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Question Paper Name :	B TECH EM 26th Feb 2021 Shift 2
Subject Name :	B TECH EM
Creation Date :	2021-02-25 13:54:40
Duration :	180
Number of Questions :	90
Total Marks :	300
Display Marks:	Yes

B TECH EM

Group Number :	1
Group Id :	708191234
Group Maximum Duration :	0
Group Minimum Duration :	180
Show Attended Group? :	No
Edit Attended Group? :	No
Break time :	0
Group Marks :	300
Is this Group for Examiner? :	No

Physics Section A

Section Id :	708191982
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 :	7081911262
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 70819121634 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A radioactive sample is undergoing α decay. At any time t_1, its activity is A and another time t_2, the activity is $\frac{A}{5}$. What is the average life time for the sample ?

Options :

70819170051. $\frac{\ln 5}{t_2 - t_1}$

70819170052. $\frac{\ln (t_2 + t_1)}{2}$

70819170053. $\frac{t_2 - t_1}{\ln 5}$

70819170054. $\frac{t_1 - t_2}{\ln 5}$

Question Number : 1 Question Id : 70819121634 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

किरणोत्सारी नमुन्याचा α ऱ्हास होत आहे, t_1 ह्या कोणत्याही क्षणी त्याची सक्रियता A आहे व तूर्त्या t_2 वेळे, सक्रियता $\frac{A}{5}$ आहे. नमुन्याचा सरासरी आयुष्यकाल किती आहे ?

Options :

70819170051. $\frac{\ln 5}{t_2 - t_1}$

70819170052. $\frac{\ln (t_2 + t_1)}{2}$

70819170053. $\frac{t_2 - t_1}{\ln 5}$

70819170054. $\frac{t_1 - t_2}{\ln 5}$

Question Number : 2 Question Id : 70819121635 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

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

Assertion A : For a simple microscope, the angular size of the object equals the angular size of the image.

Reason R : Magnification is achieved as the small object can be kept much closer to the eye than 25 cm and hence it subtends a large angle.

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

Options :

70819170055. Both A and R are true and R is the correct explanation of A

70819170056. Both A and R are true but R is NOT the correct explanation of A

70819170057. A is true but R is false

70819170058. A is false but R is true

Question Number : 2 Question Id : 70819121635 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

खाली दोन विधाने दिलेली आहेत. निश्चित **विधान A** आणि **कारण R** असे दिलेले आहे.
विधान A : साध्या सूक्ष्मदर्शीसाठी, वस्तुचा कोनीय आकार हा प्रतिमेच्या कोनीय आकाराएवढाच असतो.
कारण R : डोळ्यापासून 25 cm पेक्षा खुप कमी अंतरावर लहान वस्तू ठेऊ शकलो तर विशालन मिळते व त्यामुळे ते मोठा कोन करते.
वरील विधानांसंदर्भात, खाली दिलेल्या पर्यायातून **योग्य** उत्तर निवडा.

Options :

70819170055. **A** व **R** दोन्ही बरोबर आहेत व **R** हे **A** चे योग्य स्पष्टीकरण आहे.

70819170056. **A** व **R** दोन्ही बरोबर आहेत पण **R** हे **A** चे योग्य स्पष्टीकरण नाही.

70819170057. **A** बरोबर आहे पण **R** बरोबर नाही.

70819170058. **A** बरोबर नाही पण **R** बरोबर आहे.

Question Number : 3 Question Id : 70819121636 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A tuning fork A of unknown frequency produces 5 beats/s with a fork of known frequency 340 Hz. When fork A is filed, the beat frequency decreases to 2 beats/s. What is the frequency of fork A ?

Options :

70819170059. 335 Hz

70819170060. 338 Hz

70819170061. 345 Hz

70819170062. 342 Hz

Question Number : 3 Question Id : 70819121636 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

माहीत नसलेल्या वारंवारतेचा नादकाटा A माहीत असलेल्या 340 Hz वारंवारतेच्या नादकांट्याबरोबर एका सेकंदात 5 विस्पंद तयार करतो. जेव्हा A नादकाटा घासला, विस्पंद वारंवारता एका सेकंदात 2 विस्पंद होते. A नादकाट्याची वारंवारता किती आहे ?

Options :

70819170059. 335 Hz

70819170060. 338 Hz

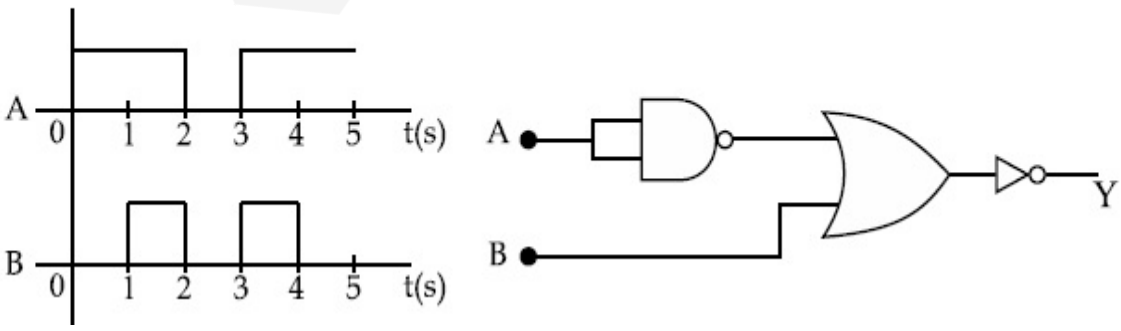
70819170061. 345 Hz

70819170062. 342 Hz

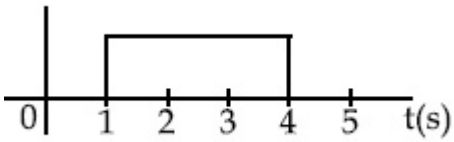
Question Number : 4 Question Id : 70819121637 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

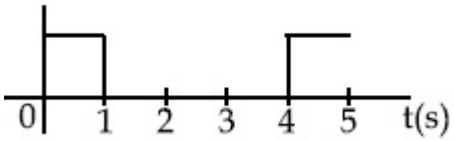
Draw the output signal Y in the given combination of gates.



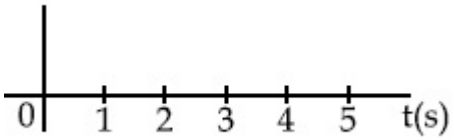
Options :



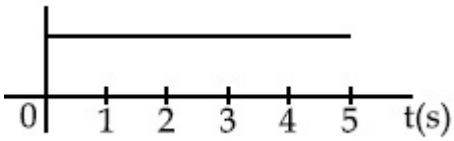
70819170063.



70819170064.



70819170065.

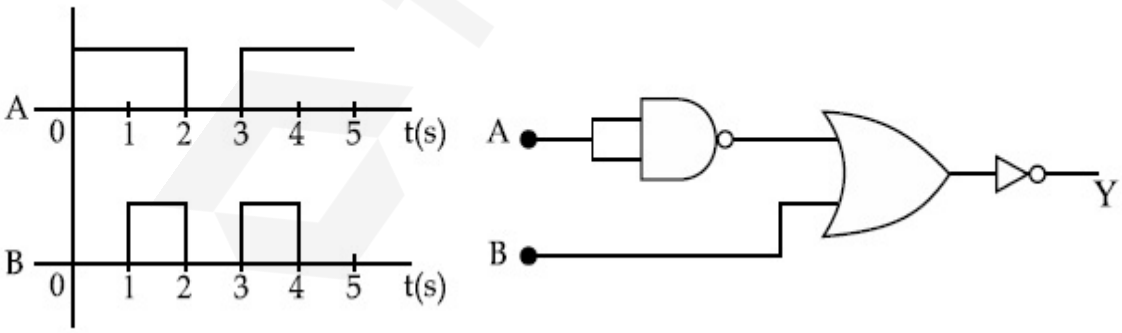


70819170066.

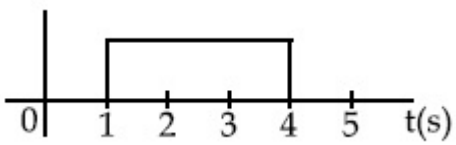
Question Number : 4 Question Id : 70819121637 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

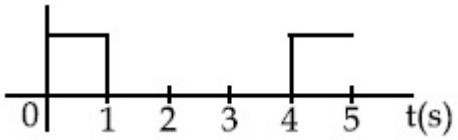
दिलेल्या एकत्रित द्वारांसाठी निष्पन्न Y संकेत काढा.

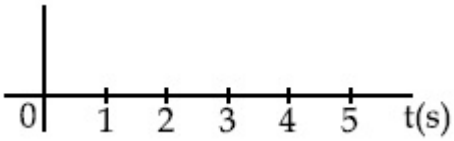


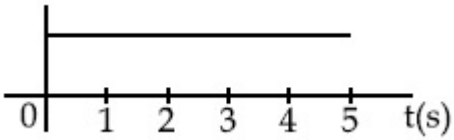
Options :



70819170063.

70819170064. 

70819170065. 

70819170066. 

Question Number : 5 Question Id : 70819121638 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Given below are two statements :

Statement I : A second's pendulum has a time period of 1 second.

Statement II : It takes precisely one second to move between the two extreme positions.

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

Options :

70819170067. Both Statement I and Statement II are true

70819170068. Both Statement I and Statement II are false

70819170069. Statement I is true but Statement II is false

70819170070. Statement I is false but Statement II is true

Question Number : 5 Question Id : 70819121638 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

खाली दोन विधाने दिलेली आहेत.

विधान I : सेकंद दोलकाचा कालखंड काल 1 सेकंद आहे.

विधान II : दोन टोकांच्या स्थितीत गतिमान होण्यासाठी तो नेमका 1 सेकंद घेतो.

वरील विधानांसंदर्भात, खाली दिलेल्या पर्यायातून **योग्य** उत्तर निवडा.

Options :

70819170067. **विधान I** व **विधान II** दोन्ही बरोबर आहेत.

70819170068. **विधान I** व **विधान II** दोन्ही चूक आहेत.

70819170069. **विधान I** बरोबर आहे पण **विधान II** चूक आहे.

70819170070. **विधान I** चूक आहे पण **विधान II** बरोबर आहे.

Question Number : 6 Question Id : 70819121639 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If 'C' and 'V' represent capacity and voltage respectively then what are the dimensions of λ where $C/V = \lambda$?

Options :

70819170071. $[M^{-2} L^{-3} I^{2} T^{6}]$

70819170072. $[M^{-3} L^{-4} I^{3} T^{7}]$

70819170073. $[M^{-2} L^{-4} I^{3} T^{7}]$

70819170074. $[M^{-1} L^{-3} I^{-2} T^{-7}]$

Question Number : 6 Question Id : 70819121639 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

जर C व V अनुक्रमे धारकता व व्होल्टता दर्शवितात (जर $C/V = \lambda$ आहे) तर λ च्या मिती काय आहेत?

Options :

70819170071. $[M^{-2}L^{-3}I^{2}T^{6}]$

70819170072. $[M^{-3}L^{-4}I^{3}T^{7}]$

70819170073. $[M^{-2}L^{-4}I^{3}T^{7}]$

70819170074. $[M^{-1}L^{-3}I^{-2}T^{-7}]$

Question Number : 7 Question Id : 70819121640 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

An aeroplane, with its wings spread 10 m, is flying at a speed of 180 km/h in a horizontal direction. The total intensity of earth's field at that part is 2.5×10^{-4} Wb/m^2 and the angle of dip is 60°. The emf induced between the tips of the plane wings will be _____.

Options :

70819170075. 108.25 mV

70819170076. 62.50 mV

70819170077. 88.37 mV

70819170078. 54.125 mV

Question Number : 7 Question Id : 70819121640 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

एक विमान, ज्याचे पंख 10 m पसरलेले आहेत, ते क्षितिजसमांतर दिशेत 180 km/hr वेगाने उडत आहे. त्या बिंदूवर पृथ्वीच्या क्षेत्राची तीव्रता 2.5×10^{-4} Wb/m^2 आहे व नमन कोन 60° आहे. विमानाच्या पंखाचा टोकांमध्ये प्रवर्तित झालेले विद्युत गामक बल _____ असेल.

Options :

70819170075. 108.25 mV

70819170076. 62.50 mV

70819170077. 88.37 mV

70819170078. 54.125 mV

Question Number : 8 Question Id : 70819121641 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A cord is wound round the circumference of wheel of radius r. The axis of the wheel is horizontal and the moment of inertia about it is I. A weight mg is attached to the cord at the end. The weight falls from rest. After falling through a distance 'h', the square of angular velocity of wheel will be :

Options :

70819170079. $2gh$

70819170080. $\frac{2gh}{I + mr^2}$

70819170081. $\frac{2mgh}{I + mr^2}$

70819170082. $\frac{2mgh}{I + 2mr^2}$

Question Number : 8 Question Id : 70819121641 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

r त्रिज्या असलेल्या चाकाच्या परिघाभोवती एक दोरी गुंडाळलेली आहे. चाकाचा अक्ष क्षितिजसमांतर आहे व त्याभोवती जडत्व आघूर्ण I आहे. दोरीच्या टोकास mg वजन लावले. 'h' अंतरातुन खाली पडल्यानंतर चाकाच्या कोनीय वेगाचा वर्ग _____ असेल.

