794. लागोपाठच्या झल्लरी जवळ येतील
70819155795. लघुतमेची तीव्रता वाढेल
70819155796. मध्यावरील द्युतिमान झल्लरी काळी झल्लरी होईल

Question Number : 15 Question Id : 70819116878 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

An X-ray tube is operated at 1.24 million volt. The shortest wavelength of the produced photon will be :

Options :

70819155797. 10^{-1} nm

70819155798. 10^{-2} nm

70819155799. 10^{-3} nm

70819155800. 10^{-4} nm

Question Number : 15 Question Id : 70819116878 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

X-किरण नळी 1.24 मिलीयन व्होल्टला कार्यरत होते. तयार झालेल्या फोटॉनची लघुतम तरंगलांबी _____ असेल.

Options :

70819155797. 10^{-1} nm

70819155798. 10^{-2} nm

70819155799. 10^{-3} nm

70819155800. 10^{-4} nm

Question Number : 16 Question Id : 70819116879 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The de Broglie wavelength of a proton and α -particle are equal. The ratio of their velocities is :

Options :

70819155801. 4 : 1

70819155802. 4 : 2

70819155803. 4 : 3

70819155804. 1 : 4

Question Number : 16 Question Id : 70819116879 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

प्रोटॉन व α -कणाची डी-ब्रोगीली तरंगलांबी सारखीच आहे. त्यांच्या वेगांचे गुणोत्तर _____ आहे.

Options :

70819155801. 4 : 1

70819155802. 4 : 2

70819155803. 4 : 3

70819155804. 1 : 4

Question Number : 17 Question Id : 70819116880 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

According to Bohr atom model, in which of the following transitions will the frequency be maximum ?

Options :

70819155805. $n=2$ to $n=1$

70819155806. $n=3$ to $n=2$

70819155807. $n=4$ to $n=3$

70819155808. $n=5$ to $n=4$

Question Number : 17 Question Id : 70819116880 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

बोहरच्या अणू प्रतिकृतीत, खालीलपैकी कोणत्या संक्रमणात वारंवारता महत्तम आहे ?

Options :

70819155805. $n=2$ पासून $n=1$

70819155806. $n=3$ पासून $n=2$

70819155807. $n=4$ पासून $n=3$

70819155808. $n=5$ पासून $n=4$

Question Number : 18 Question Id : 70819116881 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Zener breakdown occurs in a $p-n$ junction having p and n both :

Options :

70819155809. lightly doped and have narrow depletion layer.

70819155810. lightly doped and have wide depletion layer.

70819155811. heavily doped and have narrow depletion layer.

70819155812. heavily doped and have wide depletion layer.

Question Number : 18 Question Id : 70819116881 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$p-n$ संधी डायोडमध्ये झिनरचे विभजन होते जेव्हा p व n दोन्ही _____.

Options :

70819155809. हलके प्रलेपित केले आहेत व अरुंद डिप्लीशन स्तर आहे.

70819155810. हलके प्रलेपित केले आहेत व रुंद डिप्लीशन स्तर आहे.

70819155811. जडपणे प्रलेपित केले आहे व अरुंद डिप्लीशन स्तर आहे.

70819155812. जडपणे प्रलेपित केले आहे व रुंद डिप्लीशन स्तर आहे.

Question Number : 19 Question Id : 70819116882 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Given below are two statements :

Statement I : PN junction diodes can be used to function as transistor, simply by connecting two diodes, back to back, which acts as the base terminal.

Statement II : In the study of transistor, the amplification factor β indicates ratio of the collector current to the base current.

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

Options :

70819155813. Both Statement I and Statement II are true
70819155814. Both Statement I and Statement II are false
70819155815. Statement I is true but Statement II is false
70819155816. Statement I is false but Statement II is true

Question Number : 19 Question Id : 70819116882 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

खाली दोन विधाने दिलेली आहेत.

विधान I : दोन एकसारखे डायोड एकामागून एक असे जोडून, जे तळाच्या टोकासारखे कार्य करतात, PN संधी डायोड ट्रांझिस्टर सारखे कार्य करतात.

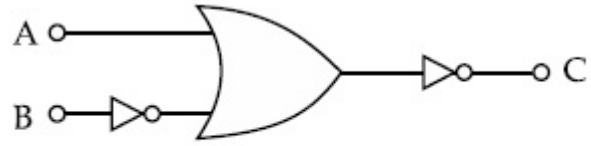
विधान II : ट्रांझिस्टरच्या अभ्यासात, प्रवर्धी गुणांक β हा संग्राही धारा व आधार धारा यांचे गुणोत्तर आहे. वरील विधानांसंदर्भात, खाली दिलेल्या पर्यायातून योग्य उत्तर निवडा.

Options :

70819155813. विधान I व विधान II दोन्ही बरोबर आहेत.
70819155814. विधान I व विधान II दोन्ही चूक आहेत.
70819155815. विधान I बरोबर आहे पण विधान II चूक आहे.
70819155816. विधान I चूक आहे पण विधान II बरोबर आहे.

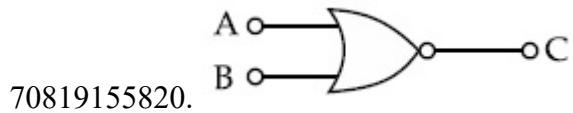
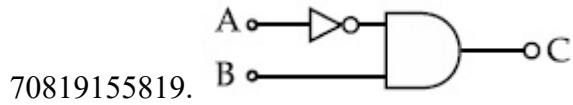
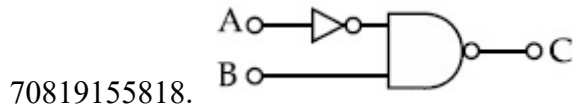
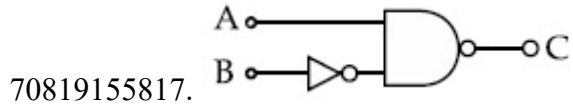
Question Number : 20 Question Id : 70819116883 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1



The logic circuit shown above is equivalent to :

Options :



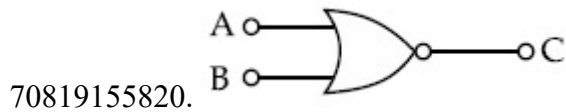
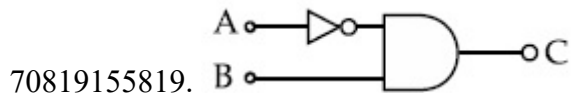
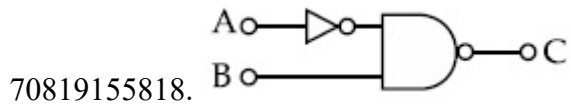
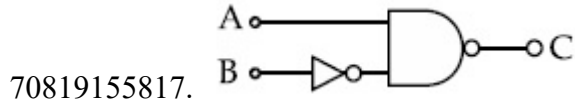
Question Number : 20 Question Id : 70819116883 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1



वरील तर्क द्वार परिपथ _____ बरोबर समतुल्य आहेत.

Options :



Physics Section B

Section Id :	708191665
Section Number :	2
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	10
Number of Questions to be attempted :	5
Section Marks :	20
Mark As Answered Required? :	Yes
Sub-Section Number :	1
Sub-Section Id :	708191945
Question Shuffling Allowed :	Yes

Question Number : 21 Question Id : 70819116884 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Two solids A and B of mass 1 kg and 2 kg respectively are moving with equal linear momentum. The ratio of their kinetic energies $(K.E.)_A : (K.E.)_B$ will be $\frac{A}{1}$, so the value of A will be _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 21 **Question Id :** 70819116884 **Question Type :** SA

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

दोन घन A व B अनुक्रमे वस्तुमान 1 kg व 2 kg असलेले सारख्याच रेखीय संवेगाने गतिमान आहेत. त्यांच्या गतिज ऊर्जेचे गुणोत्तर $(\text{गतिज ऊर्जा})_A : (\text{गतिज ऊर्जा})_B$ हे $\frac{A}{1}$ आहे तर A चे मूल्य _____ असेल.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 22 **Question Id :** 70819116885 **Question Type :** SA

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

A uniform metallic wire is elongated by 0.04 m when subjected to a linear force F. The elongation, if its length and diameter is doubled and subjected to the same force will be _____ cm.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 22 **Question Id :** 70819116885 **Question Type :** SA

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

एकसमान धातुच्या तारेवर F एवढे रेषीय बल लावले तेव्हा तीत 0.04 m ने वाढ झाली. जर तेवढेच बल लावले व त्याची लांबी व व्यास दोनपट केला तर त्यातील वाढ _____ cm असेल.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 23 **Question Id :** 70819116886 **Question Type :** SA

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

A uniform thin bar of mass 6 kg and length 2.4 meter is bent to make an equilateral hexagon. The moment of inertia about an axis passing through the centre of mass and perpendicular to the plane of hexagon is _____ $\times 10^{-1} \text{ kg m}^2$.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 23 Question Id : 70819116886 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

6 kg वस्तुमान व 2.4 m लांबीच्या एकसमान बारीक पट्टीपासून एक सारख्या बाजू असलेला षटकोन तयार केला. षटकोनाच्या प्रतलास लंबरूप व वस्तु केंद्रातून जाणाऱ्या अक्षाभोवती जडत्व आघूर्ण _____ $\times 10^{-1} \text{ kg m}^2$ आहे.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 24 Question Id : 70819116887 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The root mean square speed of molecules of a given mass of a gas at 27°C and 1 atmosphere pressure is 200 ms^{-1} . The root mean square speed of molecules of the gas at 127°C and

2 atmosphere pressure is $\frac{x}{\sqrt{3}} \text{ ms}^{-1}$. The value of x will be _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 24 Question Id : 70819116887 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

27°C तापमानास व 1 वातावरणातील दाबास दिलेल्या वायूच्या वस्तुमानाच्या रेणूंचा वर्ग माध्य वर्गमूळ वेग 200 ms^{-1} आहे. 127°C व 2 वातावरणातील दाबाच्या वायूच्या रेणूंचे वर्ग माध्य वर्गमूळ वेग $\frac{x}{\sqrt{3}} \text{ ms}^{-1}$ आहे.

x चे मूल्य _____ असेल.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 25 **Question Id :** 70819116888 **Question Type :** SA

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

Two cars are approaching each other at an equal speed of 7.2 km/hr. When they see each other, both blow horns having frequency of 676 Hz. The beat frequency heard by each driver will be _____ Hz. [Velocity of sound in air is 340 m/s.]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 25 **Question Id :** 70819116888 **Question Type :** SA

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

दोन गाड्या 7.2 km/hr वेगाने एकमेकांसमोर येत आहेत. त्या जेव्हा एकमेकांस पहातात, तेव्हा 676 Hz वारंवारतेचा भोंगा वाजवितात. प्रत्येक चालकाने ऐकलेली विस्पंद वारंवारता _____ Hz असेल.
(हवेतील ध्वनिचा वेग 340 m/s आहे)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

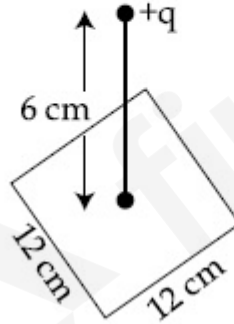
Possible Answers :

5 to 5.001

Question Number : 26 **Question Id :** 70819116889 **Question Type :** SA

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

A point charge of $+12 \mu\text{C}$ is at a distance 6 cm vertically above the centre of a square of side 12 cm as shown in figure. The magnitude of the electric flux through the square will be _____ $\times 10^3 \text{ Nm}^2/\text{C}$.