Options :

70819170079. $2gh$

70819170080. $\frac{2gh}{I + mr^2}$

70819170081. $\frac{2mgh}{I + mr^2}$

70819170082. $\frac{2mgh}{I + 2mr^2}$

Question Number : 9 Question Id : 70819121642 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The trajectory of a projectile in a vertical plane is $y = \alpha x - \beta x^2$, where α and β are constants and x & y are respectively the horizontal and vertical distances of the projectile from the point of projection. The angle of projection θ and the maximum height attained H are respectively given by :

Options :

70819170083. $\tan^{-1}\beta, \frac{\alpha^2}{2\beta}$

70819170084.

$\tan^{-1}\left(\frac{\beta}{\alpha}\right), \frac{\alpha^2}{\beta}$

$\tan^{-1}\alpha, \frac{\alpha^2}{4\beta}$

70819170085.

$\tan^{-1}\alpha, \frac{4\alpha^2}{\beta}$

70819170086.

Question Number : 9 Question Id : 70819121642 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

प्रक्षेपकाचा विक्षेपपथ उभ्या प्रतलामध्ये $y=\alpha x-\beta x^2$ आहे जेथे α व β स्थिरांक आहेत व x व y अनुक्रमे प्रक्षेपणाच्या बिंदूपासून प्रक्षेपकाचे क्षितिजसमांतर व उभे अंतर आहे. प्रक्षेपण कोन θ व महत्तम उंची H हे अनुक्रमे _____ असे दिले आहेत.

Options :

$\tan^{-1}\beta, \frac{\alpha^2}{2\beta}$

70819170083.

$\tan^{-1}\left(\frac{\beta}{\alpha}\right), \frac{\alpha^2}{\beta}$

70819170084.

$\tan^{-1}\alpha, \frac{\alpha^2}{4\beta}$

70819170085.

$\tan^{-1}\alpha, \frac{4\alpha^2}{\beta}$

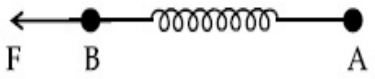
70819170086.

Question Number : 10 Question Id : 70819121643 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Two masses A and B, each of mass M are fixed together by a massless spring. A force acts on the mass B as shown in figure. If the mass A starts moving away from mass B with acceleration 'a', then the acceleration of mass B will be :



Options :

70819170087. $\frac{MF}{F + Ma}$

70819170088. $\frac{F + Ma}{M}$

70819170089. $\frac{Ma - F}{M}$

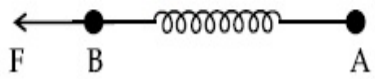
70819170090. $\frac{F - Ma}{M}$

Question Number : 10 Question Id : 70819121643 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

प्रत्येकी M वस्तुमान असलेली A व B हि दोन वस्तुमाने वजनविरहीत स्प्रिंगने जोडलेली आहेत. आकृतीत दाखविल्याप्रमाणे B वस्तुमानावर बल कार्य करते. जर A वस्तुमान, B वस्तुमानापासून 'a' त्वरणाने लांब गतिमान होते तर B वस्तुमानाचे त्वरण _____ असेल.



Options :

70819170087. $\frac{MF}{F + Ma}$

70819170088. $\frac{F + Ma}{M}$

70819170089. $\frac{Ma - F}{M}$

70819170090. $\frac{F - Ma}{M}$

Question Number : 11 Question Id : 70819121644 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Given below are two statements :

Statement I : An electric dipole is placed at the centre of a hollow sphere. The flux of electric field through the sphere is zero but the electric field is not zero anywhere in the sphere.

Statement II : If R is the radius of a solid metallic sphere and Q be the total charge on it. The electric field at any point on the spherical surface of radius r (< R) is zero but the electric flux passing through this closed spherical surface of radius r is not zero.

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

Options :

70819170091. Both Statement I and Statement II are true

70819170092. Both Statement I and Statement II are false

70819170093. Statement I is true but Statement II is false

70819170094. Statement I is false but Statement II is true

Question Number : 11 Question Id : 70819121644 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

खाली दोन विधाने दिलेली आहेत.

विधान I : पोकळ गोळ्याच्या मध्यावर विद्युत द्विध्रुव ठेवलेला आहे. गोळ्यामधून विद्युत क्षेत्राचे अभिवाह शून्य आहे पण गोळ्यामध्ये कोठेही विद्युत क्षेत्र शून्य नाही.

विधान II : जर भरीव धातुच्या गोळ्याची त्रिज्या R आहे व त्यावर एकूण प्रभार Q आहे. r त्रिज्या असलेल्या गोलाकार पृष्ठभागावर कोणत्याही बिंदूवर विद्युत क्षेत्र शून्य आहे r (< R) पण r त्रिज्या असलेल्या ह्या बंद गोलाकार पृष्ठभागाच्या कोणत्याही बिंदूवर विद्युत अभिवाह शून्य नाही.

वरील विधानांसंदर्भात, खाली दिलेल्या पर्यायातून **योग्य** उत्तर निवडा.

Options :

70819170091. **विधान I** व **विधान II** दोन्ही बरोबर आहेत.

70819170092. **विधान I** व **विधान II** दोन्ही चूक आहेत.

70819170093. **विधान I** बरोबर आहे पण **विधान II** चूक आहे.

70819170094. **विधान I** चूक आहे पण **विधान II** बरोबर आहे.

Question Number : 12 Question Id : 70819121645 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A scooter accelerates from rest for time t_1 at constant rate a_1 and then retards at constant rate a_2 for time t_2 and comes to rest. The correct value of $\frac{t_1}{t_2}$ will be :

Options :

70819170095. $\frac{a_1}{a_2}$

70819170096. $\frac{a_2}{a_1}$

70819170097.

$\frac{a_1 + a_2}{a_1}$

70819170098. $\frac{a_1 + a_2}{a_2}$

Question Number : 12 Question Id : 70819121645 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

एक दुचाकी स्थिरतेपासून t_1 काळ a_1 एवढ्या स्थिर दराने त्वरणित होते व नंतर t_2 काळ a_2 स्थिर दराने मंदित होते व स्थिर रहाते. $\frac{t_1}{t_2}$ चे योग्य मूल्य _____ असेल.

Options :

70819170095. $\frac{a_1}{a_2}$

70819170096. $\frac{a_2}{a_1}$

70819170097. $\frac{a_1 + a_2}{a_1}$

70819170098. $\frac{a_1 + a_2}{a_2}$

Question Number : 13 Question Id : 70819121646 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The internal energy (U), pressure (P) and volume (V) of an ideal gas are related as $U = 3PV + 4$.
The gas is :

Options :

70819170099. monoatomic only.

70819170100. diatomic only.

70819170101. polyatomic only.

70819170102. either monoatomic or diatomic.

Question Number : 13 Question Id : 70819121646 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

आदर्श वायूसाठी आंतरिक ऊर्जा (U), दाब (P) व आकारमान (V) यांचा संबंध $U=3PV+4$ असा आहे. वायू _____ आहे.

Options :

70819170099. फक्त एकअण्विक

70819170100. फक्त द्विअण्विक

70819170101. फक्त बहूअणुक

70819170102. एकअण्विक किंवा द्विअण्विक

Question Number : 14 Question Id : 70819121647 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The recoil speed of a hydrogen atom after it emits a photon in going from $n=5$ state to $n=1$ state will be :

Options :

70819170103. $4.34\ m/s$

70819170104. $4.17\ m/s$

70819170105. $3.25\ m/s$

70819170106. $2.19\ m/s$

Question Number : 14 Question Id : 70819121647 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

हायड्रोजन अणूचा परत फिरण्याचा वेग, जेव्हा तो $n=5$ अवस्थेतून $n=1$ अवस्थेत जाताना फोटॉन बाहेर टाकतो, तो _____ m/s आहे.

Options :

70819170103. $4.34\ m/s$

70819170104. $4.17\ m/s$

70819170105. $3.25\ m/s$

70819170106. $2.19\ m/s$

Question Number : 15 Question Id : 70819121648 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The length of metallic wire is l_1 when tension in it is T_1. It is l_2 when the tension is T_2. The original length of the wire will be :

Options :

70819170107.

$\frac{l_1 + l_2}{2}$

70819170108. $\frac{T_2 l_1 + T_1 l_2}{T_1 + T_2}$

70819170109. $\frac{T_1 l_1 - T_2 l_2}{T_2 - T_1}$

70819170110. $\frac{T_2 l_1 - T_1 l_2}{T_2 - T_1}$

Question Number : 15 Question Id : 70819121648 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

धातुच्या तारेची लांबी l_1 आहे जेव्हा त्यातील ताण T_1 आहे. ती l_2 आहे जेव्हा ताण T_2 आहे. तारेची मूळ लांबी _____ असेल.

Options :

70819170107. $\frac{l_1 + l_2}{2}$

70819170108. $\frac{T_2 l_1 + T_1 l_2}{T_1 + T_2}$

70819170109. $\frac{T_1 l_1 - T_2 l_2}{T_2 - T_1}$

70819170110. $\frac{T_2 l_1 - T_1 l_2}{T_2 - T_1}$

Question Number : 16 Question Id : 70819121649 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A particle executes S.H.M., the graph of velocity as a function of displacement is :

Options :

70819170111. a circle.

70819170112. a parabola.

70819170113. an ellipse.

70819170114. a helix.

Question Number : 16 Question Id : 70819121649 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

एक कण सरल आवर्त गतीत आहे. वेग व विस्थापन यांचा आलेख _____ आहे.

Options :

70819170111. वर्तुळ

70819170112. अन्वस्त

70819170113. विवृत्त

70819170114. हेलिक्स

Question Number : 17 Question Id : 70819121650 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The incident ray, reflected ray and the outward drawn normal are denoted by the unit vectors $\vec{a}$, $\vec{b}$ and $\vec{c}$ respectively. Then choose the correct relation for these vectors.

Options :

70819170115. $\vec{b}=\vec{a}-\vec{c}$

70819170116. $\vec{b}=\vec{a}-2\left(\vec{a}\cdot\vec{c}\right)\vec{c}$

70819170117. $\vec{b}=\vec{a}+2\vec{c}$

70819170118. $\vec{b}=2\vec{a}+\vec{c}$

Question Number : 17 Question Id : 70819121650 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

आपाती किरण, परावर्तीत किरण व बाहेर काढलेला लंब हे अनुक्रमे $\vec{a}$, $\vec{b}$ व $\vec{c}$ ह्या एकक सदिशाने दर्शविले आहेत. तर ह्या सदिशांसाठी योग्य संबंध निवडा.

Options :

70819170115. $\vec{b}=\vec{a}-\vec{c}$

70819170116. $\vec{b}=\vec{a}-2\left(\vec{a}\cdot\vec{c}\right)\vec{c}$

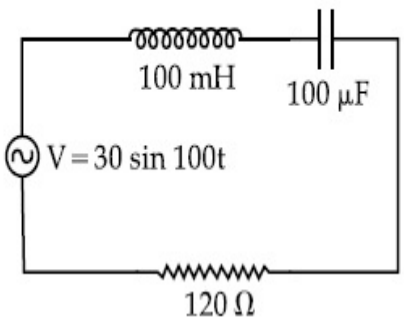
70819170117. $\vec{b}=\vec{a}+2\vec{c}$

70819170118. $\vec{b} = 2\vec{a} + \vec{c}$

Question Number : 18 Question Id : 70819121651 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Find the peak current and resonant frequency of the following circuit (as shown in figure).



Options :

70819170119. 2 A and 50 Hz

70819170120. 0.2 A and 50 Hz

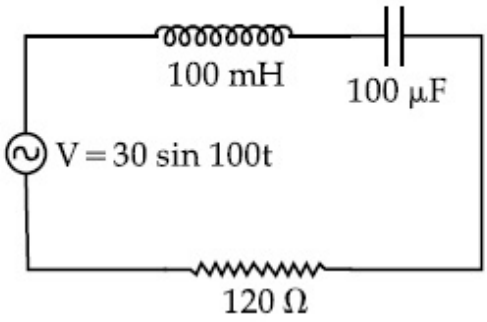
70819170121. 2 A and 100 Hz

70819170122. 0.2 A and 100 Hz

Question Number : 18 Question Id : 70819121651 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

खालील परिपथात शिखर धारा व संस्पंदीत वारंवारता काढा (आकृतीत दाखवा प्रमाणे).



Options :

70819170119. 2 A व 50 Hz

70819170120. 0.2 A व 50 Hz

70819170121. 2 A व 100 Hz

70819170122. 0.2 A व 100 Hz

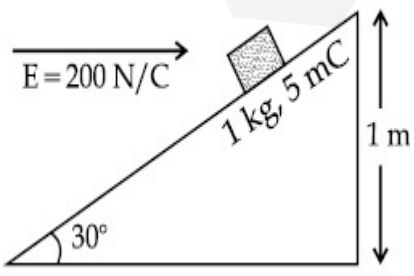
Question Number : 19 Question Id : 70819121652 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

An inclined plane making an angle of 30° with the horizontal is placed in a uniform horizontal electric field $200\ \frac{N}{C}$ as shown in the figure. A body of mass 1 kg and charge 5 mC is allowed to slide down from rest at a height of 1 m. If the coefficient of friction is 0.2, find the time taken by the body to reach the bottom.