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

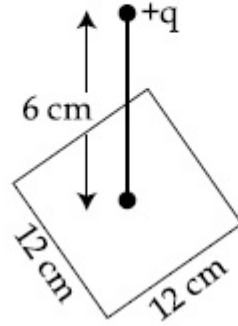
Possible Answers :

5 to 5.001

Question Number : 26 Question Id : 70819116889 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

आकृतीत दाखविल्याप्रमाणे, 12 cm बाजू असलेल्या चौकोनाच्या मध्यापासून 6 cm उभ्या अंतरावर $+12 \mu\text{C}$ चा बिंदूप्रभार आहे. चौकोनातून जाणाऱ्या विद्युत अभिवाहकी किंमत $\text{_____} \times 10^3 \text{ Nm}^2/\text{C}$ असेल.



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 27 Question Id : 70819116890 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A cylindrical wire of radius 0.5 mm and conductivity $5 \times 10^7 \text{ S/m}$ is subjected to an electric field of 10 mV/m. The expected value of current in the wire will be $x^3 \pi \text{ mA}$. The value of x is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 27 Question Id : 70819116890 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

0.5 mm त्रिज्येची व 5×10^7 S/m वाहकता असलेली नळकांड्यासारखी तार 10 mV/m एवढ्या विद्युत क्षेत्रात ठेवली. तारेतील अपेक्षित धारेचे मूल्य $x^3 \pi$ mA असेल. x चे मूल्य _____ आहे.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 28 Question Id : 70819116891 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A series LCR circuit is designed to resonate at an angular frequency $\omega_0 = 10^5$ rad/s. The circuit draws 16 W power from 120 V source at resonance. The value of resistance 'R' in the circuit is _____ Ω .

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 28 Question Id : 70819116891 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$\omega_0 = 10^5$ rad/s वारंवारतेने संस्पंदी होण्यासाठी एकसरीतील LCR परिपथ तयार केला. परिपथ संस्पंदीत 120 व्होल्ट उद्गमातून 16 वॅट शक्ती घेते. परिपथातील 'R' चे मूल्य _____ Ω आहे.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 29 Question Id : 70819116892 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

An electromagnetic wave of frequency 3 GHz enters a dielectric medium of relative electric permittivity 2.25 from vacuum. The wavelength of this wave in that medium will be _____ $\times 10^{-2}$ cm.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 29 Question Id : 70819116892 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

निर्वातातून 2.25 सापेक्ष विद्युत पार्यता असलेल्या पराविद्युत माध्यमात 3 GHz वारंवारतेची विद्युत चुंबकीय तरंग शिरत आहे. त्या माध्यमात तरंगाची तरंगलांबी _____ $\times 10^{-2}$ cm असेल.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 30 Question Id : 70819116893 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A signal of 0.1 kW is transmitted in a cable. The attenuation of cable is -5 dB per km and cable length is 20 km. The power received at receiver is 10^{-x} W. The value of x is _____.

$$[\text{Gain in dB} = 10 \log_{10} \left(\frac{P_o}{P_i} \right)]$$

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 30 Question Id : 70819116893 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

0.1 kW चा संकेत केबलमधून पारंपित आहे. केबलचे क्षीणन एका किलोमीटरसाठी -5 dB आहे व केबलची लांबी 20 km आहे. ग्राहीने मिळविलेली शक्ती 10^{-x} W आहे तर x चे मूल्य _____ आहे.

$$[\text{Gain in dB} = 10 \log_{10} \left(\frac{P_o}{P_i} \right)]$$

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Chemistry Section A

Section Id :	708191666
Section Number :	3
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	20
Number of Questions to be attempted :	20
Section Marks :	80
Mark As Answered Required? :	Yes
Sub-Section Number :	1
Sub-Section Id :	708191946
Question Shuffling Allowed :	Yes

Question Number : 31 Question Id : 70819116894 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

According to Bohr's atomic theory :

- (A) Kinetic energy of electron is $\propto \frac{Z^2}{n^2}$.
- (B) The product of velocity (v) of electron and principal quantum number (n), 'vn' $\propto Z^2$.
- (C) Frequency of revolution of electron in an orbit is $\propto \frac{Z^3}{n^3}$.
- (D) Coulombic force of attraction on the electron is $\propto \frac{Z^3}{n^4}$.

Choose the most appropriate answer from the options given below :

Options :

70819155831. (A), (C) and (D) only

70819155832. (A) and (D) only

70819155833. (C) only

70819155834. (A) only

Question Number : 31 Question Id : 70819116894 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

भोरच्या अणूसंदर्भातील सिद्धांतानुसार

(A) इलेक्ट्रॉनची गतिज ऊर्जा $\propto \frac{Z^2}{n^2}$

(B) इलेक्ट्रॉनची गती (v) आणि प्रमुख क्वांटम अंक (n) ह्यांचा गुणाकार 'vn' $\propto Z^2$

(C) इलेक्ट्रॉनची परिभ्रमणाची कक्षेतील वारंवारिता $\propto \frac{Z^3}{n^3}$

(D) इलेक्ट्रॉन वरील आकर्षणाचे कूलोम बल $\propto \frac{Z^3}{n^4}$

खालील पर्यायांमधून बरोबर उत्तराचा पर्याय निवडा.

Options :

70819155831. (A), (C), (D) फक्त

70819155832. (A) आणि (D) फक्त

70819155833. (C) फक्त

70819155834. (A) फक्त

Question Number : 32 Question Id : 70819116895 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

The correct shape and I-I-I bond angles respectively in I_3^- ion are :

Options :

70819155835. Linear; 180°

70819155836. Distorted trigonal planar; 135° and 90°

70819155837. T-shaped; 180° and 90°

70819155838. Trigonal planar; 120°

Question Number : 32 Question Id : 70819116895 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

I_3^- आयनातील बरोबर आकार आणि I-I-I मधील कोन अनुक्रमे _____ आहेत.

Options :

70819155835. रेषीय, 180°

70819155836. बिघडलेला प्रतलीय त्र्यगोनल, 135° आणि 90°

70819155837. T-आकाराचा, 180° आणि 90°

70819155838. प्रतलीय त्र्यगोनल, 120°

Question Number : 33 Question Id : 70819116896 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Most suitable salt which can be used for efficient clotting of blood will be :

Options :

70819155839. NaHCO_3

70819155840. $\text{Mg}(\text{HCO}_3)_2$

70819155841. FeCl_3

70819155842. FeSO_4

Question Number : 33 Question Id : 70819116896 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

रक्ताच्या गोठण्यासाठी सगळ्यांत उपयुक्त क्षार _____ असेल.

Options :

70819155839. NaHCO_3

70819155840. $\text{Mg}(\text{HCO}_3)_2$

70819155841. FeCl_3

70819155842. FeSO_4

Question Number : 34 Question Id : 70819116897 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

The correct set from the following in which both pairs are in correct order of melting point is :

Options :

70819155843. $\text{LiCl} > \text{LiF} ; \text{MgO} > \text{NaCl}$

70819155844. $\text{LiF} > \text{LiCl} ; \text{MgO} > \text{NaCl}$

70819155845. $\text{LiCl} > \text{LiF} ; \text{NaCl} > \text{MgO}$

70819155846. $\text{LiF} > \text{LiCl} ; \text{NaCl} > \text{MgO}$

Question Number : 34 Question Id : 70819116897 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

खालील पर्यायांमधून बरोबर सेट निवडा ज्यात दोन्ही जोड्या द्रवणांकाचा बरोबर क्रम दर्शवितात.

Options :

70819155843. $\text{LiCl} > \text{LiF} ; \text{MgO} > \text{NaCl}$

70819155844. $\text{LiF} > \text{LiCl} ; \text{MgO} > \text{NaCl}$

70819155845. $\text{LiCl} > \text{LiF} ; \text{NaCl} > \text{MgO}$

70819155846. $\text{LiF} > \text{LiCl} ; \text{NaCl} > \text{MgO}$

Question Number : 35 Question Id : 70819116898 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Match List - I with List - II.

List - I	List - II
(Metal)	(Ores)
(a) Aluminium	(i) Siderite
(b) Iron	(ii) Calamine
(c) Copper	(iii) Kaolinite
(d) Zinc	(iv) Malachite

Choose the correct answer from the options given below :

Options :

70819155847. (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)

70819155848. (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

70819155849. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

70819155850. (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

Question Number : 35 Question Id : 70819116898 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

यादी I यादी II बरोबर जुळवा.

यादी I (धातु)	यादी II (धातुक)
(a) अल्युमिनिअम	(i) सिडेराइट
(b) लोह	(ii) कोलोमाइन
(c) तांबे	(iii) केओलिनाइट
(d) झिंक	(iv) मॅलाचाइट

खालील पर्यायांमधून बरोबर उत्तर शोधा.

Options :

70819155847. (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)

70819155848. (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

70819155849. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

70819155850. (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

Question Number : 36 Question Id : 70819116899 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Given below are two statements : one is labelled as **Assertion A** and the other is labelled as **Reason R**.

Assertion A : Hydrogen is the most abundant element in the Universe, but it is not the most abundant gas in the troposphere.

Reason R : Hydrogen is the lightest element.

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

Options :

70819155851. Both **A** and **R** are true and **R** is the correct explanation of **A**

70819155852. Both **A** and **R** are true but **R** is NOT the correct explanation of **A**

70819155853. **A** is true but **R** is false

70819155854. **A** is false but **R** is true

Question Number : 36 Question Id : 70819116899 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

खाली दोन विधाने दिलेली आहेत, एक विधान **A** आणि दूसरे कारण **R** आहे.