$[g = 9.8\ m/s^2;\ \sin 30° = \frac{1}{2};\ \cos 30° = \frac{\sqrt{3}}{2}]$



Options :

70819170123. 2.3 s

70819170124. 1.3 s

70819170125. 0.92 s

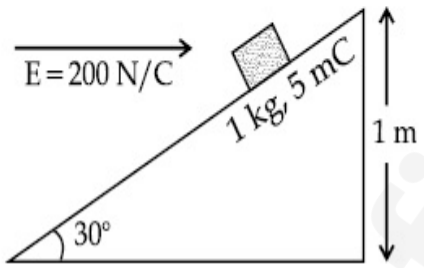
70819170126. 0.46 s

Question Number : 19 Question Id : 70819121652 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

क्षितिजसमांतरशी $30°$ कोन केलेले आनत प्रतल $200\ \frac{N}{C}$ एवढ्या एकसमान क्षितिजसमांतर विद्युत क्षेत्रात ठेवलेले आहे असे आकृतीत दाखविले आहे. $1\ kg$ वस्तुमानाची वस्तू व $5\ mC$ प्रभार $1\ m$ उंचीवरुन, स्थिर असताना खाली घसरु दिला. जर घर्षण गुणांक 0.2 आहे, तर वस्तुने तळाशी पोहोचेपर्यंत घेतलेला काळ काढा.

$[g = 9.8\ m/s^2;\ \sin 30° = \frac{1}{2};\ \cos 30° = \frac{\sqrt{3}}{2}]$



Options :

70819170123. 2.3 s

70819170124. 1.3 s

70819170125. 0.92 s

70819170126. 0.46 s

Question Number : 20 Question Id : 70819121653 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A wire of 1 Ω has a length of 1 m. It is stretched till its length increases by 25%. The percentage change in resistance to the nearest integer is :

Options :

70819170127. 76%

70819170128. 56%

70819170129. 25%

70819170130. 12.5%

Question Number : 20 Question Id : 70819121653 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

1 Ω तारेची लांबी 1 m आहे. ती अशी ताणली कि तीची लांबी 25% ने वाढली. रोधाचा टक्केवारीतील बदल जवळच्या पूर्णांकात _____ आहे.

Options :

70819170127. 76%

70819170128. 56%

70819170129. 25%

70819170130. 12.5%

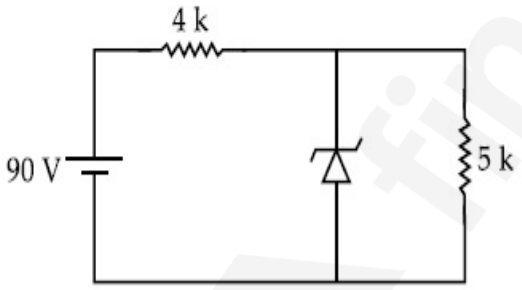
Physics Section B

Section Id :	708191983
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 :	7081911263
Question Shuffling Allowed :	Yes

Question Number : 21 Question Id : 70819121654 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The zener diode has a $V_z = 30$ V. The current passing through the diode for the following circuit is _____ mA.



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

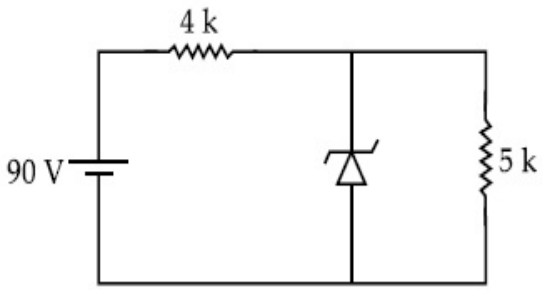
Possible Answers :

5 to 5.001

Question Number : 21 Question Id : 70819121654 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

झीनर डायोडचे $V_z = 30$ V आहे. खालील परिपथात डायोडमधून जाणारी धारा _____ mA 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 : 22 Question Id : 70819121655 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Time period of a simple pendulum is T. The time taken to complete $\frac{5}{8}$ oscillations starting from mean position is $\frac{\alpha}{\beta}$T. The value of α 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 : 22 Question Id : 70819121655 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

साध्या दोलकाचा कालखंड काल T आहे. मध्य स्थितीपासून सुरुवात केल्यानंतर $\frac{5}{8}$ दोलने पूर्ण करण्यासाठी घेतलेला वेळ $\frac{\alpha}{\beta}T$ आहे. α 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 : 23 Question Id : 70819121656 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The volume V of a given mass of monoatomic gas changes with temperature T according to the relation $V = KT^{\frac{2}{3}}$. The workdone when temperature changes by 90 K will be xR. The value of x is _____.
[R = universal gas constant]

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 : 70819121656 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

दिलेल्या वस्तुमानाच्या एकअण्विक वायूचे V आकारमान T तापमानाबरोबर $V = KT^{\frac{2}{3}}$ ह्या संबंधाप्रमाणे बदलते. जेव्हा तापमान 90 K ने बदलते तेव्हा केलेले कार्य xR असेल. x चे मूल्य _____ आहे.
[R = सार्वत्रिक वायू स्थिरांक]

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 : 70819121657 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Two stream of photons, possessing energies equal to twice and ten times the work function of metal are incident on the metal surface successively. The value of ratio of maximum velocities of the photoelectrons emitted in the two respective cases is $x : y$. 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 : 24 Question Id : 70819121657 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

फोटॉनचे दोन स्त्रोत, धातुच्या कार्यफलाच्या दोनपट व दहापट ऊर्जा मिळविलेले, धातुच्या पृष्ठभागावर पाठोपाठ आपाती आहेत. दोन बाबतीतील बाहेर पडलेल्या प्रकाश इलेक्ट्रॉनच्या महत्तम वेगाच्या गुणोत्तराचे मूल्य $x : y$ आहे. 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 : 25 Question Id : 70819121658 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If the highest frequency modulating a carrier is 5 kHz, then the number of AM broadcast stations accommodated in a 90 kHz bandwidth are _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 25 Question Id : 70819121658 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

जर आपरिवर्तीत वाहनिकाची महत्तम वारंवारता 5 kHz आहे तर 90 kHz बँडपट्टीतीत असलेल्या आयाम आपरिवर्तीत प्रसारण स्थानकांची संख्या _____ आहे.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

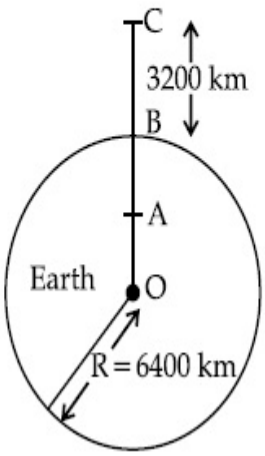
Possible Answers :

5 to 5.001

Question Number : 26 Question Id : 70819121659 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

In the reported figure of earth, the value of acceleration due to gravity is same at point A and C but it is smaller than that of its value at point B (surface of the earth). The value of OA : AB will be $x : y$. The value of x is _____.



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

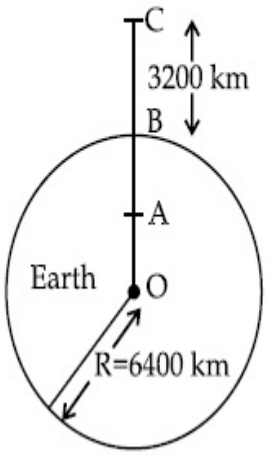
Possible Answers :

5 to 5.001

Question Number : 26 Question Id : 70819121659 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

दाखविलेल्या पृथ्वीच्या आकृतीत, A व C बिंदूवर गुरुत्व त्वरणाचे मूल्य सारखे आहे पण B [illegible] अस्तित्वा मूल्यापेक्षा कमी आहे (पृथ्वीचा पृष्ठभाग). OA : AB चे मूल्य $x : y$ आहे. 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 : 27 Question Id : 70819121660 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

1 mole of rigid diatomic gas performs a work of $\frac{Q}{5}$ when heat Q is supplied to it. The molar heat capacity of the gas during this transformation is $\frac{xR}{8}$. The value of x is _____.

[R = universal gas constant]

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 : 70819121660 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

1 मोलचा दृढ द्विअण्विक वायू $\frac{Q}{5}$ कार्य करतो जेव्हा त्यास Q उष्णता पुरवठा केली. ह्या रूपांतरणात वायूची मोलर उष्णता धारकता $\frac{xR}{8}$ आहे. x चे मूल्य _____ आहे.

[R = सार्वत्रिक वायू स्थिरांक]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

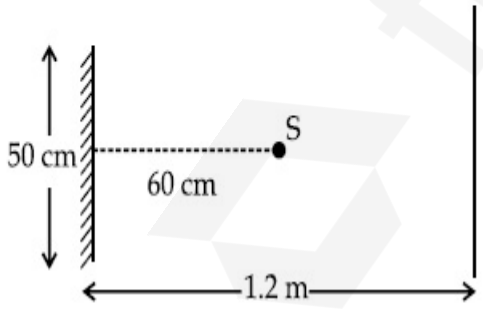
Possible Answers :

5 to 5.001

Question Number : 28 Question Id : 70819121661 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A point source of light S, placed at a distance 60 cm infront of the centre of a plane mirror of width 50 cm, hangs vertically on a wall. A man walks infront of the mirror along a line parallel to the mirror at a distance 1.2 m from it (see in the figure). The distance between the extreme points where he can see the image of the light source in the mirror is _____ cm.



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

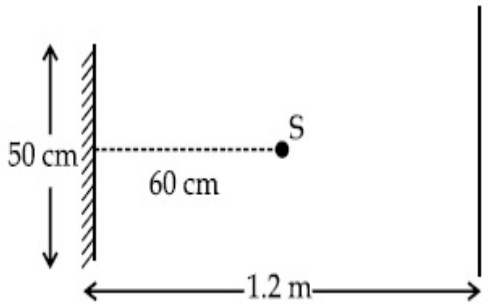
Possible Answers :

5 to 5.001

Question Number : 28 Question Id : 70819121661 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

प्रकाशाचा उद्‌गम बिंदू S, 50 cm रुंदीच्या प्रतल आरशाच्या मध्यासमोर 60 cm अंतरावर ठेवला आहे. आरशासमोर एक माणूस 1.2 मीटर अंतरावरील आरशास रेषीय समांतर चालत जातो (आकृती पहा). आरशात प्रकाशाच्या उद्‌गमाची प्रतिमा जेथे पाहू शकेल असे दोन शेवटच्या बिंदूंमधील अंतर _____ cm 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 : 70819121662 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A particle executes S.H.M. with amplitude 'a' and time period 'T'. The displacement of the particle when its speed is half of maximum speed is $\frac{\sqrt{x}\,a}{2}$. 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 : 29 Question Id : 70819121662 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

एक कण a आयामाने व T कालखंड कालाने सरल आवर्त गतित आहे. जेव्हा कणाचा वेग महत्तम वेगाच्या अर्धा आहे तेव्हा विस्थापन $\frac{\sqrt{x}\,a}{2}$ आहे. 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 : 30 Question Id : 70819121663 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

27 similar drops of mercury are maintained at 10 V each. All these spherical drops combine into a single big drop. The potential energy of the bigger drop is _____ times that of a smaller drop.

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 : 70819121663 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

मरक्युरीचे 27 एकसारखे थेंब प्रत्येकी 10 V ला ठेवलेले आहेत. ते सर्व गोलाकार थेंब एकत्र येऊन एक मोठा थेंब तयार करतात. मोठ्या थेंबाची स्थितीज ऊर्जा एका लहान थेंबाच्या _____ पट 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

Chemistry Section A

Section Id :	708191984
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 :	7081911264
Question Shuffling Allowed :	Yes

Question Number : 31 Question Id : 70819121664 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Match List-I with List-II.

	List-I (Molecule)		List-II (Bond order)
(a)	Ne_2	(i)	1
(b)	N_2	(ii)	2
(c)	F_2	(iii)	0
(d)	O_2	(iv)	3

Choose the correct answer from the options given below :

Options :

70819170141. (a) → (i), (b) → (ii), (c) → (iii), (d) → (iv)

70819170142. (a) → (iv), (b) → (iii), (c) → (ii), (d) → (i)

70819170143. (a) → (ii), (b) → (i), (c) → (iv), (d) → (iii)

70819170144. (a) → (iii), (b) → (iv), (c) → (i), (d) → (ii)

Question Number : 31 Question Id : 70819121664 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

यादी I, यादी II बरोबर जुळवा.

	यादी I (रेणू)		यादी II (बंध कोटी)
(a)	Ne_2	(i)	1
(b)	N_2	(ii)	2
(c)	F_2	(iii)	0
(d)	O_2	(iv)	3

खालील पर्यायांतून **बरोबर** उत्तर निवडा.