विधान A : हायड्रोजन हे विश्वात सगळ्यात जास्त आढळणारे मूलद्रव्य आहे, परंतु ट्रोपोस्फियरमध्ये तो सगळ्यात जास्त आढळणारा वायू नाही.

कारण R : हायड्रोजन सगळ्यात हलके मूलद्रव्य आहे.

वरील दिलेल्या विधानांनुसार, खालील पर्यायांमधून बरोबर उत्तर शोधा.

Options :

70819155851. दोन्ही A आणि R बरोबर आहेत व R हे A चे बरोबर स्पष्टीकरण आहे.
70819155852. दोन्ही A आणि R बरोबर आहेत परंतु R हे A चे बरोबर स्पष्टीकरण नाही.
70819155853. A बरोबर आहे परंतु R चुकीचे आहे.
70819155854. A चुकीचे आहे परंतु R बरोबर आहे.

Question Number : 37 Question Id : 70819116900 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Match List - I with List - II.

List - I (Salt)	List - II (Flame colour wavelength)
(a) LiCl	(i) 455.5 nm
(b) NaCl	(ii) 670.8 nm
(c) RbCl	(iii) 780.0 nm
(d) CsCl	(iv) 589.2 nm

Choose the correct answer from the options given below :

Options :

70819155855. (a)-(iv), (b)-(ii), (c)-(iii), (d)-(i)
70819155856. (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)
70819155857. (a)-(i), (b)-(iv), (c)-(ii), (d)-(iii)
70819155858. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

Question Number : 37 Question Id : 70819116900 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

यादी I यादी II बरोबर जुळवा.

यादी I (संयुग/क्षार)	यादी II (ज्योतीच्या रंगाची तरंगलांबी)
(a) LiCl	(i) 455.5 nm
(b) NaCl	(ii) 670.8 nm
(c) RbCl	(iii) 780.0 nm
(d) CsCl	(iv) 589.2 nm

खालील पर्यायांमधून बरोबर उत्तर शोधा.

Options :

70819155855. (a)-(iv), (b)-(ii), (c)-(iii), (d)-(i)

70819155856. (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)

70819155857. (a)-(i), (b)-(iv), (c)-(ii), (d)-(iii)

70819155858. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

Question Number : 38 Question Id : 70819116901 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

The incorrect statement among the following is :

Options :

70819155859. VO_2 is a reducing agent

70819155860. RuO_4 is an oxidizing agent

70819155861. Cr_2O_3 is an amphoteric oxide

70819155862. Red colour of ruby is due to the presence of Co^{3+}

Question Number : 38 Question Id : 70819116901 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

खालीलपैकी चुकीचे विधान _____ आहे.

Options :

70819155859. VO_2 हे क्षपणकारक आहे

70819155860. RuO_4 हे ऑक्सिडीकारक आहे

70819155861. Cr_2O_3 हे उभयधर्मी ऑक्साइड आहे

70819155862. माणिकाचा लाल रंग Co^{3+} च्या उपस्थितीमुळे आहे

Question Number : 39 Question Id : 70819116902 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

What is the correct order of the following elements with respect to their density ?

Options :

70819155863. $\text{Cr} < \text{Fe} < \text{Co} < \text{Cu} < \text{Zn}$

70819155864. $Zn < Cr < Fe < Co < Cu$

70819155865. $Zn < Cu < Co < Fe < Cr$

70819155866. $Cr < Zn < Co < Cu < Fe$

Question Number : 39 Question Id : 70819116902 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

खालील पर्यायांमध्ये मूलद्रव्यांच्या घनतांचा बरोबर क्रम असलेला पर्याय कोणता ?

Options :

70819155863. $Cr < Fe < Co < Cu < Zn$

70819155864. $Zn < Cr < Fe < Co < Cu$

70819155865. $Zn < Cu < Co < Fe < Cr$

70819155866. $Cr < Zn < Co < Cu < Fe$

Question Number : 40 Question Id : 70819116903 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The calculated magnetic moments (spin only value) for species $[FeCl_4]^{2-}$, $[Co(C_2O_4)_3]^{3-}$

and MnO_4^{2-} respectively are :

Options :

70819155867. 4.90, 0 and 1.73 BM

70819155868. 5.92, 4.90 and 0 BM

70819155869. 5.82, 0 and 0 BM

70819155870. 4.90, 0 and 2.83 BM

Question Number : 40 Question Id : 70819116903 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

$[\text{FeCl}_4]^{2-}$, $[\text{Co}(\text{C}_2\text{O}_4)_3]^{3-}$ आणि MnO_4^{2-} ह्या प्रजातींच्या गणन केलेल्या चुंबकीय आघूर्णांच्या किंमती (स्पीन फक्त) अनुक्रमे _____ आहे.

Options :

70819155867. 4.90, 0 आणि 1.73 BM

70819155868. 5.92, 4.90 आणि 0 BM

70819155869. 5.82, 0 आणि 0 BM

70819155870. 4.90, 0 आणि 2.83 BM

Question Number : 41 Question Id : 70819116904 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Given below are two statements :

Statement I : The value of the parameter "Biochemical Oxygen Demand (BOD)" is important for survival of aquatic life.

Statement II : The optimum value of BOD is 6.5 ppm.

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

Options :

70819155871. Both Statement I and Statement II are true

70819155872. Both Statement I and Statement II are false

70819155873. Statement I is true but Statement II is false

70819155874. Statement I is false but Statement II is true

Question Number : 41 Question Id : 70819116904 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

खाली दोन विधाने दिलेली आहेत.

विधान I : जीवरासायनिक ऑक्सिजनची गरज (BOD) ह्याची किंमत जलीय जीवांच्या जगण्यासाठी महत्वाची असते.

विधान II : BOD ची अनुकूलतम किंमत 6.5 ppm आहे.

वरील विधानांना अनुसरून, खालील पर्यायांमधून बरोबर उत्तर शोधा.

Options :

70819155871. दोन्ही विधाने I आणि II बरोबर आहेत.

70819155872. दोन्ही विधाने I आणि II चुकीची आहेत.

70819155873. विधान I बरोबर आहे परंतु विधान II चुकीचे आहे.

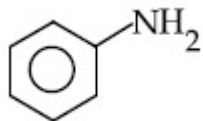
70819155874. विधान I चुकीचे आहे परंतु विधान II बरोबर आहे.

Question Number : 42 Question Id : 70819116905 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

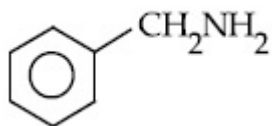
Correct Marks : 4 Wrong Marks : 1

The diazonium salt of which of the following compounds will form a coloured dye on reaction with β -Naphthol in NaOH ?

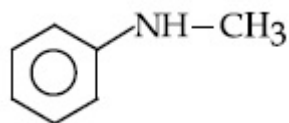
Options :



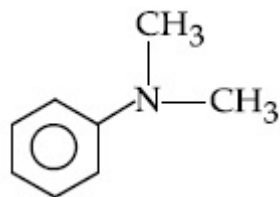
70819155875.



70819155876.



70819155877.



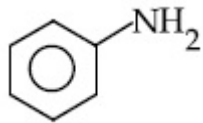
70819155878.

Question Number : 42 Question Id : 70819116905 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

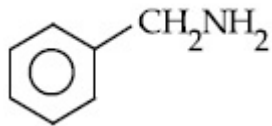
Correct Marks : 4 Wrong Marks : 1

खालीलपैकी कोणत्या संयुगाच्या डायझोनियम क्षाराची NaOH मध्ये β -नॅफ्थॉल बरोबर अभिक्रिया केली असता रंगीत रंजक तयार होईल ?

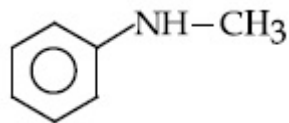
Options :



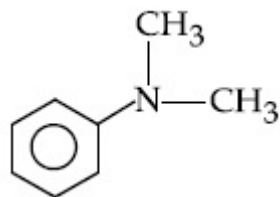
70819155875.



70819155876.



70819155877.



70819155878.

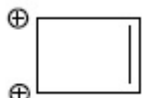
Question Number : 43 Question Id : 70819116906 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Which one of the following compounds is non-aromatic ?

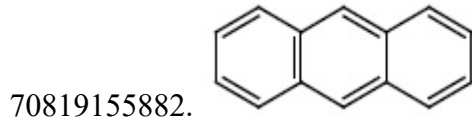
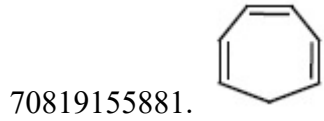
Options :



70819155879.



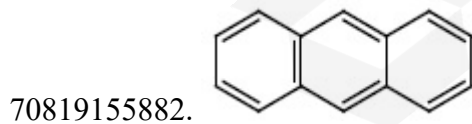
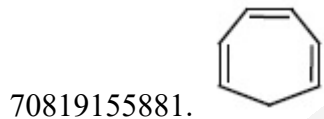
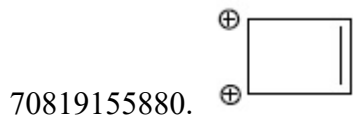
70819155880.



Question Number : 43 Question Id : 70819116906 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

खालीलपैकी अॅरोमॅटीक नसलेले संयुग कोणते आहे ?

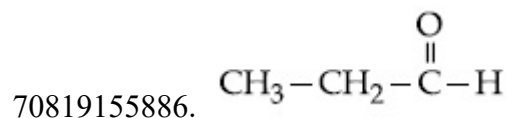
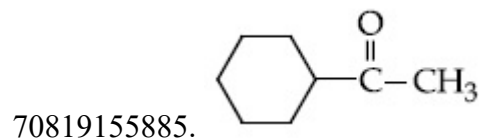
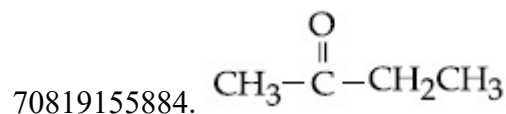
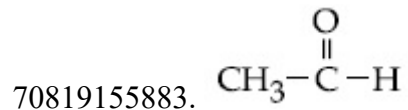
Options :



Question Number : 44 Question Id : 70819116907 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Which one of the following carbonyl compounds cannot be prepared by addition of water on an alkyne in the presence of HgSO_4 and H_2SO_4 ?