Options :

70819170141. (a) → (i), (b) → (ii), (c) → (iii), (d) → (iv)

70819170142. (a) → (iv), (b) → (iii), (c) → (ii), (d) → (i)

70819170143. (a) → (ii), (b) → (i), (c) → (iv), (d) → (iii)

70819170144. (a) → (iii), (b) → (iv), (c) → (i), (d) → (ii)

Question Number : 32 Question Id : 70819121665 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The nature of charge on resulting colloidal particles when $FeCl_3$ is added to excess of hot water is :

Options :

70819170145. positive

70819170146. negative

70819170147. neutral

70819170148. sometimes positive and sometimes negative

Question Number : 32 Question Id : 70819121665 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$FeCl_3$ भरपूर गरम पाण्यात टाकले असता तयार होणाऱ्या कलिलावरिल प्रभार _____ आहे.

Options :

70819170145. धन

70819170146. ऋण

70819170147. उदासीन

70819170148. कधी धन आणि कधी ऋण

Question Number : 33 Question Id : 70819121666 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The correct order of electron gain enthalpy is :

Options :

70819170149. O > S > Se > Te

70819170150. Te > Se > S > O

70819170151. S > O > Se > Te

70819170152. S > Se > Te > O

Question Number : 33 Question Id : 70819121666 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

इलेक्ट्रॉन गेन एन्थॅल्पीची बरोबर कोटी _____ आहे.

Options :

70819170149. O > S > Se > Te

70819170150. Te > Se > S > O

70819170151. S > O > Se > Te

70819170152. S > Se > Te > O

Question Number : 34 Question Id : 70819121667 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Match List-I with List-II.

	List-I		List-II
(a)	Siderite	(i)	Cu
(b)	Calamine	(ii)	Ca
(c)	Malachite	(iii)	Fe
(d)	Cryolite	(iv)	Al
		(v)	Zn

Choose the correct answer from the options given below :

Options :

70819170153. (a) → (i), (b) → (ii), (c) → (v), (d) → (iii)

70819170154. (a) → (iii), (b) → (v), (c) → (i), (d) → (iv)

70819170155. (a) → (i), (b) → (ii), (c) → (iii), (d) → (iv)

70819170156. (a) → (iii), (b) → (i), (c) → (v), (d) → (ii)

Question Number : 34 Question Id : 70819121667 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

यादी I हि यादी II बरोबर जुळवा.

	यादी I		यादी II
(a)	सिडेराईट	(i)	Cu
(b)	कॅलामाईन	(ii)	Ca
(c)	मॅलाचाईट	(iii)	Fe
(d)	क्रायोलाईट	(iv)	Al
		(v)	Zn

खालील पर्यायांमधून **बरोबर** उत्तर निवडा.

Options :

70819170153. (a) → (i), (b) → (ii), (c) → (v), (d) → (iii)

70819170154. (a) → (iii), (b) → (v), (c) → (i), (d) → (iv)

70819170155. (a) → (i), (b) → (ii), (c) → (iii), (d) → (iv)

70819170156. (a) → (iii), (b) → (i), (c) → (v), (d) → (ii)

Question Number : 35 Question Id : 70819121668 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which of the following forms of hydrogen emits low energy β^- particles ?

Options :

70819170157. Proton H^+

70819170158. Protium ${}_1^1H$

70819170159. Deuterium ${}_1^2H$

70819170160. Tritium ${}_1^3H$

Question Number : 35 Question Id : 70819121668 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

खालीलपैकी हायड्रोजनचे कोणते रूप कमी ऊर्जेचे β^- कण बाहेर टाकते ?

Options :

70819170157. प्रोटॉन H^+

70819170158. प्रोशिअम $^{1}_{1}H$

70819170159. ड्युटेरिअम $^{2}_{1}H$

70819170160. ट्रिशिअम $^{3}_{1}H$

Question Number : 36 Question Id : 70819121669 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Match List-I with List-II.

	List-I		List-II
(a)	Sodium Carbonate	(i)	Deacon
(b)	Titanium	(ii)	Castner-Kellner
(c)	Chlorine	(iii)	van-Arkel
(d)	Sodium hydroxide	(iv)	Solvay

Choose the correct answer from the options given below :

Options :

70819170161. (a) → (iv), (b) → (iii), (c) → (i), (d) → (ii)

70819170162. (a) → (iv), (b) → (i), (c) → (ii), (d) → (iii)

70819170163. (a) → (i), (b) → (iii), (c) → (iv), (d) → (ii)

70819170164. (a) → (iii), (b) → (ii), (c) → (i), (d) → (iv)

Question Number : 36 Question Id : 70819121669 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

यादी I, यादी II बरोबर जुळवा.

	यादी I		यादी II
(a)	सोडिअम कार्बोनेट	(i)	डेकॉन
(b)	टिटॅनिअम	(ii)	कास्टनर–केल्नर
(c)	क्लोरीन	(iii)	वॅन आरकल
(d)	सोडिअम हायड्रॉक्साइड	(iv)	सॉल्व्हे

खालील पर्यायांमधून **बरोबर** उत्तर निवडा.

Options :

70819170161. (a) → (iv), (b) → (iii), (c) → (i), (d) → (ii)

70819170162. (a) → (iv), (b) → (i), (c) → (ii), (d) → (iii)

70819170163. (a) → (i), (b) → (iii), (c) → (iv), (d) → (ii)

70819170164. (a) → (iii), (b) → (ii), (c) → (i), (d) → (iv)

Question Number : 37 Question Id : 70819121670 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which pair of oxides is acidic in nature ?

Options :

70819170165. B_2O_3, SiO_2

70819170166. B_2O_3, CaO

70819170167. N_2O, BaO

70819170168. CaO, SiO_2

Question Number : 37 Question Id : 70819121670 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

कोणती ऑक्साइडस्ची जोडी आम्लधर्मी आहे ?

Options :

70819170165. B_2O_3, SiO_2

70819170166. B_2O_3, CaO

70819170167. N_2O, BaO

70819170168. CaO, SiO_2

Question Number : 38 Question Id : 70819121671 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 : In TlI_3, isomorphous to CsI_3, the metal is present in +1 oxidation state.

Reason R : Tl metal has fourteen *f* electrons in its electronic configuration.

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

Options :

70819170169. Both **A** and **R** are correct and **R** is the correct explanation of **A**

70819170170. Both **A** and **R** are correct but **R** is NOT the correct explanation of **A**

70819170171. **A** is correct but **R** is not correct

70819170172. **A** is not correct but **R** is correct

Question Number : 38 Question Id : 70819121671 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

खाली दोन विधाने दिलेली आहेत. **निश्चित विधान A** आणि **कारण R** असे दिलेले आहे.

निश्चित विधान A : TlI_3 जो CsI_3 शी समरूपी असून, धातू $+1$ ऑक्सिडन स्थितीत आहे.

कारण R : Tl धातुमध्ये चौदा f इलेक्ट्रॉन्स् इलेक्ट्रॉनी संरूपणात आहेत.

वरील विधानांना अनुसरून, खालील पर्यायांमधून सगळ्यात **योग्य** उत्तर निवडा.

Options :

70819170169. दोन्ही **A** आणि **R** बरोबर आहेत व **R** हे **A** चे बरोबर स्पष्टीकरण आहे.

70819170170. दोन्ही **A** आणि **R** बरोबर आहेत पण **R** हे **A** चे चुकीचे स्पष्टीकरण आहे.

70819170171. **A** बरोबर आहे पण **R** चुकीचे आहे.

70819170172. **A** चुकीचे आहे पण **R** बरोबर आहे.

Question Number : 39 Question Id : 70819121672 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Calgon is used for water treatment. Which of the following statement is NOT true about Calgon ?

Options :

70819170173. Calgon contains the 2^{nd} most abundant element by weight in the Earth's crust.

70819170174. It is polymeric compound and is water soluble.

70819170175. It is also known as Graham's salt.

70819170176. It doesnot remove Ca^{2+} ion by precipitation.

Question Number : 39 Question Id : 70819121672 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

पाण्यावरील प्रक्रियेसाठी कॅलगॉन वापरतात. खालीलपैकी कॅलगॉन संबंधातील कोणते विधान चुकीचे आहे ?

Options :

70819170173. कॅलगॉन मध्ये पृथ्वीच्या कवचांमध्ये वस्तुमानानुसार सर्वात जास्त आढळणाऱ्या द्वितीय क्रमांकाचा मूलद्रव्य आहे.

70819170174. ते पाण्यात विरधळणारे बहुवारिक संयुग आहे.

70819170175. त्याला ग्राहमस् सॉल्ट असेही समजले जाते.

70819170176. तो Ca^{2+} आयनांना अवक्षेपणाने काढू शकत नाही.

Question Number : 40 Question Id : 70819121673 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Ceric ammonium nitrate and $CHCl_3$/alc. KOH are used for the identification of functional groups present in _____ and _____ respectively.

Options :

70819170177. alcohol, amine

70819170178. amine, alcohol

70819170179. alcohol, phenol

70819170180. amine, phenol

Question Number : 40 Question Id : 70819121673 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

सेरिक अमोनिअम नायट्रेट व $CHCl_3$/KOH (अल्कहोलिक) ह्यांचा उपयोग _____ आणि _____ तील क्रियात्मक गट शोधण्यासाठी होतो.

Options :

70819170177. अल्कोहोल, अमाइन

70819170178. अमाइन, अल्कोहोल

70819170179. अल्कोहोल, फेनॉल

70819170180. अमाइन, फेनॉल

Question Number : 41 Question Id : 70819121674 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

In $\overset{1}{C}H_2=\overset{2}{C}=\overset{3}{C}H-\overset{4}{C}H_3$ molecule, the hybridization of carbon 1, 2, 3 and 4 respectively, are :

Options :

70819170181. sp^2, sp^2, sp^2, sp^3

70819170182. sp^3, sp, sp^3, sp^3

70819170183. sp^2, sp, sp^2, sp^3

70819170184. sp^2, sp^3, sp^2, sp^3

Question Number : 41 Question Id : 70819121674 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$\overset{1}{CH_2}=\overset{2}{C}=\overset{3}{CH}-\overset{4}{CH_3}$ मधील 1, 2, 3 आणि 4 कार्बनचे संकरण अनुक्रमे _____ आहे.

Options :

70819170181. sp^2, sp^2, sp^2, sp^3

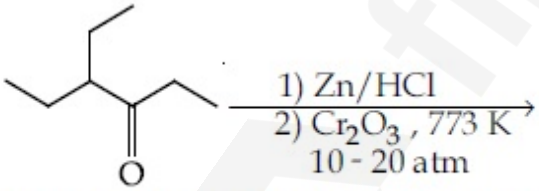
70819170182. sp^3, sp, sp^3, sp^3

70819170183. sp^2, sp, sp^2, sp^3

70819170184. sp^2, sp^3, sp^2, sp^3

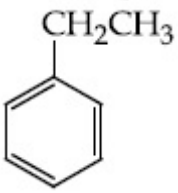
Question Number : 42 Question Id : 70819121675 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

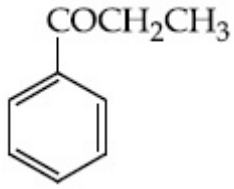


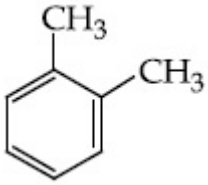
Considering the above reaction, the major product among the following is :

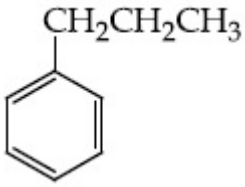
Options :

70819170185. 

70819170186.

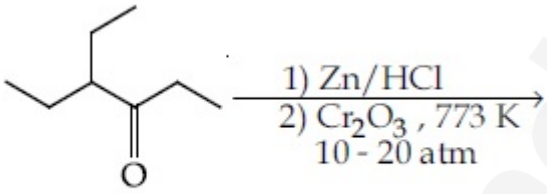


70819170187. 

70819170188. 

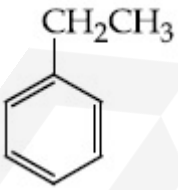
Question Number : 42 Question Id : 70819121675 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

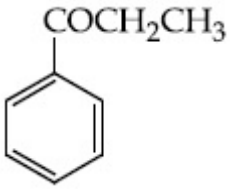
Correct Marks : 4 Wrong Marks : 1



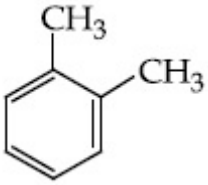
वरील अभिक्रियेसाठी खालीलपैकी प्रमुख उत्पाद _____ आहे.

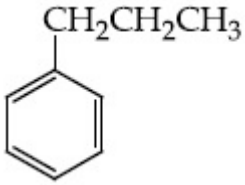
Options :

70819170185. 

70819170186. 

70819170187.

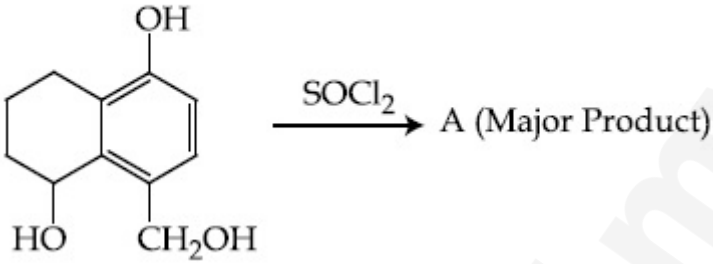


70819170188. 

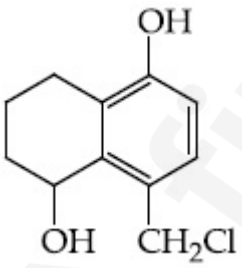
Question Number : 43 Question Id : 70819121676 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

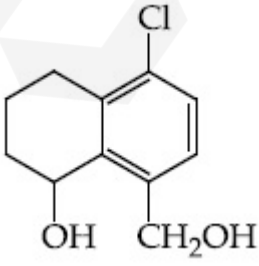
Correct Marks : 4 Wrong Marks : 1

Identify A in the given reaction.

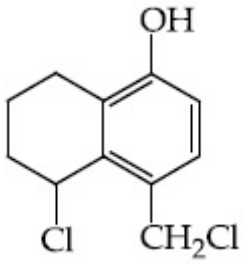


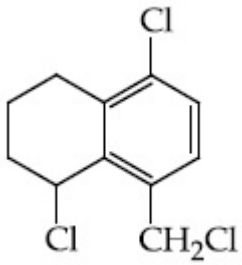
Options :

70819170189. 

70819170190. 

70819170191.





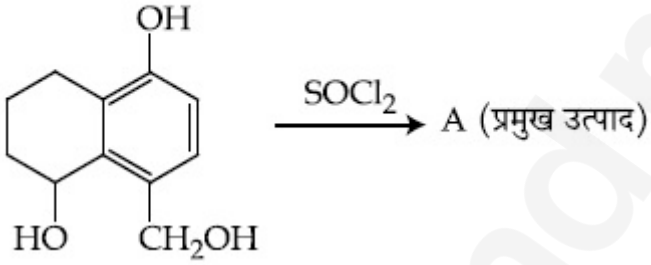
70819170192.

Question Number : 43 Question Id : 70819121676 Question Type : MCQ Option Shuffling : Yes

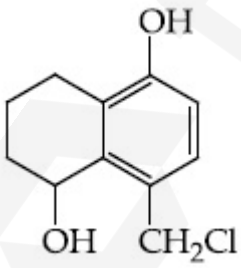
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

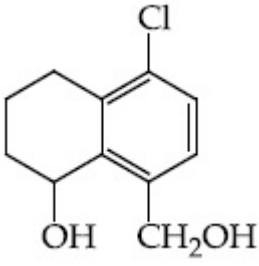
खालील अभिक्रियेत A शोधा.



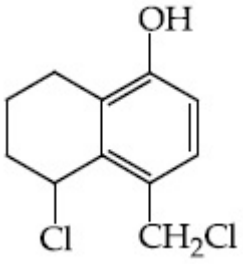
Options :

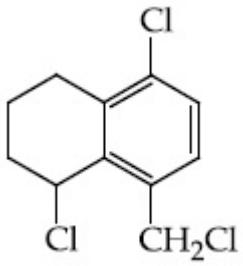


70819170189.



70819170190.

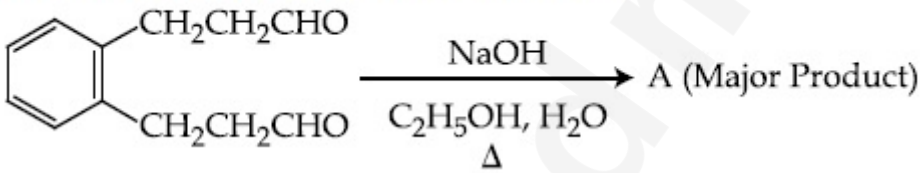
70819170191. 

70819170192. 

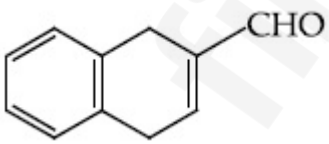
Question Number : 44 Question Id : 70819121677 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

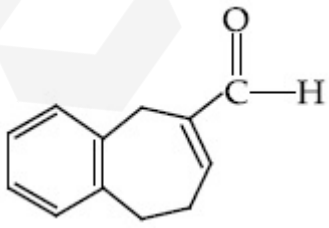
Correct Marks : 4 Wrong Marks : 1

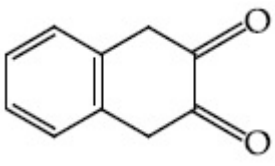
Identify A in the given chemical reaction.

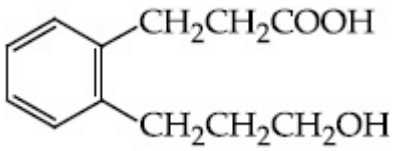


Options :

70819170193. 

70819170194. 

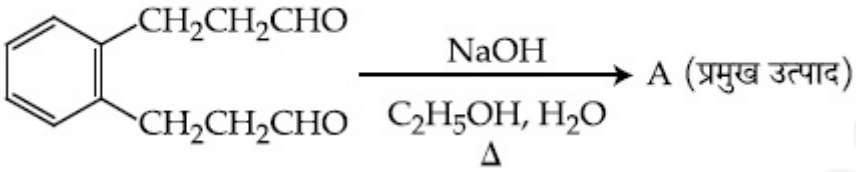
70819170195. 

70819170196. 

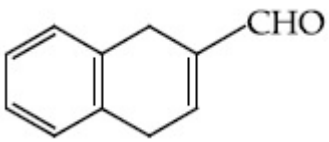
Question Number : 44 Question Id : 70819121677 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

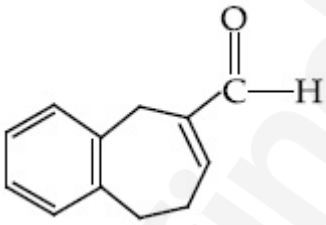
Correct Marks : 4 Wrong Marks : 1

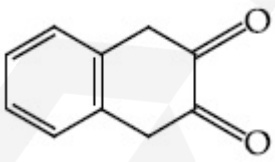
खालील रासायनिक अभिक्रियेतील A शोधा.

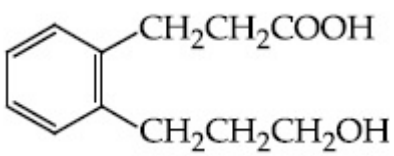


Options :

70819170193. 

70819170194. 

70819170195. 

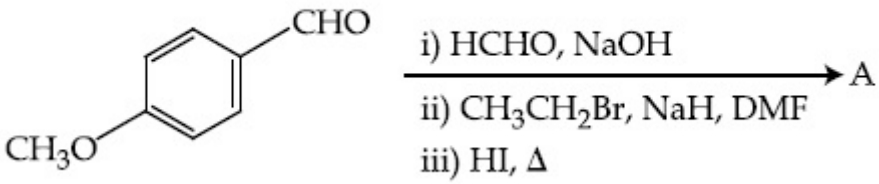
70819170196. 

Question Number : 45 Question Id : 70819121678 Question Type : MCQ Option Shuffling : Yes

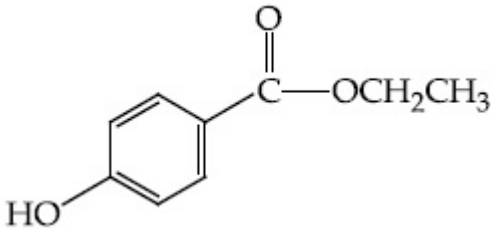
Is Question Mandatory : No

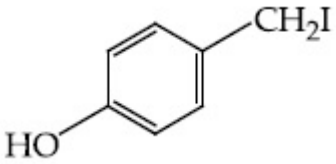
Correct Marks : 4 Wrong Marks : 1

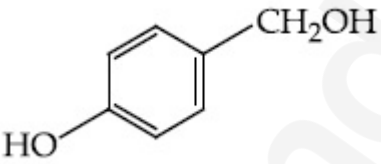
Identify A in the following chemical reaction.

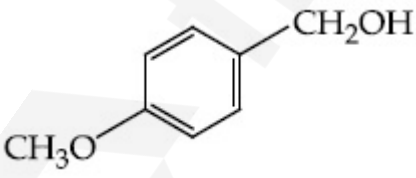


Options :

70819170197. 

70819170198. 

70819170199. 

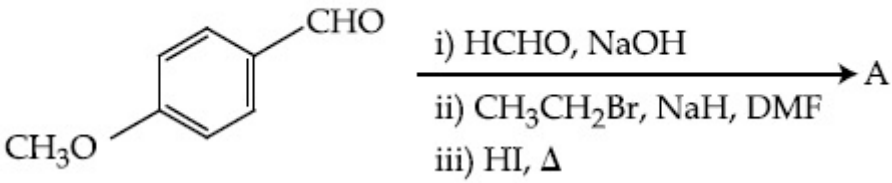
70819170200. 

Question Number : 45 Question Id : 70819121678 Question Type : MCQ Option Shuffling : Yes

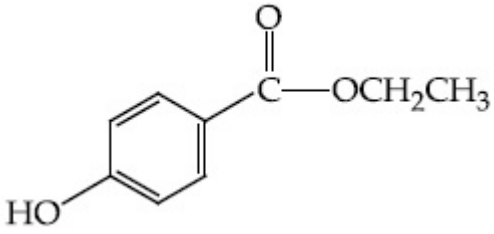
Is Question Mandatory : No

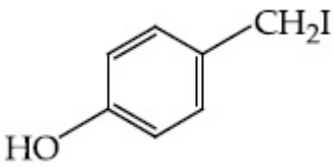
Correct Marks : 4 Wrong Marks : 1

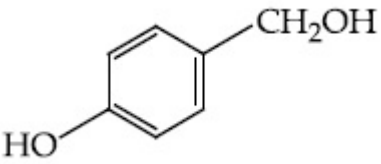
खालील रासायनिक अभिक्रियेतील A शोधा.

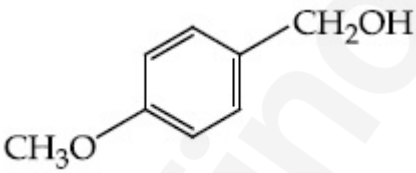


Options :

70819170197. 

70819170198. 

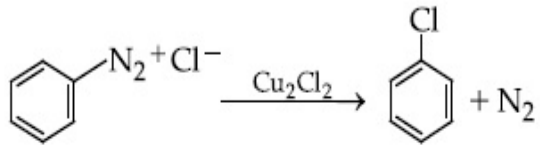
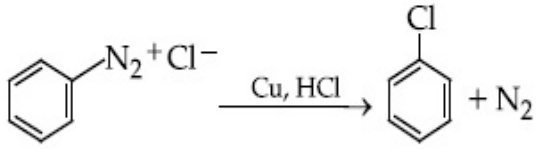
70819170199. 

70819170200. 

Question Number : 46 Question Id : 70819121679 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Match List-I with List-II.

List-I		List-II	
(a)		(i)	Wurtz reaction
(b)		(ii)	Sandmeyer reaction
(c)	$2CH_3CH_2Cl + 2Na \xrightarrow{\text{Ether}} C_2H_5 - C_2H_5 + 2NaCl$	(iii)	Fittig reaction
(d)	$2C_6H_5Cl + 2Na \xrightarrow{\text{Ether}} C_6H_5 - C_6H_5 + 2NaCl$	(iv)	Gatterman reaction

Choose the correct answer from the options given below :

Options :

70819170201. (a) → (ii), (b) → (iv), (c) → (i), (d) → (iii)

70819170202. (a) → (ii), (b) → (i), (c) → (iv), (d) → (iii)

70819170203. (a) → (iii), (b) → (i), (c) → (iv), (d) → (ii)

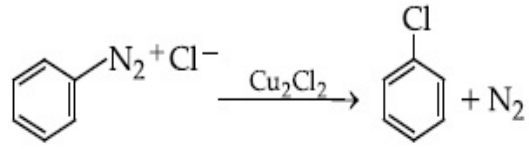
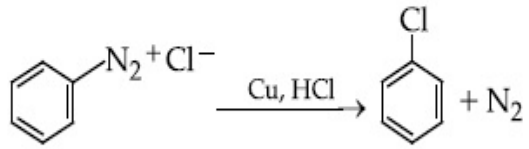
70819170204. (a) → (iii), (b) → (iv), (c) → (i), (d) → (ii)

Question Number : 46 Question Id : 70819121679 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

यादी I, यादी II बरोबर जुळवा.