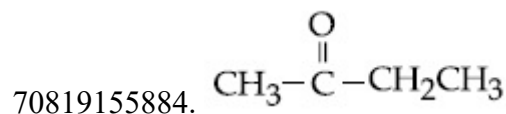
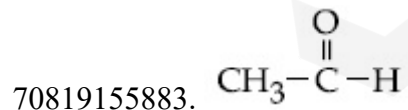
Options :

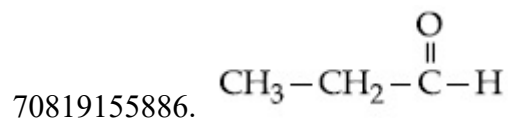
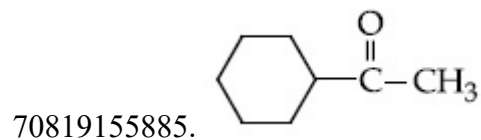


Question Number : 44 Question Id : 70819116907 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

खालीलपैकी कोणते कार्बोनील संयुग हे HgSO_4 आणि H_2SO_4 च्या उपस्थितीत अल्काइनमध्ये पाणी टाकून तयार करता येणार नाही ?

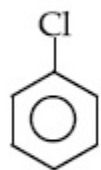
Options :



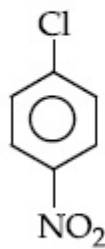


Question Number : 45 Question Id : 70819116908 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

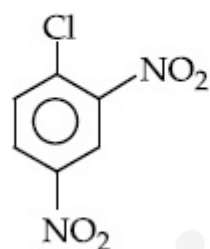
The correct order of the following compounds showing increasing tendency towards nucleophilic substitution reaction is :



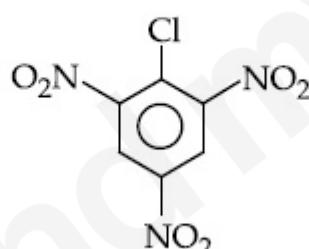
(i)



(ii)



(iii)



(iv)

Options :

70819155887. (iv) < (iii) < (ii) < (i)

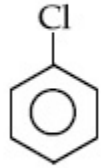
70819155888. (iv) < (i) < (iii) < (ii)

70819155889. (i) < (ii) < (iii) < (iv)

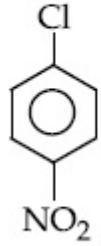
70819155890. (iv) < (i) < (ii) < (iii)

Question Number : 45 Question Id : 70819116908 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
 Correct Marks : 4 Wrong Marks : 1

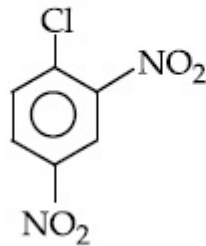
केंद्राकर्षी प्रतियोजन अभिक्रियेतील खालील संयुगांचा वाढत्या गतीचा क्रम _____ आहे.



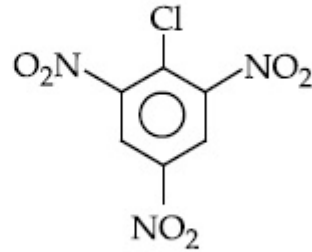
(i)



(ii)



(iii)



(iv)

Options :

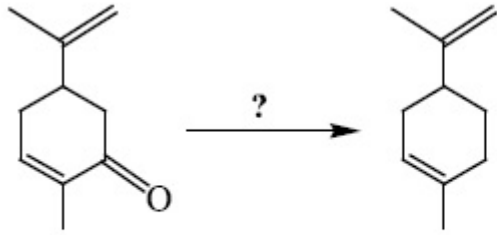
70819155887. (iv) < (iii) < (ii) < (i)

70819155888. (iv) < (i) < (iii) < (ii)

70819155889. (i) < (ii) < (iii) < (iv)

70819155890. (iv) < (i) < (ii) < (iii)

Question Number : 46 Question Id : 70819116909 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
 Correct Marks : 4 Wrong Marks : 1



Which of the following reagent is suitable for the preparation of the product in the above reaction ?

Options :

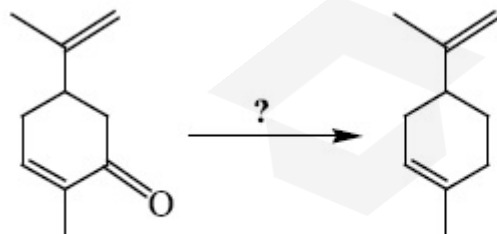
70819155891. NaBH_4

70819155892. $\text{NH}_2-\text{NH}_2/\text{C}_2\text{H}_5\text{O}^\ominus\text{Na}^\oplus$

70819155893. Ni/H_2

70819155894. Red P + Cl_2

Question Number : 46 Question Id : 70819116909 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1



वरील अभिक्रियेसाठी उपयुक्त अभिक्रियाकारक कोणता आहे ?

Options :

70819155891. NaBH_4

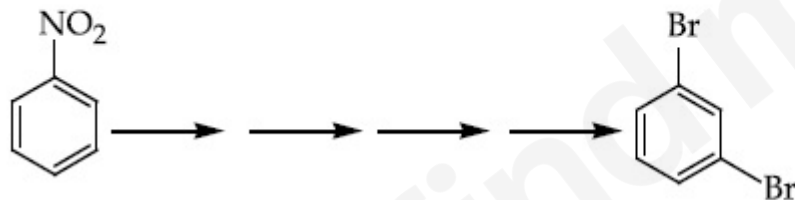
70819155892. $\text{NH}_2-\text{NH}_2/\text{C}_2\text{H}_5\text{O}^\ominus\text{Na}^\oplus$

70819155893. Ni/H_2

70819155894. लाल P + Cl_2

Question Number : 47 Question Id : 70819116910 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

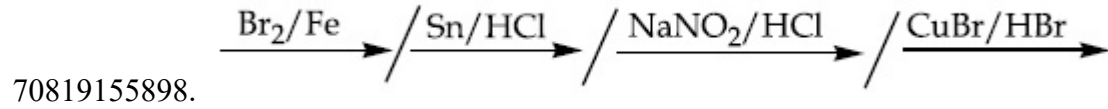
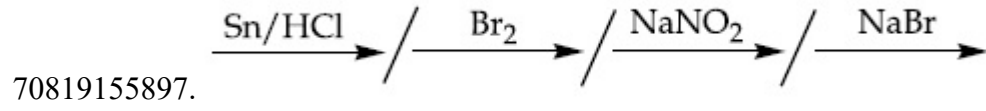
What is the correct sequence of reagents used for converting nitrobenzene into *m*-dibromobenzene ?



Options :

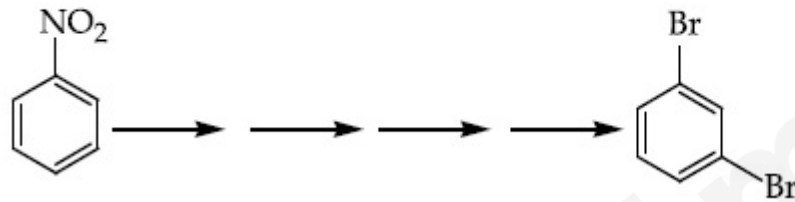
70819155895. $\xrightarrow{\text{Sn}/\text{HCl}} \text{---} \xrightarrow{\text{KBr}} \text{---} \xrightarrow{\text{Br}_2} \text{---} \xrightarrow{\text{H}^+} \text{---}$

70819155896. $\xrightarrow{\text{NaNO}_2} \text{---} \xrightarrow{\text{HCl}} \text{---} \xrightarrow{\text{KBr}} \text{---} \xrightarrow{\text{H}^+} \text{---}$

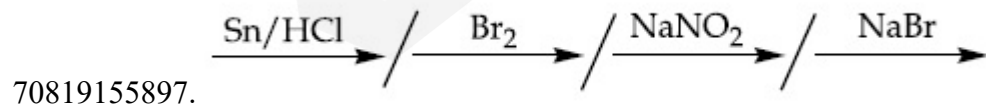
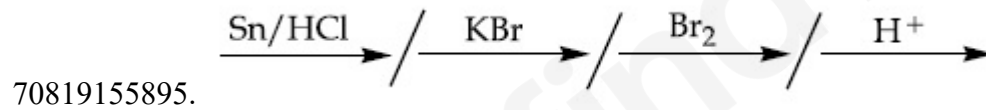


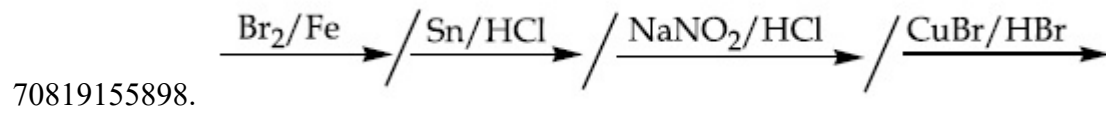
Question Number : 47 Question Id : 70819116910 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

नायट्रोबेंझीनचे *m*-डायब्रोमोबेंझिनमध्ये रूपांतर करण्यासाठी अभिक्रियाकारकांचा कोणता क्रम बरोबर आहे ?



Options :





Question Number : 48 Question Id : 70819116911 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

In polymer Buna-S : 'S' stands for :

Options :

70819155899. Sulphur

70819155900. Strength

70819155901. Styrene

70819155902. Sulphonation

Question Number : 48 Question Id : 70819116911 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

ब्युना-S ह्या बहुवारिकातील 'S' म्हणजे _____

Options :

70819155899. सल्फर

70819155900. शक्ती

70819155901. स्टाइरिन

70819155902. सल्फोनेशन

Question Number : 49 Question Id : 70819116912 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Match List - I and List - II.

List - I	List - II
(a) Valium	(i) Antifertility drug
(b) Morphine	(ii) Pernicious anaemia
(c) Norethindrone	(iii) Analgesic
(d) Vitamin B ₁₂	(iv) Tranquilizer

Options :

70819155903. (a)-(i), (b)-(iii), (c)-(iv), (d)-(ii)

70819155904. (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

70819155905. (a)-(iv), (b)-(iii), (c)-(i), (d)-(ii)

70819155906. (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)

Question Number : 49 Question Id : 70819116912 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

यादी I यादी II शी जुळवा.

यादी I	यादी II
(a) व्हेलिअम	(i) फलनक्षमता विरुद्ध औषध (अँटीफरटिलीटी)
(b) मॉर्फिन	(ii) परनिसिअस अरक्तता
(c) नॉरएथिंड्रोन	(iii) वेदनाशामक
(d) व्हिटॅमिन B ₁₂	(iv) प्रशांतक

Options :

70819155903. (a)-(i), (b)-(iii), (c)-(iv), (d)-(ii)

70819155904. (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

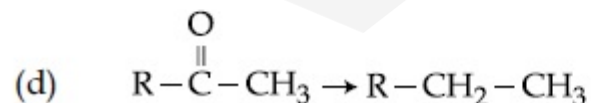
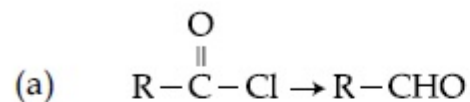
70819155905. (a)-(iv), (b)-(iii), (c)-(i), (d)-(ii)

70819155906. (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)

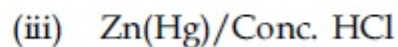
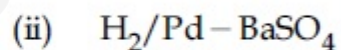
Question Number : 50 Question Id : 70819116913 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Match List - I and List - II.

List - I



List - II



Choose the correct answer from the options given below :

Options :

70819155907. (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)

70819155908. (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

70819155909. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

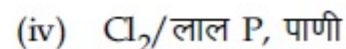
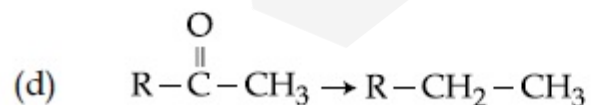
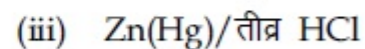
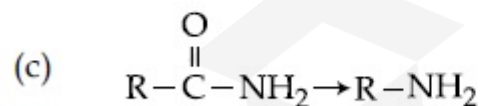
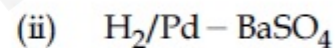
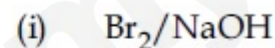
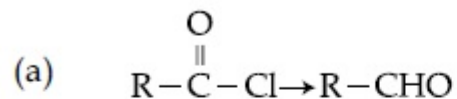
70819155910. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

Question Number : 50 Question Id : 70819116913 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

यादी I यादी II शी जुळवा.

यादी I

यादी II



खालील पर्यायांमधून बरोबर उत्तर शोधा.

Options :

70819155907. (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)

70819155908. (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

70819155909. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

70819155910. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

Chemistry Section B

Section Id :	708191667
Section Number :	4
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	10
Number of Questions to be attempted :	5
Section Marks :	20
Mark As Answered Required? :	Yes
Sub-Section Number :	1
Sub-Section Id :	708191947
Question Shuffling Allowed :	Yes

Question Number : 51 Question Id : 70819116914 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The formula of a gaseous hydrocarbon which requires 6 times of its own volume of O_2 for complete oxidation and produces 4 times its own volume of CO_2 is C_xH_y . The value of y is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 51 Question Id : 70819116914 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

एका वायुरूप हायड्रोकार्बनचे सूत्र, ज्याला स्वतःच्या आकारमानाच्या 6 पट ऑक्सिजन संपूर्ण ज्वलनासाठी लागुन त्यातून 4 पट त्याच्या आकारमानाच्या CO_2 तयार होतो ते C_xH_y आहे. y ची किंमत _____ आहे.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 52 Question Id : 70819116915 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The volume occupied by 4.75 g of acetylene gas at 50°C and 740 mmHg pressure is _____ L. (Rounded off to the nearest integer)

[Given $R = 0.0826 \text{ L atm K}^{-1} \text{ mol}^{-1}$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 52 Question Id : 70819116915 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

4.75 ग्रॅम अॅसिटायलिन वायु 50°C तापमानाला आणि 740 mm Hg दाबाला _____ L आकारमान व्यापतो.

(जवळच्या पूर्णांकात) [दिलेले आहे $R = 0.0826 \text{ L atm K}^{-1} \text{ mol}^{-1}$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

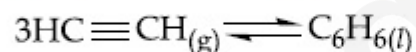
Possible Answers :

5 to 5.001

Question Number : 53 Question Id : 70819116916 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Assuming ideal behaviour, the magnitude of $\log K$ for the following reaction at 25°C is $x \times 10^{-1}$. The value of x is _____. (Integer answer)



[Given : $\Delta_f G^\circ(\text{HC}\equiv\text{CH}) = -2.04 \times 10^5 \text{ J mol}^{-1}$; $\Delta_f G^\circ(\text{C}_6\text{H}_6) = -1.24 \times 10^5 \text{ J mol}^{-1}$; $R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

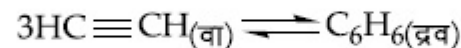
Possible Answers :

5 to 5.001

Question Number : 53 Question Id : 70819116916 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

आदर्श वागणूक समजून 25°C तापमानाला खालील अभिक्रियेसाठी $\log K$ ची किंमत $x \times 10^{-1}$ आहे.
तर x ची किंमत _____ आहे.



[दिलेले आहे : $\Delta_f G^{\circ}(\text{HC}\equiv\text{CH}) = -2.04 \times 10^5 \text{ J mol}^{-1}$; $\Delta_f G^{\circ}(\text{C}_6\text{H}_6) = -1.24 \times 10^5 \text{ J mol}^{-1}$;
 $R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 54 **Question Id :** 70819116917 **Question Type :** SA

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

C_6H_6 freezes at 5.5°C . The temperature at which a solution of 10 g of C_4H_{10} in 200 g of C_6H_6 freeze is _____ $^{\circ}\text{C}$. (The molal freezing point depression constant of C_6H_6 is 5.12°C/m .)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 54 **Question Id :** 70819116917 **Question Type :** SA

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

C_6H_6 हे $5.5^{\circ}C$ ला गोठते. 200 ग्रॅम C_6H_6 मध्ये 10 ग्रॅम C_4H_{10} घातले असता हे द्रावण $^{\circ}C$ मधील किती तापमानाला गोठेल ? (C_6H_6 साठी मोलल निम्नतापमानी स्थिरांक $5.12^{\circ}C/m$ आहे)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 55 **Question Id :** 70819116918 **Question Type :** SA

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

The solubility product of PbI_2 is 8.0×10^{-9} . The solubility of lead iodide in 0.1 molar solution of lead nitrate is $x \times 10^{-6}$ mol/L. The value of x is _____. (Rounded off to the nearest integer)

[Given $\sqrt{2} = 1.41$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 55 **Question Id :** 70819116918 **Question Type :** SA

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

PbI_2 साठी द्रावणीयता गुणन फल 8.0×10^{-9} आहे. 0.1 मोलर लेड नायट्रेटच्या द्रावणातील लेड आयोडाइडची द्रावणीयता $x \times 10^{-6}$ mol/L आहे तर x ची किंमत _____ आहे. (जवळच्या पूर्णांकात)

[दिलेले आहे $\sqrt{2} = 1.41$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 56 **Question Id :** 70819116919 **Question Type :** SA

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

The magnitude of the change in oxidising power of the $\text{MnO}_4^-/\text{Mn}^{2+}$ couple is $x \times 10^{-4}$ V, if the H^+ concentration is decreased from 1 M to 10^{-4} M at 25°C . (Assume concentration of MnO_4^- and Mn^{2+} to be same on change in H^+ concentration). The value of x is _____. (Rounded off to the nearest integer)

$$\left[\text{Given : } \frac{2.303 RT}{F} = 0.059 \right]$$

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 56 **Question Id :** 70819116919 **Question Type :** SA

Correct Marks : 4 Wrong Marks : 0

$\text{MnO}_4^-/\text{Mn}^{2+}$ ची ऑक्सिडन शक्ती जर H^+ आयनांची संहती 1 M पासून 10^{-4} M इतकी कमी केली तर $\text{MnO}_4^-/\text{Mn}^{2+}$ ह्या युग्माची 25°C ला ऑक्सिडीकारक शक्ती $x \times 10^{-4}$ V इतकी बदलते तर x ची किंमत _____ आहे.

(समजा MnO_4^- आणि Mn^{2+} ह्यांच्या संहती H^+ संहतीच्या बदलाने त्याच रहातात)

(जवळच्या पूर्णांकात) [दिलेले आहे $\frac{2.303 RT}{F} = 0.059$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 57 Question Id : 70819116920 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Sucrose hydrolyses in acid solution into glucose and fructose following first order rate law with a half-life of 3.33 h at 25°C . After 9 h, the fraction of sucrose remaining is f . The value

of $\log_{10}\left(\frac{1}{f}\right)$ is _____ $\times 10^{-2}$. (Rounded off to the nearest integer)

[Assume : $\ln 10 = 2.303$, $\ln 2 = 0.693$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 57 Question Id : 70819116920 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

प्रथम कोटी गतीच्या नियमानुसार आम्लधर्मी द्रावणात सुक्रोजचे विघटन होऊन ग्लूकोज व फ्रुक्टोज तयार होते,

त्याचा अर्धायुकाल 3.33 तास 25°C तापमानाला आहे. 9 तासानंतर सुक्रोजचा शिल्लक अंश f आहे. $\log_{10}\left(\frac{1}{f}\right)$

ची किंमत _____ $\times 10^{-2}$ आहे. (जवळचा पूर्णांक) [समजा $\ln 10 = 2.303$, $\ln 2 = 0.693$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 58 Question Id : 70819116921 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Among the following allotropic forms of sulphur, the number of allotropic forms, which will show paramagnetism is _____.

(A) α -sulphur (B) β -sulphur (C) S_2 -form

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 58 Question Id : 70819116921 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

खालील दिलेल्या सल्फरच्या अपरुपापैकी जे समचुंबकियत्व दाखवतात अश्यांची संख्या _____ आहे.

- (A) α -सल्फर (B) β -सल्फर (C) S_2 -फॉर्म

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

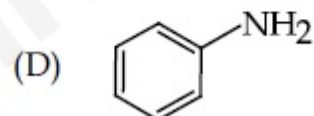
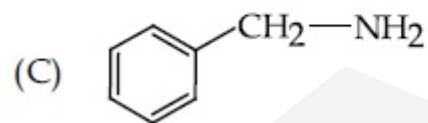
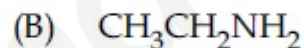
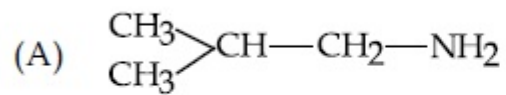
Possible Answers :

5 to 5.001

Question Number : 59 Question Id : 70819116922 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The total number of amines among the following which can be synthesized by Gabriel synthesis is _____.