यादी I		यादी II
(a)		(i) वुर्ट्झ अभिक्रिया
(b)		(ii) सँडमेयर अभिक्रिया
(c)	$2CH_3CH_2Cl + 2Na \xrightarrow{\text{ईथर}} C_2H_5 - C_2H_5 + 2NaCl$	(iii) फिटिग अभिक्रिया
(d)	$2C_6H_5Cl + 2Na \xrightarrow{\text{ईथर}} C_6H_5 - C_6H_5 + 2NaCl$	(iv) गॅटरमन अभिक्रिया

खालील पर्यायांमधून **बरोबर** उत्तर शोधा.

Options :

70819170201. (a) → (ii), (b) → (iv), (c) → (i), (d) → (iii)

70819170202. (a) → (ii), (b) → (i), (c) → (iv), (d) → (iii)

70819170203. (a) → (iii), (b) → (i), (c) → (iv), (d) → (ii)

70819170204. (a) → (iii), (b) → (iv), (c) → (i), (d) → (ii)

Question Number : 47 Question Id : 70819121680 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Seliwanoff test and Xanthoproteic test are used for the identification of _____ and _____ respectively.

Options :

70819170205. aldoses, ketoses

70819170206. ketoses, aldoses

70819170207. ketoses, proteins

70819170208. proteins, ketoses

Question Number : 47 Question Id : 70819121680 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

सेलिवॅनोफ चाचणी व झँथोप्रोटेइक चाचणी ह्या _____ आणि _____ अनुक्रमे शोधण्यासाठी वापरतात.

Options :

70819170205. अल्डोज, किटोज

70819170206. किटोज, अल्डोज

70819170207. किटोज, प्रथिने

70819170208. प्रथिने, किटोज

Question Number : 48 Question Id : 70819121681 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Match List-I with List-II.

	List-I		List-II
(a)	Sucrose	(i)	β-D-Galactose and β-D-Glucose
(b)	Lactose	(ii)	α-D-Glucose and β-D-Fructose
(c)	Maltose	(iii)	α-D-Glucose and α-D-Glucose

Choose the correct answer from the options given below :

Options :

70819170209. (a) → (ii), (b) → (i), (c) → (iii)

70819170210. (a) → (iii), (b) → (ii), (c) → (i)

70819170211. (a) → (i), (b) → (iii), (c) → (ii)

70819170212. (a) → (iii), (b) → (i), (c) → (ii)

Question Number : 48 Question Id : 70819121681 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

यादी I, यादी II बरोबर जुळवा.

	यादी I		यादी II
(a)	सूक्रोज	(i)	β-D-गॅलॅक्टोज् आणि β-D-ग्लूकोज
(b)	लॅक्टोज	(ii)	α-D-ग्लूकोज आणि β-D-फ्रुक्टोज
(c)	मॅल्टोज	(iii)	α-D-ग्लूकोज आणि α-D-ग्लुकोज

खालील पर्यायांमधून **बरोबर** उत्तर शोधा.

Options :

70819170209. (a) → (ii), (b) → (i), (c) → (iii)

70819170210. (a) → (iii), (b) → (ii), (c) → (i)

70819170211. (a) → (i), (b) → (iii), (c) → (ii)

70819170212. (a) → (iii), (b) → (i), (c) → (ii)

Question Number : 49 Question Id : 70819121682 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

2,4-DNP test can be used to identify :

Options :

70819170213. halogens

70819170214. aldehyde

70819170215. amine

70819170216. ether

Question Number : 49 Question Id : 70819121682 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

2,4-DNP च्या चाचणीचा उपयोग _____ शोधण्यासाठी करता येतो.

Options :

70819170213. हॅलोजन्स्

70819170214. अल्डिहाइड

70819170215. अमाइन

70819170216. ईथर

Question Number : 50 Question Id : 70819121683 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A. Phenyl methanamine
B. N,N-Dimethylaniline
C. N-Methyl aniline
D. Benzenamine
Choose the correct order of basic nature of the above amines.

Options :

70819170217. A > B > C > D

70819170218. D > C > B > A

70819170219. A > C > B > D

70819170220. D > B > C > A

Question Number : 50 Question Id : 70819121683 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A. फिनाइल मिथेनामाईन

B. N,N–डायमिथाइलॲनिलिन

C. N–मिथाइल ॲनिलिन

D. बेंझिनामाईन

खालील पर्यायांमधून वरील अमाईन्सची अल्कार्धाची **बरोबर** कोटी ओळखा.

Options :

70819170217. A > B > C > D

70819170218. D > C > B > A

70819170219. A > C > B > D

70819170220. D > B > C > A

Chemistry Section B

Section Id : 708191985

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 :	7081911265
Question Shuffling Allowed :	Yes

Question Number : 51 Question Id : 70819121684 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The $NaNO_3$ weighed out to make 50 mL of an aqueous solution containing 70.0 mg Na^+ per mL is _____ g. (Rounded off to the nearest integer)
[Given : Atomic weight in g mol^{-1} - Na : 23 ; N : 14 ; O : 16]

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 : 70819121684 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

50 mL जलिय $NaNO_3$ द्रावणात 70.0 mg Na^+ आयन/mL असण्यासाठी त्याचे वजन _____ g आहे.
(जवळच्या पूर्णांकात)
(दिलेले आहे : अणु वस्तुमान g mol^{-1} - Na : 23, N : 14, O : 16)

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 : 70819121685 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The number of octahedral voids per lattice site in a lattice is _____. (Rounded off to the nearest integer)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 52 Question Id : 70819121685 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

जालकातील अष्टपृष्ठी पोकळ्यांची पर जालक बिंदुनुसार संख्या _____ आहे. (पूर्णांक)

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 : 70819121686 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A ball weighing 10 g is moving with a velocity of 90 ms^{-1}. If the uncertainty in its velocity is 5%, then the uncertainty in its position is _____ $\times 10^{-33}$ m. (Rounded off to the nearest integer)

[Given : $h = 6.63 \times 10^{-34}$ Js]

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 : 70819121686 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

10 g चा चेंडू 90 ms^{-1} च्या वेगाने जात आहे. जर त्याच्या वेगातील अनिश्चितता 5% असेल तर त्याच्या स्थानातील अनिश्चितता _____ $\times 10^{-33}$ m आहे. (जवळच्या पूर्णांकात)

(दिलेले आहे : $h = 6.63 \times 10^{-34}$ Js)

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 : 70819121687 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The average S–F bond energy in kJ mol^{-1} of SF_6 is _____. (Rounded off to the nearest integer)

[Given : The values of standard enthalpy of formation of $SF_6(g)$, S(g) and F(g) are - 1100, 275 and 80 kJ mol^{-1} respectively.]

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 : 70819121687 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

S–F बंधाची SF_6 मधील सरासरी बंध ऊर्जा kJ mol^{-1} मध्ये _____ आहे. (जवळच्या पूर्णांकात)
(दिलेले आहे : मानक घडण एन्थॅल्पी SF_6(वायु), S(वायु) आणि F (वायू) - 1100, 275 आणि 80 kJ mol^{-1} अनुक्रमे आहेत.)

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 : 70819121688 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

When 12.2 g of benzoic acid is dissolved in 100 g of water, the freezing point of solution was found to be $-0.93^{\circ}C$ ($K_f(H_2O) = 1.86$ K kg mol^{-1}). The number (n) of benzoic acid molecules associated (assuming 100% association) 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 : 55 Question Id : 70819121688 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

12.2 g बेंझॉइक आम्ल 100 g पाण्यात विरघळवले असता, तयार झालेल्या द्रावणाचा गोठणांक −0.93°C आहे. (K_f (पाणी) = 1.86 K kg mol^{-1}) सहचारी बेंझॉइक आम्लाच्या रेणूंची संख्या (n) _____ आहे. (समजा 100% सहचारीता 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 : 56 Question Id : 70819121689 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The pH of ammonium phosphate solution, if pk_a of phosphoric acid and pk_b of ammonium hydroxide are 5.23 and 4.75 respectively, 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 : 56 Question Id : 70819121689 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

फॉस्फोरिक आम्लाचा pk_a आणि अमोनिअम हायड्रॉक्साइडचा pk_b अनुक्रमे 5.23 व 4.75 असलेल्या अमोनिअम फॉस्फेट द्रावणाचा pH _____ 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 : 57 Question Id : 70819121690 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Emf of the following cell at 298 K in V is $x \times 10^{-2}$.

$$Zn|Zn^{2+}\ (0.1\ M)||Ag^{+}\ (0.01\ M)|Ag$$

The value of x is _____. (Rounded off to the nearest integer)

[Given : $E^{\theta}_{Zn^{2+}/Zn} = -0.76\ V$; $E^{\theta}_{Ag^{+}/Ag} = +0.80\ V$; $\frac{2.303RT}{F} = 0.059$]

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 : 70819121690 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

खालील घटाचे 298 K ला विद्युत गामक बल (emf) V मध्ये $x \times 10^{-2}$ अ

$Zn|Zn^{2+}\ (0.1\ M)||Ag^{+}\ (0.01\ M)|Ag$

x ची किंमत _____ आहे. (जवळच्या पूर्णांकात)

[दिलेले आहे : $E^{\theta}_{Zn^{2+}/Zn} = -0.76\ V$; $E^{\theta}_{Ag^{+}/Ag} = +0.80\ V$; $\frac{2.303RT}{F} = 0.059$]

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 : 58 Question Id : 70819121691 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If the activation energy of a reaction is 80.9 kJ mol^{-1}, the fraction of molecules at 700 K, having enough energy to react to form products is e^{-x}. The value of x is _____. (Rounded off to the nearest integer)

[Use $R = 8.31\ J\ K^{-1}\ mol^{-1}$]

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 : 58 Question Id : 70819121691 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

एका अभिक्रियेसाठी सक्रियण ऊर्जा 80.9 kJ mol^{-1} आहे, 700 K तापमानाला पुरेशी ऊर्जा असणाऱ्या रेणूंचा अंश जो उत्पाद तयार करू शकतो तो e^{-x} आहे. x ची किंमत _____ आहे. (जवळच्या पूर्णांकात)

[वापरा $R = 8.31\ J\ K^{-1}\ mol^{-1}$]

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 : 59 Question Id : 70819121692 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

In mildly alkaline medium, thiosulphate ion is oxidized by MnO_4^- to "A". The oxidation state of sulphur in "A" 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 : 70819121692 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

विरल अल्कधर्मी वातावरणात, MnO_4^- मुळे थायोसल्फेटचे ऑक्सिडीकरण 'A' मध्ये होते सल्फरची 'A' मधील ऑक्सिडन स्थिती _____ 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 : 60 Question Id : 70819121693 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The number of stereoisomers possible for $[Co(ox)_2(Br)(NH_3)]^{2-}$ is _____.
[ox = oxalate]

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 : 70819121693 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$[Co(ox)_2(Br)(NH_3)]^{2-}$ मधील त्रिमितीय समसूत्रींची संख्या _____ आहे.
(ox = ऑक्झॅलेट)

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 : 708191986

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 : 7081911266

Question Shuffling Allowed : Yes

Question Number : 61 Question Id : 70819121694 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If the mirror image of the point $(1, 3, 5)$ with respect to the plane $4x - 5y + 2z = 8$ is (α, β, γ), then $5(\alpha + \beta + \gamma)$ equals :

Options :

70819170231. 39

70819170232. 41

70819170233. 43

70819170234. 47

Question Number : 61 Question Id : 70819121694 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

जर $(1, 3, 5)$ या बिंदू ची आरशातील प्रतिमा (mirror image) $4x - 5y + 2z = 8$ या प्रतलाच्या संदर्भात (α, β, γ) असेल, तर $5(\alpha + \beta + \gamma)$ बरोबर _____.

Options :

70819170231. 39

70819170232. 41

70819170233. 43

70819170234. 47

Question Number : 62 Question Id : 70819121695 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let A = {1, 2, 3, ..., 10} and $f: A \to A$ be defined as

$$f(k) = \begin{cases} k+1 & \text{if k is odd} \\ k & \text{if k is even} \end{cases}$$

Then the number of possible functions $g: A \to A$ such that $gof = f$ is :

Options :

70819170235. $5!$

70819170236. ${}^{10}C_5$

70819170237. 5^5

70819170238. 10^5

Question Number : 62 Question Id : 70819121695 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

समजा A = {1, 2, 3, ..., 10} आणि $f: A \to A$ निश्चित (defined) आहे.

$$f(k) = \begin{cases} k+1 & \text{जर k विषम आहे.} \\ k & \text{जर k सम आहे.} \end{cases}$$

जसे की $gof = f$ असेल तर $g: A \to A$ फलांची संभाव्य संख्या _____आहे.