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

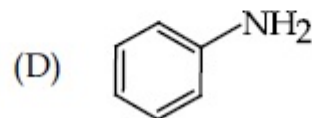
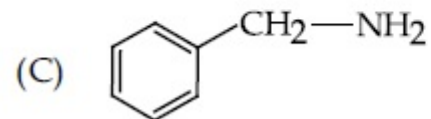
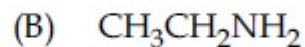
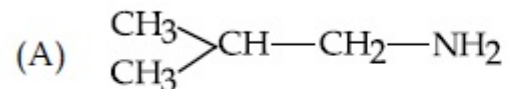
Possible Answers :

5 to 5.001

Question Number : 59 Question Id : 70819116922 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

गॅब्रिअल संश्लेषणातून खालील दिलेल्या अमाइन्सपैकी एकूण _____ अमाइन्स तयार करता येतील.



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 60 Question Id : 70819116923 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

1.86 g of aniline completely reacts to form acetanilide. 10% of the product is lost during purification. Amount of acetanilide obtained after purification (in g) is _____ $\times 10^{-2}$.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 60 Question Id : 70819116923 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

1.86 ग्रॅम ॲनिलीनच्या पूर्ण अभिक्रियेनंतर ॲसिटानिलाइड तयार झाले. शुद्धीकरणात 10% उत्पाद कमी झाला. शुद्धीकरणानंतर मिळालेले ॲसिटानिलाइड _____ $\times 10^{-2}$ g आहे.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Mathematics Section A

Section Id :	708191668
Section Number :	5
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	20
Number of Questions to be attempted :	20
Section Marks :	80
Mark As Answered Required? :	Yes
Sub-Section Number :	1
Sub-Section Id :	708191948
Question Shuffling Allowed :	Yes

Question Number : 61 Question Id : 70819116924 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let $a, b \in \mathbb{R}$. If the mirror image of the point $P(a, 6, 9)$ with respect to the line

$$\frac{x-3}{7} = \frac{y-2}{5} = \frac{z-1}{-9} \text{ is } (20, b, -a-9), \text{ then } |a+b| \text{ is equal to :}$$

Options :

70819155921. 84

70819155922. 86

70819155923. 88

70819155924. 90

Question Number : 61 Question Id : 70819116924 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

समजा $a, b \in \mathbb{R}$, $\frac{x-3}{7} = \frac{y-2}{5} = \frac{z-1}{-9}$ या रेषेच्या संदर्भातील (with respect to) बिंदू $P(a, 6, 9)$ चे आरशातील प्रतिबिंब (mirror image) $(20, b, -a-9)$ आहे, तर $|a+b|$ बरोबर _____ आहे.

Options :

70819155921. 84

70819155922. 86

70819155923. 88

70819155924. 90

Question Number : 62 Question Id : 70819116925 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let a, b, c be in arithmetic progression. Let the centroid of the triangle with vertices

$(a, c), (2, b)$ and (a, b) be $\left(\frac{10}{3}, \frac{7}{3}\right)$. If α, β are the roots of the equation $ax^2 + bx + 1 = 0$, then

the value of $\alpha^2 + \beta^2 - \alpha\beta$ is :

Options :

70819155925. $-\frac{69}{256}$

70819155926. $-\frac{71}{256}$

70819155927. $\frac{69}{256}$

70819155928. $\frac{71}{256}$

Question Number : 62 Question Id : 70819116925 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

समजा a, b, c गणित श्रेढी (A. P.) मधे आहेत. समजा $(a, c), (2, b)$ आणि (a, b) शिरोबिंदू असणाऱ्या त्रिकोणाचे

प्रकेंद्र (centroid) $\left(\frac{10}{3}, \frac{7}{3}\right)$ आहे. जर α, β ही $ax^2 + bx + 1 = 0$ या समीकरणाची मूळे असतील तर

$\alpha^2 + \beta^2 - \alpha\beta$ चे मूल्य _____ आहे.

Options :

70819155925. $\frac{69}{256}$

70819155926. $\frac{71}{256}$

70819155927. $\frac{69}{256}$

70819155928. $\frac{71}{256}$

Question Number : 63 Question Id : 70819116926 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

If P is a point on the parabola $y = x^2 + 4$ which is closest to the straight line $y = 4x - 1$, then the co-ordinates of P are :

Options :

70819155929. (3, 13)

70819155930. (2, 8)

70819155931. (-2, 8)

70819155932. (1, 5)

Question Number : 63 Question Id : 70819116926 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

जर $y = x^2 + 4$ या अन्वस्त (parabola) वरील P बिंदू आहे आणि तो $y = 4x - 1$ या सरळ रेषेजवळ (closest) आहे. तर P चे निर्देशक (co-ordinates) _____ आहेत.

Options :

70819155929. (3, 13)

70819155930. (2, 8)

70819155931. (-2, 8)

70819155932. (1, 5)

Question Number : 64 Question Id : 70819116927 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

For which of the following curves, the line $x + \sqrt{3}y = 2\sqrt{3}$ is the tangent at the point

$$\left(\frac{3\sqrt{3}}{2}, \frac{1}{2} \right) ?$$

Options :

70819155933. $x^2 + y^2 = 7$

70819155934. $x^2 + 9y^2 = 9$

70819155935. $y^2 = \frac{1}{6\sqrt{3}}x$

70819155936. $2x^2 - 18y^2 = 9$

Question Number : 64 Question Id : 70819116927 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

खाली दिलेल्या कोणत्या वक्रासाठी $\left(\frac{3\sqrt{3}}{2}, \frac{1}{2}\right)$ या बिंदूवरील काढलेल्या रेषा $x + \sqrt{3}y = 2\sqrt{3}$ ची स्पर्शिका आहे ?

Options :

70819155933. $x^2 + y^2 = 7$

70819155934. $x^2 + 9y^2 = 9$

70819155935. $y^2 = \frac{1}{6\sqrt{3}}x$

70819155936. $2x^2 - 18y^2 = 9$

Question Number : 65 Question Id : 70819116928 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

The value of the integral, $\int_1^3 [x^2 - 2x - 2] dx$, where $[x]$ denotes the greatest integer less than or equal to x , is :

Options :

70819155937. -5

70819155938. -4

70819155939. $-\sqrt{2} - \sqrt{3} - 1$

70819155940. $-\sqrt{2} - \sqrt{3} + 1$

Question Number : 65 Question Id : 70819116928 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$\int_1^3 [x^2 - 2x - 2] dx$, या पूर्णांकी (integral) चे मूल्य _____ आहे. जेव्हा $[x]$ हे x किंवा त्यापेक्षा लहान

महत्तम पूर्णांक दर्शविते.

Options :

70819155937. -5

70819155938. -4

70819155939. $-\sqrt{2} - \sqrt{3} - 1$

70819155940. $-\sqrt{2} - \sqrt{3} + 1$

Question Number : 66 Question Id : 70819116929 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The negation of the statement

$\sim p \wedge (p \vee q)$ is :

Options :

70819155941. $\sim p \vee q$

70819155942. $\sim P \wedge q$

70819155943. $P \wedge \sim q$

70819155944. $P \vee \sim q$

Question Number : 66 Question Id : 70819116929 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

$\sim P \wedge (P \vee Q)$ या विधानाचे नकरण (negation) _____ आहे.

Options :

70819155941. $\sim P \vee Q$

70819155942. $\sim P \wedge Q$

70819155943. $P \wedge \sim Q$

70819155944. $P \vee \sim Q$

Question Number : 67 Question Id : 70819116930 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Let A and B be 3×3 real matrices such that A is symmetric matrix and B is skew-symmetric matrix. Then the system of linear equations $(A^2B^2 - B^2A^2)X = O$, where X is a 3×1 column matrix of unknown variables and O is a 3×1 null matrix, has :

Options :

70819155945. no solution

70819155946. a unique solution

70819155947. exactly two solutions

70819155948. infinitely many solutions

Question Number : 67 Question Id : 70819116930 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

समजा A आणि B हे 3×3 वास्तव सारणी (real matrices) आहेत. जसे की A सममित सारणी (symmetric matrix) आहे आणि B विषम सममित सारणी (skew-symmetric matrix) आहे. जेव्हा X ही अज्ञात चलाची (unknown variables) 3×1 स्तंभ सारणी (column matrix) आहे आणि O ही 3×1 शून्य सारणी (null matrix) आहे. तर $(A^2B^2 - B^2A^2)X = O$ या रेषीय समीकरणांची (linear equations) सारणी _____ आहे.

Options :

70819155945. उकल नसलेली (no solution)

70819155946. एकमेव उकल (a unique solution) असलेली

70819155947. बरोबर दोन उकली (exactly two solutions)

70819155948. अनंत बहू उकली (infinitely many solutions)

Question Number : 68 Question Id : 70819116931 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Let $f(x)$ be a differentiable function defined on $[0, 2]$ such that $f'(x) = f'(2-x)$ for all

$x \in (0, 2)$, $f(0) = 1$ and $f(2) = e^2$. Then the value of $\int_0^2 f(x) dx$ is :

Options :

70819155949. $1 - e^2$

70819155950. $1 + e^2$

70819155951. $2(1 + e^2)$

70819155952. $2(1 - e^2)$

Question Number : 68 Question Id : 70819116931 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

समजा $f(x)$ हे $[0, 2]$ वर निश्चित (defined) होणारे विकलनीय फल (differentiable function) आहे, जसे की

$f'(x) = f'(2-x)$ सर्व $x \in (0, 2)$, $f(0) = 1$ आणि $f(2) = e^2$. तर $\int_0^2 f(x) dx$ चे मूल्य _____ आहे.

Options :

70819155949. $1 - e^2$

70819155950. $1 + e^2$

70819155951. $2(1 + e^2)$

70819155952. $2(1 - e^2)$

Question Number : 69 Question Id : 70819116932 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Let f be a twice differentiable function defined on \mathbb{R} such that $f(0) = 1$, $f'(0) = 2$ and

$f'(x) \neq 0$ for all $x \in \mathbb{R}$. If $\begin{vmatrix} f(x) & f'(x) \\ f'(x) & f''(x) \end{vmatrix} = 0$, for all $x \in \mathbb{R}$, then the value of $f(1)$ lies in the

interval :

Options :

70819155953. (0, 3)

70819155954. (3, 6)

70819155955. (6, 9)

70819155956. (9, 12)

Question Number : 69 Question Id : 70819116932 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

समजा f हे \mathbb{R} वर निश्चित (defined) होणारे एक दोन वेळ विकलनीय फल (differentiable function) आहे.

जसे की $f(0) = 1$, $f'(0) = 2$ आणि $f'(x) \neq 0$ सर्व $x \in \mathbb{R}$ साठी. जर $\begin{vmatrix} f(x) & f'(x) \\ f'(x) & f''(x) \end{vmatrix} = 0$, सर्व $x \in \mathbb{R}$ साठी. तर

$f(1)$ चे मूल्य _____ अंतराला (interval) मध्ये आहे.

Options :

70819155953. (0, 3)

70819155954. (3, 6)

70819155955. (6, 9)

70819155956. (9, 12)

Question Number : 70 Question Id : 70819116933 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

If the curve $y = ax^2 + bx + c$, $x \in \mathbb{R}$, passes through the point (1, 2) and the tangent line to this curve at origin is $y = x$, then the possible values of a , b , c are :

Options :

70819155957. $a = 1, b = 1, c = 0$

70819155958. $a = 1, b = 0, c = 1$

70819155959. $a = -1, b = 1, c = 1$

70819155960. $a = \frac{1}{2}, b = \frac{1}{2}, c = 1$

Question Number : 70 Question Id : 70819116933 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

जर $y = ax^2 + bx + c$, $x \in \mathbb{R}$ हा वक्र (1, 2) या बिंदूमधून जातो आणि आरंभ बिंदू वरील ह्या वक्राची स्पर्शिका रेषा (tangent line) $y = x$ आहे, तर a , b , c ची शक्य मूल्ये (possible values) _____ आहेत.

Options :

70819155957. $a = 1, b = 1, c = 0$

70819155958. $a = 1, b = 0, c = 1$

70819155959. $a = -1, b = 1, c = 1$

70819155960. $a = \frac{1}{2}, b = \frac{1}{2}, c = 1$

Question Number : 71 Question Id : 70819116934 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

If $n \geq 2$ is a positive integer, then the sum of the series

$${}^{n+1}C_2 + 2({}^2C_2 + {}^3C_2 + {}^4C_2 + \dots + {}^nC_2) \text{ is :}$$

Options :

70819155961. $\frac{n(n-1)(2n+1)}{6}$

70819155962. $\frac{n(n+1)(2n+1)}{6}$

70819155963. $\frac{n(2n+1)(3n+1)}{6}$

70819155964. $\frac{n(n+1)^2(n+2)}{12}$

Question Number : 71 Question Id : 70819116934 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

जर $n \geq 2$ हे धन पूर्णांक (positive integer) आहे, तर ${}^{n+1}C_2 + 2({}^2C_2 + {}^3C_2 + {}^4C_2 + \dots + {}^nC_2)$ या श्रेणी (series) ची बेरीज _____ आहे.

Options :

70819155961. $\frac{n(n-1)(2n+1)}{6}$

70819155962. $\frac{n(n+1)(2n+1)}{6}$

70819155963. $\frac{n(2n+1)(3n+1)}{6}$

70819155964. $\frac{n(n+1)^2(n+2)}{12}$

Question Number : 72 Question Id : 70819116935 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

For the system of linear equations :

$$x - 2y = 1, x - y + kz = -2, ky + 4z = 6, k \in \mathbb{R},$$

consider the following statements :

- (A) The system has unique solution if $k \neq 2, k \neq -2$.
- (B) The system has unique solution if $k = -2$.
- (C) The system has unique solution if $k = 2$.
- (D) The system has no-solution if $k = 2$.
- (E) The system has infinite number of solutions if $k \neq -2$.

Which of the following statements are correct ?

Options :

70819155965. (A) and (D) only

70819155966. (A) and (E) only

70819155967. (C) and (D) only

70819155968. (B) and (E) only

Question Number : 72 Question Id : 70819116935 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

$x - 2y = 1$, $x - y + kz = -2$, $ky + 4z = 6$, $k \in \mathbb{R}$ या रेषीय समीकरणांच्या (linear equations) प्रणालीसाठी, खाली दिलेल्या विधानांचा विचार करा.

(A) प्रणालीची एकमेव उकल (unique solution) आहे जर $k \neq 2$, $k \neq -2$.

(B) प्रणालीची एकमेव उकल आहे जर $k = -2$.

(C) प्रणालीची एकमेव उकल आहे जर $k = 2$.

(D) प्रणालीची उकल नाही जर $k = 2$.

(E) प्रणालीची अनंत उकलींची संख्या आहे जर $k \neq -2$.

खालीलपैकी कोणती विधाने बरोबर आहेत ?

Options :

70819155965. (A) आणि (D) फक्त

70819155966. (A) आणि (E) फक्त

70819155967. (C) आणि (D) फक्त

70819155968. (B) आणि (E) फक्त

Question Number : 73 Question Id : 70819116936 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let $f: \mathbf{R} \rightarrow \mathbf{R}$ be defined as

$$f(x) = \begin{cases} -55x, & \text{if } x < -5 \\ 2x^3 - 3x^2 - 120x, & \text{if } -5 \leq x \leq 4 \\ 2x^3 - 3x^2 - 36x - 336, & \text{if } x > 4, \end{cases}$$

Let $A = \{x \in \mathbf{R} : f \text{ is increasing}\}$. Then A is equal to :

Options :

70819155969. $(-\infty, -5) \cup (4, \infty)$

70819155970. $(-5, -4) \cup (4, \infty)$

70819155971. $(-\infty, -5) \cup (-4, \infty)$

70819155972. $(-5, \infty)$

Question Number : 73 Question Id : 70819116936 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

समजा $f: \mathbf{R} \rightarrow \mathbf{R}$ हे निश्चित (defined) आहे.

$$f(x) = \begin{cases} -55x, & \text{जर } x < -5 \\ 2x^3 - 3x^2 - 120x, & \text{जर } -5 \leq x \leq 4 \\ 2x^3 - 3x^2 - 36x - 336, & \text{जर } x > 4, \end{cases}$$

समजा $A = \{x \in \mathbf{R} : f \text{ वाढता आहे}\}$. तर A बरोबर _____ आहे.

Options :

70819155969. $(-\infty, -5) \cup (4, \infty)$

70819155970. $(-5, -4) \cup (4, \infty)$

70819155971. $(-\infty, -5) \cup (-4, \infty)$

70819155972. $(-5, \infty)$

Question Number : 74 Question Id : 70819116937 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

A possible value of $\tan\left(\frac{1}{4}\sin^{-1}\frac{\sqrt{63}}{8}\right)$ is :

Options :

70819155973. $\frac{1}{\sqrt{7}}$

70819155974. $\frac{1}{2\sqrt{2}}$

70819155975. $\sqrt{7} - 1$

70819155976. $2\sqrt{2} - 1$

Question Number : 74 Question Id : 70819116937 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

$\tan\left(\frac{1}{4}\sin^{-1}\frac{\sqrt{63}}{8}\right)$ चे शक्य असलेले मूल्य (possible value) _____ आहे.

Options :

70819155973. $\frac{1}{\sqrt{7}}$

70819155974. $\frac{1}{2\sqrt{2}}$

70819155975. $\sqrt{7} - 1$

70819155976. $2\sqrt{2} - 1$

Question Number : 75 Question Id : 70819116938 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

The angle of elevation of a jet plane from a point A on the ground is 60° . After a flight of 20 seconds at the speed of 432 km/hour, the angle of elevation changes to 30° . If the jet plane is flying at a constant height, then its height is :

Options :

70819155977. $3600\sqrt{3}$ m

70819155978. $2400\sqrt{3}$ m

70819155979. $1800\sqrt{3}$ m

70819155980. $1200\sqrt{3}$ m

Question Number : 75 Question Id : 70819116938 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

एका जेट विमानाचे जमिनीवरील बिंदू A पासून उन्नत कोन (angle of elevation) 60° आहे. 432 किलोमीटर/तास या वेगाने 20 सेकंद उडाल्यानंतर उन्नत कोन 30° मध्ये बदलला. जर जेट विमान अचल (constant) उंचीवर उडत असेल तर त्याची उंची _____ आहे.

Options :

70819155977. $3600\sqrt{3}$ मीटर

70819155978. $2400\sqrt{3}$ मीटर

70819155979. $1800\sqrt{3}$ मीटर

70819155980. $1200\sqrt{3}$ मीटर

Question Number : 76 Question Id : 70819116939 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

The vector equation of the plane passing through the intersection of the planes

$\vec{r} \cdot (\hat{i} + \hat{j} + \hat{k}) = 1$ and $\vec{r} \cdot (\hat{i} - 2\hat{j}) = -2$, and the point (1, 0, 2) is :

Options :

70819155981. $\vec{r} \cdot (3\hat{i} + 7\hat{j} + 3\hat{k}) = 7$

70819155982. $\vec{r} \cdot (\hat{i} + 7\hat{j} + 3\hat{k}) = 7$

70819155983. $\vec{r} \cdot (\hat{i} - 7\hat{j} + 3\hat{k}) = \frac{7}{3}$

70819155984. $\vec{r} \cdot (\hat{i} + 7\hat{j} + 3\hat{k}) = \frac{7}{3}$

Question Number : 76 Question Id : 70819116939 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

$\vec{r} \cdot (\hat{i} + \hat{j} + \hat{k}) = 1$ आणि $\vec{r} \cdot (\hat{i} - 2\hat{j}) = -2$ या प्रतलांच्या छेदामधून आणि $(1, 0, 2)$ या बिंदूमधून जाणाऱ्या प्रतलाचे सदिश समीकरण (vector equation) _____ आहे.

Options :

70819155981. $\vec{r} \cdot (3\hat{i} + 7\hat{j} + 3\hat{k}) = 7$

70819155982. $\vec{r} \cdot (\hat{i} + 7\hat{j} + 3\hat{k}) = 7$

70819155983. $\vec{r} \cdot (\hat{i} - 7\hat{j} + 3\hat{k}) = \frac{7}{3}$

70819155984. $\vec{r} \cdot (\hat{i} + 7\hat{j} + 3\hat{k}) = \frac{7}{3}$

Question Number : 77 Question Id : 70819116940 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

For the statements p and q, consider the following compound statements :

(a) $(\sim q \wedge (p \rightarrow q)) \rightarrow \sim p$

(b) $((p \vee q) \wedge \sim p) \rightarrow q$

Then which of the following statements is correct ?

Options :

70819155985. (a) is a tautology but not (b).

70819155986. (b) is a tautology but not (a).

70819155987. (a) and (b) both are tautologies.

70819155988. (a) and (b) both are not tautologies.

Question Number : 77 Question Id : 70819116940 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

p आणि q विधानांसाठी, खाली दिलेल्या मिश्र विधानांचा (compound statements) विचार करा.