Options :

70819170235. $5!$

70819170236. ${}^{10}C_5$

70819170237. 5^5

70819170238. 10^5

Question Number : 63 Question Id : 70819121696 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let A_1 be the area of the region bounded by the curves $y = \sin x$, $y = \cos x$ and y-axis in the first quadrant. Also, let A_2 be the area of the region bounded by the curves $y = \sin x$, $y = \cos x$, x-axis and $x = \frac{\pi}{2}$ in the first quadrant. Then,

Options :

70819170239. $A_1 : A_2 = 1 : 2$ and $A_1 + A_2 = 1$

70819170240. $A_1 : A_2 = 1 : \sqrt{2}$ and $A_1 + A_2 = 1$

70819170241. $A_1 = A_2$ and $A_1 + A_2 = \sqrt{2}$

70819170242. $2A_1 = A_2$ and $A_1 + A_2 = 1 + \sqrt{2}$

Question Number : 63 Question Id : 70819121696 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

समजा पहिल्या चरणातील, $y=\sin x$, $y=\cos x$ आणि y-अक्ष यांच्या द्वारे परिबद्ध (bounded) केलेल्या क्षेत्राचे (region) क्षेत्रफळ A_1 आहे. समजा पहिल्या चरणातील, $y=\sin x$, $y=\cos x$, x-अक्ष आणि $x=\frac{\pi}{2}$ यांच्या द्वारे परिबद्ध केलेल्या क्षेत्राचे क्षेत्रफळ A_2 आहे. तर

Options :

70819170239. $A_1 : A_2 = 1 : 2$ आणि $A_1 + A_2 = 1$

70819170240. $A_1 : A_2 = 1 : \sqrt{2}$ आणि $A_1 + A_2 = 1$

70819170241. $A_1 = A_2$ आणि $A_1 + A_2 = \sqrt{2}$

70819170242. $2A_1 = A_2$ आणि $A_1 + A_2 = 1 + \sqrt{2}$

Question Number : 64 Question Id : 70819121697 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If $0 < a, b < 1$, and $\tan^{-1}a + \tan^{-1} b = \frac{\pi}{4}$, then the value of

$$(a + b) - \left(\frac{a^2+b^2}{2}\right) + \left(\frac{a^3+b^3}{3}\right) - \left(\frac{a^4+b^4}{4}\right) + \ldots \text{ is :}$$

Options :

70819170243. e

70819170244. $e^2 - 1$

70819170245. $\log_e 2$

70819170246. $\log_e\left(\frac{e}{2}\right)$

Question Number : 64 Question Id : 70819121697 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

जर $0 < a, b < 1$ आणि $\tan^{-1}a + \tan^{-1} b = \frac{\pi}{4}$, तर

$(a + b) - \left(\frac{a^2 + b^2}{2}\right) + \left(\frac{a^3 + b^3}{3}\right) - \left(\frac{a^4 + b^4}{4}\right) + \ldots$. चे मूल्य _____ आहे.

Options :

70819170243. e

70819170244. $e^2 - 1$

70819170245. $\log_e 2$

70819170246. $\log_e\left(\frac{e}{2}\right)$

Question Number : 65 Question Id : 70819121698 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let slope of the tangent line to a curve at any point $P(x, y)$ be given by $\frac{xy^2 + y}{x}$. If the curve intersects the line $x + 2y = 4$ at $x = -2$, then the value of y, for which the point $(3, y)$ lies on the curve, is :

Options :

70819170247. $-\frac{4}{3}$

70819170248. $-\frac{18}{19}$

70819170249. $\frac{18}{35}$

70819170250. $-\frac{18}{11}$

Question Number : 65 Question Id : 70819121698 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

समजा $\frac{xy^2 + y}{x}$ कोणत्याही वक्राचा $P(x, y)$ बिंदू मध्ये काढलेल्या स्पर्शिका रेषेचा (tangent line) कल (slope) आहे. जर वक्र $x+2y=4$ या रेषेला $x=-2$ मधे छेदतो, ज्यासाठी $(3, y)$ बिंदू वक्रामध्ये आहे. तर y चे, मूल्य _____ आहे.

Options :

70819170247. $-\frac{4}{3}$

70819170248. $-\frac{18}{19}$

70819170249. $\frac{18}{35}$

70819170250. $-\frac{18}{11}$

Question Number : 66 Question Id : 70819121699 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The sum of the series $\sum_{n=1}^{\infty} \frac{n^2 + 6n + 10}{(2n+1)!}$ is equal to :

Options :

70819170251. $\frac{41}{8}e + \frac{19}{8}e^{-1} - 10$

70819170252. $\frac{41}{8}e + \frac{19}{8}e^{-1} + 10$

70819170253. $-\frac{41}{8}e + \frac{19}{8}e^{-1} - 10$

70819170254. $\frac{41}{8}e - \frac{19}{8}e^{-1} - 10$

Question Number : 66 Question Id : 70819121699 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$\sum_{n=1}^{\infty} \frac{n^2 + 6n + 10}{(2n+1)!}$ या श्रेणी (series) ची बेरीज बरोबर _____ आहे.

Options :

70819170251. $\frac{41}{8}e + \frac{19}{8}e^{-1} - 10$

70819170252. $\frac{41}{8}e + \frac{19}{8}e^{-1} + 10$

70819170253. $-\frac{41}{8}e+\frac{19}{8}e^{-1}-10$

70819170254. $\frac{41}{8}e-\frac{19}{8}e^{-1}-10$

Question Number : 67 Question Id : 70819121700 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let $f(x)=\int_0^x e^t f(t)dt+e^x$ be a differentiable function for all $x \in R$. Then $f(x)$ equals :

Options :

70819170255. $2e^{(e^x-1)}-1$

70819170256. $e^{(e^x-1)}$

70819170257. $e^{e^x}-1$

70819170258. $2e^{e^x}-1$

Question Number : 67 Question Id : 70819121700 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

समजा $f(x)=\int_0^x e^t f(t)dt+e^x$ सर्व $x \in R$ साठी विकलनीय फल (differentiable function) आहे. तर $f(x)$ बरोबर _____.

Options :

70819170255. $2e^{(e^x-1)}-1$

70819170256. $e^{(e^x-1)}$

70819170257. $e^{e^x}-1$

70819170258. $2e^{e^x}-1$

Question Number : 68 Question Id : 70819121701 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let $f(x)$ be a differentiable function at $x=a$ with $f'(a)=2$ and $f(a)=4$. Then $\lim\limits_{x\to a}\dfrac{xf(a)-af(x)}{x-a}$ equals :

Options :

70819170259. $2a-4$

70819170260. $4-2a$

70819170261. $2a+4$

70819170262. $a+4$

Question Number : 68 Question Id : 70819121701 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

समजा $f(x)$ हे $x=a$ वरील विकलनीय फल (differentiable function) आहे जसे $f'(a)=2$ आणि $f(a)=4$, तर $\lim\limits_{x\to a}\dfrac{xf(a)-af(x)}{x-a}$ बरोबर _____.

Options :

70819170259. $2a-4$

70819170260. $4-2a$

70819170261. $2a+4$

70819170262. $a+4$

Question Number : 69 Question Id : 70819121702 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let $f(x)=\sin^{-1}x$ and $g(x)=\frac{x^2-x-2}{2x^2-x-6}$. If $g(2)=\lim\limits_{x\to 2}g(x)$, then the domain of the function fog is :

Options :

70819170263. $(-\infty,-2]\cup\left[-\frac{3}{2},\infty\right)$

70819170264. $(-\infty,-2]\cup\left[-\frac{4}{3},\infty\right)$

70819170265. $(-\infty,-1]\cup[2,\infty)$

70819170266. $(-\infty,-2]\cup[-1,\infty)$

Question Number : 69 Question Id : 70819121702 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

समजा $f(x)=\sin^{-1}x$ आणि $g(x)=\dfrac{x^2-x-2}{2x^2-x-6}$. जर $g(2)=\lim\limits_{x\to 2}g(x)$, तर fog या फलाचे अधिक्षेत्र (domain) _____ आहे.

Options :

70819170263. $(-\infty,-2]\cup\left[-\dfrac{3}{2},\infty\right)$

70819170264. $(-\infty,-2]\cup\left[-\dfrac{4}{3},\infty\right)$

70819170265. $(-\infty,-1]\cup[2,\infty)$

70819170266. $(-\infty,-2]\cup[-1,\infty)$

Question Number : 70 Question Id : 70819121703 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let A(1, 4) and B(1, −5) be two points. Let P be a point on the circle $(x-1)^2+(y-1)^2=1$ such that $(PA)^2+(PB)^2$ have maximum value, then the points, P, A and B lie on :

Options :

70819170267. an ellipse

70819170268. a hyperbola

70819170269. a parabola

70819170270. a straight line

Question Number : 70 Question Id : 70819121703 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

समजा A(1, 4) आणि B(1, −5) हे दोन बिंदू आहेत. समजा P हा बिंदू $(x-1)^2+(y-1)^2=1$ या वर्तुळावर आहे. जसे की $(PA)^2+(PB)^2$ ला महत्तम मूल्य (maximum value) आहेत.

तर P, A आणि B हे बिंदू _____ वर आहेत.

Options :

70819170267. विवृत्त (an ellipse)

70819170268. अपास्त (a hyperbola)

70819170269. अन्वस्त (a parabola)

70819170270. सरळ रेषा (a straight line)

Question Number : 71 Question Id : 70819121704 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If vectors $\vec{a_1} = x\hat{i} - \hat{j} + \hat{k}$ and $\vec{a_2} = \hat{i} + y\hat{j} + z\hat{k}$ are collinear, then a possible unit vector parallel to the vector $x\hat{i} + y\hat{j} + z\hat{k}$ is :

Options :

70819170271. $\frac{1}{\sqrt{2}}\left(-\hat{j}+\hat{k}\right)$

70819170272. $\frac{1}{\sqrt{3}}\left(\hat{i}-\hat{j}+\hat{k}\right)$

70819170273. $\frac{1}{\sqrt{3}}\left(\hat{i}+\hat{j}-\hat{k}\right)$

70819170274. $\frac{1}{\sqrt{2}}\left(\hat{i}-\hat{j}\right)$

Question Number : 71 Question Id : 70819121704 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

जर $\vec{a_1}=x\hat{i}-\hat{j}+\hat{k}$ आणि $\vec{a_2}=\hat{i}+y\hat{j}+z\hat{k}$ हे एकरेषीय (collinear) सदिश आहेत.

तर $x\hat{i}+y\hat{j}+z\hat{k}$ या सदिशाला समांतर असलेले संभाव्य एककी सदिश (possible unit vector) _____ आहे.

Options :

70819170271. $\frac{1}{\sqrt{2}}\left(-\hat{j}+\hat{k}\right)$

70819170272. $\frac{1}{\sqrt{3}}\left(\hat{i}-\hat{j}+\hat{k}\right)$

70819170273. $\frac{1}{\sqrt{3}}\left(\hat{i}+\hat{j}-\hat{k}\right)$

70819170274. $\frac{1}{\sqrt{2}}\left(\hat{i}-\hat{j}\right)$

Question Number : 72 Question Id : 70819121705 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let $F_1(A, B, C) = (A \wedge \sim B) \vee [\sim C \wedge (A \vee B)] \vee \sim A$ and $F_2(A, B) = (A \vee B) \vee (B \rightarrow \sim A)$ be two logical expressions. Then :

Options :

70819170275. F_1 and F_2 both are tautologies

70819170276. F_1 is a tautology but F_2 is not a tautology

70819170277. F_1 is not a tautology but F_2 is a tautology

70819170278. Both F_1 and F_2 are not tautologies

Question Number : 72 Question Id : 70819121705 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

समजा $F_1(A, B, C) = (A \wedge \sim B) \vee [\sim C \wedge (A \vee B)] \vee \sim A$ आणि $F_2(A, B) = (A \vee B) \vee (B \rightarrow \sim A)$ या दोन तर्कसंगत पदावली (logical expression) आहेत. तर :

Options :

70819170275. F_1 आणि F_2 दोन्ही अनुलाप (tautologies) आहेत.

70819170276. F_1 अनुलाप आहे परंतु F_2 अनुलाप नाही.

70819170277. F_1 अनुलाप नाही परंतु F_2 अनुलाप आहे.

70819170278. दोन्ही F_1 आणि F_2 अनुलाप नाहीत.

Question Number : 73 Question Id : 70819121706 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A seven digit number is formed using digits 3, 3, 4, 4, 4, 5, 5. The probability, that number so formed is divisible by 2, is :

Options :

70819170279.

$\frac{3}{7}$

70819170280. $\frac{6}{7}$

70819170281. $\frac{1}{7}$

70819170282. $\frac{4}{7}$

Question Number : 73 Question Id : 70819121706 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

3, 3, 4, 4, 4, 5, 5 हे अंक (digits) वापरून 7 अंकी एक संख्या तयार होते. जे नंबर 2 ने विभाज्य (divisible) होणारे तयार होत आहेत त्यांची संभाव्यता _____ आहे.

Options :

70819170279. $\frac{3}{7}$

70819170280. $\frac{6}{7}$

70819170281. $\frac{1}{7}$

70819170282. $\frac{4}{7}$

Question Number : 74 Question Id : 70819121707 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Consider the following system of equations :

$$x+2y-3z=a$$
$$2x+6y-11z=b$$
$$x-2y+7z=c,$$

where a, b and c are real constants. Then the system of equations :

Options :

70819170283. has a unique solution for all a, b and c

70819170284. has a unique solution when $5a=2b+c$

70819170285. has infinite number of solutions when $5a=2b+c$

70819170286. has no solution for all a, b and c

Question Number : 74 Question Id : 70819121707 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

खालील समीकरणांच्या प्रणालीचा विचार करा

$$x+2y-3z=a$$
$$2x+6y-11z=b$$
$$x-2y+7z=c$$

जेंव्हा a, b आणि c हे वास्तव अचल (real constants) आहेत.