(a) $(\sim q \wedge (p \rightarrow q)) \rightarrow \sim p$

(b) $((p \vee q) \wedge \sim p) \rightarrow q$

तर खाली दिलेले कोणते विधान बरोबर आहे ?

Options :

70819155985. (a) हे अनुलाप (tautology) आहे परंतु (b) नाही.

70819155986. (b) हे अनुलाप (tautology) आहे परंतु (a) नाही.

70819155987. (a) आणि (b) दोन्ही अनुलाप (tautology) आहेत.

70819155988. (a) आणि (b) दोन्ही अनुलाप (tautology) नाहीत.

Question Number : 78 Question Id : 70819116941 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

If a curve $y=f(x)$ passes through the point $(1, 2)$ and satisfies $x \frac{dy}{dx} + y = bx^4$, then for

what value of b , $\int_1^2 f(x)dx = \frac{62}{5}$?

Options :

70819155989. 10

70819155990. $\frac{31}{5}$

70819155991. 5

70819155992. $\frac{62}{5}$

Question Number : 78 Question Id : 70819116941 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

जर एक वक्र $y=f(x)$ हा $(1, 2)$ या बिंदूमधून जात असेल आणि $x \frac{dy}{dx} + y = bx^4$ याची पूर्ती (satisfies)

करीत असेल, तर b च्या कोणत्या मूल्यासाठी, $\int_1^2 f(x)dx = \frac{62}{5}$?

Options :

70819155989. 10

70819155990. $\frac{31}{5}$

70819155991. 5

70819155992. $\frac{62}{5}$

Question Number : 79 Question Id : 70819116942 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

The probability that two randomly selected subsets of the set $\{1, 2, 3, 4, 5\}$ have exactly two elements in their intersection, is :

Options :

70819155993. $\frac{65}{2^7}$

70819155994. $\frac{65}{2^8}$

70819155995. $\frac{135}{2^9}$

70819155996. $\frac{35}{2^7}$

Question Number : 79 Question Id : 70819116942 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

{1, 2, 3, 4, 5} संचामधून यादृच्छिक पद्धतीने (randomly selected) दोन उपसंच जसे की दोघांच्या छेदामधील केवळ (exactly) दोन घटकांची संभाव्यता _____ आहे.

Options :

70819155993. $\frac{65}{2^7}$

70819155994. $\frac{65}{2^8}$

70819155995. $\frac{135}{2^9}$

70819155996. $\frac{35}{2^7}$

Question Number : 80 Question Id : 70819116943 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

The area of the region : $R = \{(x, y) : 5x^2 \leq y \leq 2x^2 + 9\}$ is :

Options :

70819155997. $6\sqrt{3}$ square units

70819155998. $9\sqrt{3}$ square units

70819155999. $11\sqrt{3}$ square units

70819156000. $12\sqrt{3}$ square units

Question Number : 80 Question Id : 70819116943 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

$R = \{(x, y) : 5x^2 \leq y \leq 2x^2 + 9\}$ क्षेत्राचे (region) क्षेत्रफळ _____ आहे.

Options :

70819155997. $6\sqrt{3}$ चौ. एकक

70819155998. $9\sqrt{3}$ चौ. एकक

70819155999. $11\sqrt{3}$ चौ. एकक

70819156000. $12\sqrt{3}$ चौ. एकक

Mathematics Section B

Section Id :	708191669
Section Number :	6
Section type :	Online
Mandatory or Optional :	Mandatory

Number of Questions :	10
Number of Questions to be attempted :	5
Section Marks :	20
Mark As Answered Required? :	Yes
Sub-Section Number :	1
Sub-Section Id :	708191949
Question Shuffling Allowed :	Yes

Question Number : 81 Question Id : 70819116944 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If the variance of 10 natural numbers $1, 1, 1, \dots, 1, k$ is less than 10, then the maximum possible value of k is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 81 Question Id : 70819116944 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

जर $1, 1, 1, \dots, 1, k$ दहा नैसर्गिक संख्यांचे प्रचरण (variance) 10 पेक्षा कमी होते, तर k चे संभाव्य (possible) महत्तम मूल्य _____ आहे.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 82 Question Id : 70819116945 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let a point P be such that its distance from the point (5, 0) is thrice the distance of P from the point (-5, 0). If the locus of the point P is a circle of radius r, then $4r^2$ is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 82 Question Id : 70819116945 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

समजा P एक बिंदू आहे. जसे की P चे (5, 0) पासूनचे अंतर हे (-5, 0) बिंदू पासून अंतराच्या 3 वेळ (thrice) आहे. जर बिंदू P चे निधान (locus) एक वर्तुळ आहे ज्याची त्रिज्या r आहे, तर $4r^2$ चे मूल्य _____ आहे.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 83 Question Id : 70819116946 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If the area of the triangle formed by the positive x-axis, the normal and the tangent to the circle $(x-2)^2 + (y-3)^2 = 25$ at the point (5, 7) is A, then 24A is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 83 Question Id : 70819116946 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

धन x -अक्ष, $(x-2)^2 + (y-3)^2 = 25$ वर्तुळाच्या $(5, 7)$ या बिंदूशी काढलेला प्रलंब (normal) आणि स्पर्शिका (tangent) यांनी तयार झालेल्या त्रिकोणाचे क्षेत्रफळ A आहे. तर $24A$ बरोबर _____ आहे.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 84 Question Id : 70819116947 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let $i = \sqrt{-1}$. If $\frac{(-1 + i\sqrt{3})^{21}}{(1 - i)^{24}} + \frac{(1 + i\sqrt{3})^{21}}{(1 + i)^{24}} = k$, and $n = [|k|]$ be the greatest integral part

of $|k|$. Then $\sum_{j=0}^{n+5} (j+5)^2 - \sum_{j=0}^{n+5} (j+5)$ is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 84 Question Id : 70819116947 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

समजा $i = \sqrt{-1}$, जर $\frac{(-1 + i\sqrt{3})^{21}}{(1 - i)^{24}} + \frac{(1 + i\sqrt{3})^{21}}{(1 + i)^{24}} = k$, आणि $n = [|k|]$ हा $|k|$ चा महत्तम पूर्णांक भाग

आहे. तर $\sum_{j=0}^{n+5} (j+5)^2 - \sum_{j=0}^{n+5} (j+5)$ बरोबर _____ आहे.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 85 Question Id : 70819116948 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The students S_1, S_2, \dots, S_{10} are to be divided into 3 groups A, B and C such that each group has at least one student and the group C has at most 3 students. Then the total number of possibilities of forming such groups is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 85 Question Id : 70819116948 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

S_1, S_2, \dots, S_{10} हे 10 विद्यार्थी A, B आणि C या 3 गटामध्ये विभागले गेले आहेत जसे की प्रत्येक गटामध्ये कमीत कमी (at least) एक विद्यार्थी आहे आणि C गटामध्ये जास्तीत जास्त 3 विद्यार्थी आहेत. तर असे गट तयार करण्यासाठी सगळ्या संभाव्यतां (possibilities) ची संख्या _____ आहे.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 86 Question Id : 70819116949 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

For integers n and r , let
$$\binom{n}{r} = \begin{cases} nC_r, & \text{if } n \geq r \geq 0 \\ 0, & \text{otherwise} \end{cases}$$

The maximum value of k for which the sum

$$\sum_{i=0}^k \binom{10}{i} \binom{15}{k-i} + \sum_{i=0}^{k+1} \binom{12}{i} \binom{13}{k+1-i}$$
 exists, is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 86 Question Id : 70819116949 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

पूर्णांक n आणि r साठी, समजा $\binom{n}{r} = \begin{cases} {}^n C_r, & \text{जर } n \geq r \geq 0 \\ 0, & \text{अन्यथा} \end{cases}$

k चे महत्तम मूल्य (maximum value) बरोबर _____ आहे, ज्यासाठी

$\sum_{i=0}^k \binom{10}{i} \binom{15}{k-i} + \sum_{i=0}^{k+1} \binom{12}{i} \binom{13}{k+1-i}$ ही बेरीज अस्तित्वात आहे.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 87 Question Id : 70819116950 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If $a + \alpha = 1$, $b + \beta = 2$ and $af(x) + \alpha f\left(\frac{1}{x}\right) = bx + \frac{\beta}{x}$, $x \neq 0$, then the value of the expression

$\frac{f(x) + f\left(\frac{1}{x}\right)}{x + \frac{1}{x}}$ is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 87 Question Id : 70819116950 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

जर $a + \alpha = 1$, $b + \beta = 2$ आणि $af(x) + \alpha f\left(\frac{1}{x}\right) = bx + \frac{\beta}{x}$, $x \neq 0$, तर $\frac{f(x) + f\left(\frac{1}{x}\right)}{x + \frac{1}{x}}$ या पदावली

(expression) चे मूल्य _____ आहे.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 88 Question Id : 70819116951 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let λ be an integer. If the shortest distance between the lines $x - \lambda = 2y - 1 = -2z$ and

$x = y + 2\lambda = z - \lambda$ is $\frac{\sqrt{7}}{2\sqrt{2}}$, then the value of $|\lambda|$ is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 88 Question Id : 70819116951 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

समजा λ पूर्णांक आहे. जर $x - \lambda = 2y - 1 = -2z$ आणि $x = y + 2\lambda = z - \lambda$ या रेषांमधील कमीत कमी अंतर

(shortest distance) $\frac{\sqrt{7}}{2\sqrt{2}}$ आहे. तर $|\lambda|$ चे मूल्य _____ आहे.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 89 Question Id : 70819116952 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The sum of first four terms of a geometric progression (G.P.) is $\frac{65}{12}$ and the sum of their

respective reciprocals is $\frac{65}{18}$. If the product of first three terms of the G.P. is 1, and the third term is α , then 2α is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 89 Question Id : 70819116952 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

भूमिती श्रेढी (G.P.) मधील पहिल्या चार पदांची बेरीज $\frac{65}{12}$ आहे, आणि त्याच चार पदांचे व्यस्त (reciprocals)

यांची बेरीज $\frac{65}{18}$ आहे. जर भूमिती श्रेढी (G.P.) च्या पहिल्या तीन पदांचा गुणाकार 1 आहे आणि तीसरे पद α आहे, तर 2α _____ आहे.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 90 Question Id : 70819116953 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The number of the real roots of the equation $(x+1)^2 + |x-5| = \frac{27}{4}$ is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 90 Question Id : 70819116953 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$(x+1)^2 + |x-5| = \frac{27}{4}$ या समीकरणाच्या वास्तव मूळांची (real roots) संख्या _____ आहे.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