तर समीकरणांची प्रणाली _____.

Options :

70819170283. एकमेव (unique) उकल आहे सर्व a, b आणि c साठी

70819170284. एकमेव उकल आहे जेंव्हा $5a=2b+c$

70819170285. अनंत उकलींची संख्या (infinite number of solutions) आहे जेंव्हा $5a=2b+c$

70819170286. उकल नाही सर्व a, b आणि c साठी

Question Number : 75 Question Id : 70819121708 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The triangle of maximum area that can be inscribed in a given circle of radius 'r' is :

Options :

70819170287. An isosceles triangle with base equal to 2r.

70819170288. A right angle triangle having two of its sides of length 2r and r.

70819170289. An equilateral triangle of height $\frac{2r}{3}$.

70819170290. An equilateral triangle having each of its side of length $\sqrt{3}$ r.

Question Number : 75 Question Id : 70819121708 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

r त्रिज्या असणाऱ्या वर्तुळामध्ये आंतरलिखित (inscribed) त्रिकोणाचे महत्तम क्षेत्रफळ (maximum area) _____ आहे.

Options :

70819170287. एक समद्विभुज त्रिकोण (an isosceles triangle) ज्याचा पाया बरोबर 2r आहे.

70819170288. एक काटकोन त्रिकोण (a right angle triangle) ज्याच्या दोन बाजूंची लांबी 2r आणि r आहे.

70819170289. एक समभुज त्रिकोण (an equilateral triangle) ज्याची उंची $\frac{2r}{3}$ आहे.

70819170290. एक समभुज त्रिकोण ज्याच्या प्रत्येक बाजूची उंची $\sqrt{3}$ r आहे.

Question Number : 76 Question Id : 70819121709 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let L be a line obtained from the intersection of two planes $x+2y+z=6$ and $y+2z=4$. If point $P(\alpha, \beta, \gamma)$ is the foot of perpendicular from (3, 2, 1) on L, then the value of $21(\alpha+\beta+\gamma)$ equals :

Options :

70819170291. 68

70819170292. 102

70819170293. 136

70819170294. 142

Question Number : 76 Question Id : 70819121709 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

समजा L ही $x+2y+z=6$ आणि $y+2z=4$ या दोन प्रतलांच्या छेदा पासून प्राप्त झालेली रेषा आहे. जर L वर (3, 2, 1) पासून लंबाचा पाया (foot of perpendicular) बिंदू $P(\alpha, \beta, \gamma)$ आहे, तर $21(\alpha+\beta+\gamma)$ चे मूल्य बरोबर _____.

Options :

70819170291. 68

70819170292. 102

70819170293. 136

70819170294. 142

Question Number : 77 Question Id : 70819121710 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

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

$$f(x) = \begin{cases} 2\sin\left(-\frac{\pi x}{2}\right), & \text{if } x < -1 \\ |ax^2 + x + b|, & \text{if } -1 \le x \le 1 \\ \sin(\pi x), & \text{if } x > 1 \end{cases}$$

If $f(x)$ is continuous on $\mathbf{R}$, then $a + b$ equals :

Options :

70819170295. -3

70819170296. -1

70819170297. 1

70819170298. 3

Question Number : 77 Question Id : 70819121710 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

समजा $f : \mathbf{R} \to \mathbf{R}$ निश्चित आहे.

$$f(x) = \begin{cases} 2\sin\left(-\frac{\pi x}{2}\right) & \text{जर } x < -1 \\ |ax^2 + x + b| & \text{जर } -1 \le x \le 1 \\ \sin(\pi x) & \text{जर } x > 1 \end{cases}$$

जर $f(x)$ हे $\mathbf{R}$ वर संतत (continuous) आहे, तर $a + b$ बरोबर _____.

Options :

70819170295. -3

70819170296. -1

70819170297. 1

70819170298. 3

Question Number : 78 Question Id : 70819121711 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If the locus of the mid-point of the line segment from the point (3, 2) to a point on the circle, $x^2+y^2=1$ is a circle of radius r, then r is equal to :

Options :

70819170299. $\frac{1}{4}$

70819170300. $\frac{1}{3}$

70819170301. $\frac{1}{2}$

70819170302. 1

Question Number : 78 Question Id : 70819121711 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

जर (3, 2) या बिंदूपासून $x^2+y^2=1$ या वर्तुळावरील एक बिंदू यांनी तयार होणाऱ्या रेषाखंडा (line segment) च्या मध्य-बिंदू चे निधान (locus) r त्रिज्या असणारे एक वर्तुळ आहे, तर r बरोबर _____ आहे.

Options :

70819170299. $\frac{1}{4}$

70819170300. $\frac{1}{3}$

70819170301. $\frac{1}{2}$

70819170302. 1

Question Number : 79 Question Id : 70819121712 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A natural number has prime factorization given by $n=2^x3^y5^z$, where y and z are such that $y+z=5$ and $y^{-1}+z^{-1}=\frac{5}{6}$, $y>z$. Then the number of odd divisors of n, including 1, is :

Options :

70819170303. 6

70819170304. 11

70819170305. 12

70819170306. $6x$

Question Number : 79 Question Id : 70819121712 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

एक नैसर्गिक संख्या ज्याचे मूळ अवयव (prime factorization) $n = 2^x 3^y 5^z$ आहे. जेंव्हा y आणि z असे आहेत.

जसे की $y+z=5$ आणि $y^{-1}+z^{-1}=\frac{5}{6}$, $y > z$, तर n च्या 1 यासह विषम विभाजकांची (odd divisors)

संख्या _____ आहे.

Options :

70819170303. 6

70819170304. 11

70819170305. 12

70819170306. $6x$

Question Number : 80 Question Id : 70819121713 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

For $x > 0$, if $f(x)=\int_1^x \frac{\log_e t}{(1+t)}dt$, then $f(e)+f\left(\frac{1}{e}\right)$ is equal to :

Options :

70819170307. 0

70819170308. 1

70819170309. $\frac{1}{2}$

70819170310. -1

Question Number : 80 Question Id : 70819121713 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$x > 0$ साठी, जर $f(x) = \int_1^x \frac{\log_e t}{(1+t)} dt$, तर $f(e) + f\left(\frac{1}{e}\right)$ बरोबर _____ आहे.

Options :

70819170307. 0

70819170308. 1

70819170309. $\frac{1}{2}$

70819170310. -1

Mathematics Section B

Section Id :	708191987
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 :	7081911267
Question Shuffling Allowed :	Yes

Question Number : 81 Question Id : 70819121714 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If $I_{m,n} = \int_0^1 x^{m-1}(1-x)^{n-1}\,dx$, for $m, n \geq 1$, and $\int_0^1 \frac{x^{m-1}+x^{n-1}}{(1+x)^{m+n}}\,dx = \alpha I_{m,n}$, $\alpha \in R$, then α equals _____.

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 : 70819121714 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

जर $I_{m,n} = \int_0^1 x^{m-1}(1-x)^{n-1}\,dx$, $m, n \geq 1$ साठी आणि $\int_0^1 \frac{x^{m-1}+x^{n-1}}{(1+x)^{m+n}}\,dx = \alpha I_{m,n}$, $\alpha \in R$, तर α बरोबर _____.

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 : 70819121715 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let z be those complex numbers which satisfy

$|z+5| \leq 4$ and $z(1+i) + \bar{z}(1-i) \geq -10$, $i = \sqrt{-1}$.

If the maximum value of $|z+1|^2$ is $\alpha + \beta\sqrt{2}$, then the value of $(\alpha+\beta)$ 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 : 82 Question Id : 70819121715 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

समजा z ही $|z+5| \leq 4$ आणि $z(1+i)+\bar{z}(1-i) \geqslant -10, i=\sqrt{-1}$

याची पूर्ती करणारे संमिश्र संख्या (complex number) आहे. जर $|z+1|^2$ चे महत्तम मूल्य (maximum value) $\alpha+\beta\sqrt{2}$ आहे, तर $(\alpha+\beta)$ 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 : 70819121716 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let the normals at all the points on a given curve pass through a fixed point (a, b). If the curve passes through $(3, -3)$ and $(4, -2\sqrt{2})$, and given that $a-2\sqrt{2}b=3$, then (a^2+b^2+ab) 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 : 70819121716 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

समजा दिलेल्या वक्राचा सर्व बिंदूंच्या प्रलंब रेषा (normal lines) (a, b) बिंदू मधून जातात. जर वक्र (3, −3) आणि $(4, -2\sqrt{2})$ या मधून जातो, आणि $a - 2\sqrt{2}\,b = 3$ दिलेले आहे, तर (a^2+b^2+ab) 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 : 70819121717 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let a be an integer such that all the real roots of the polynomial $2x^5+5x^4+10x^3+10x^2+10x+10$ lie in the interval $(a, a+1)$.
Then, $|a|$ 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 : 70819121717 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

समजा a एक पूर्णांक (integer) आहे. जसे की $2x^5+5x^4+10x^3+10x^2+10x+10$ या बहुपदीची (polynomial) सर्व वास्तव मूळे (real roots) $(a, a+1)$ या अंतराल (interval) मध्ये आहेत. तर $|a|$ 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 : 70819121718 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let $X_1, X_2, \ldots, X_{18}$ be eighteen observations such that $\sum_{i=1}^{18}(X_i-\alpha)=36$ and $\sum_{i=1}^{18}(X_i-\beta)^2=90$, where α and β are distinct real numbers. If the standard deviation of these observations is 1, then the value of $|\alpha-\beta|$ 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 : 70819121718 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

समजा $X_1, X_2, \ldots, X_{18}$ ही 18 निरीक्षणे (observations) आहेत.

जसे की $\sum_{i=1}^{18}(X_i - \alpha) = 36$ आणि $\sum_{i=1}^{18}(X_i - \beta)^2 = 90$, जेंव्हा α आणि β हे भिन्न (distinct) वास्तव संख्या आहेत. जर या निरीक्षणांचा प्रमाण विचलन (standard deviation) 1 आहे, तर $|\alpha - \beta|$ चे मूल्य 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 : 86 Question Id : 70819121719 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If the matrix $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 3 & 0 & -1 \end{bmatrix}$ satisfies the equation $A^{20} + \alpha A^{19} + \beta A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 4 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ for some real numbers α and β, then $\beta - \alpha$ 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 : 70819121719 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

जर $A=\begin{bmatrix}1 & 0 & 0\\ 0 & 2 & 0\\ 3 & 0 & -1\end{bmatrix}$ ही सारणी (matrix) $A^{20}+\alpha A^{19}+\beta A=\begin{bmatrix}1 & 0 & 0\\ 0 & 4 & 0\\ 0 & 0 & 1\end{bmatrix}$ काही वास्तव संख्या (real numbers) α आणि β साठी, या समीकरणाची पूर्ती करते, तर $\beta-\alpha$ बरोबर _____.

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 : 70819121720 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let α and β be two real numbers such that $\alpha+\beta=1$ and $\alpha\beta=-1$. Let $p_n=(\alpha)^n+(\beta)^n$, $p_{n-1}=11$ and $p_{n+1}=29$ for some integer $n \geq 1$. Then, the value of p_n^2 is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 87 Question Id : 70819121720 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

समजा α आणि β या दोन वास्तव संख्या आहेत. जसे की $\alpha+\beta=1$ आणि $\alpha\beta=-1$. समजा $p_n=(\alpha)^n+(\beta)^n$, $p_{n-1}=11$ आणि $p_{n+1}=29$. $n \geq 1$ काही पूर्णांक साठी, तर p_n^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 : 88 Question Id : 70819121721 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The total number of 4-digit numbers whose greatest common divisor with 18 is 3, 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 : 70819121721 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

18 सहीत (with) 4-अंकी संख्याची सर्व संख्या _____ आहेत, ज्याचे महत्तम साधारण विभाजक (greatest common divisor) 3 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 : 70819121722 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If the arithmetic mean and geometric mean of the p^{th} and q^{th} terms of the sequence $-16, 8, -4, 2, \ldots$ satisfy the equation $4x^2-9x+5=0$, then $p+q$ 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 : 89 Question Id : 70819121722 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

जर $-16, 8, -4, 2, \ldots$ या क्रमिकेचा (sequence) p^{th} आणि q^{th} पदांचा गणिती मध्य (arithmetic mean) आणि भूमिती मध्य (Geometric mean) $4x^2-9x+5=0$ या समीकरणाची पूर्ती करतात, तर $p+q$ 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 : 90 Question Id : 70819121723 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let L be a common tangent line to the curves $4x^2+9y^2=36$ and $(2x)^2+(2y)^2=31$. Then the square of the slope of the line L 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 : 70819121723 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

समजा L ही $4x^2+9y^2=36$ आणि $(2x)^2+(2y)^2=31$ या वक्रांची सामाईक स्पर्शिका रेषा (common tangent line) आहे. तर L रेषेचा कल (slope) चा वर्ग _____ 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