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**Question Paper Name :** B TECH EU 26th Feb 2021 Shift 2  
**Subject Name :** B TECH EU  
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**Display Marks:** Yes

## **B TECH EU**

**Group Number :** 1  
**Group Id :** 708191240  
**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 :** 7081911018  
**Section Number :** 1  
**Section type :** Online

<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	20
<b>Number of Questions to be attempted :</b>	20
<b>Section Marks :</b>	80
<b>Mark As Answered Required? :</b>	Yes
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	7081911298
<b>Question Shuffling Allowed :</b>	Yes

**Question Number : 1 Question Id : 70819122174 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

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

A radioactive sample is undergoing  $\alpha$  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 :**

70819171671.  $\frac{\ln 5}{t_2 - t_1}$

70819171672.  $\frac{\ln(t_2 + t_1)}{2}$

70819171673.  $\frac{t_2 - t_1}{\ln 5}$

70819171674.  $\frac{t_1 - t_2}{\ln 5}$

**Question Number : 1 Question Id : 70819122174 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

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

ایک تابکار مادہ  $\alpha$  ذرات کا اخراج کرتا ہے۔ کسی بھی وقت  $t_1$  پر اس کی تابکاریت کی فعالیت (Activity) A ہے۔ اور بعد میں کسی وقت  $t_2$  پر اس کی فعالیت  $\frac{A}{5}$  ہو تب اس تابکار مادہ کے لیے اوسط زندگی کا وقفہ ہے :

**Options :**

70819171671.  $\frac{\ln 5}{t_2 - t_1}$

70819171672.  $\frac{\ln(t_2 + t_1)}{2}$

70819171673.  $\frac{t_2 - t_1}{\ln 5}$

70819171674.  $\frac{t_1 - t_2}{\ln 5}$

**Question Number : 2 Question Id : 70819122175 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 :**

70819171675. Both A and R are true and R is the correct explanation of A

70819171676. Both A and R are true but R is NOT the correct explanation of A

70819171677. A is true but R is false

70819171678. A is false but R is true

Question Number : 2 Question Id : 70819122175 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ذیل میں دو بیانات دیئے گئے ہیں: ایک کو دعویٰ A اور دوسرے کو وجہ R کے نام دیئے گئے ہیں۔  
دعویٰ A : کسی سادہ خوردبین کے لیے کسی شے کی زاویائی ساخت (angular size) عکس کی زاویائی ساخت کے مساوی ہوتی ہے۔  
وجہ R : چھوٹے باریک اجسام کی تکبیر کرنے کے لیے ان کو آنکھ کے سامنے بہت قریب 25 cm کے اندر رکھنا پڑتا ہے۔ اس صورت میں وہ آنکھ پر بڑا زاویہ بناتے ہیں۔  
اوپر دیئے گئے بیان اور اس کی وجہ سے متعلق متبادلات دیئے گئے ہیں۔ ان میں صحیح متبادل کو چنیے :

Options :

70819171675. دونوں بیان A اور اس کی وجہ R صحیح ہیں اور وجہ R، بیان A کا مکمل وضاحت کرتا ہے۔

70819171676. دونوں بیان A اور اس کی وجہ R صحیح ہیں اور وجہ R، بیان A کی صحیح وضاحت نہیں کرتا ہے۔

70819171677. بیان A صحیح ہے جبکہ وجہ R غلط ہے۔

70819171678. بیان A غلط ہے جبکہ وجہ R صحیح ہے۔

Question Number : 3 Question Id : 70819122176 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 :

70819171679. 335 Hz

70819171680. 338 Hz

70819171681. 345 Hz

70819171682. 342 Hz

**Question Number : 3 Question Id : 70819122176 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

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

ایک نامعلوم تعدد کا دو شاخہ A دوسرے 340 Hz تعدد والے دو شاخہ کے ساتھ ہم آواز کرنے پر 5 ضرب فی سیکنڈ (5 beats/second) پیدا کرتا ہے۔ اگر دو شاخہ A کو تھوڑا بھر دیں تب حاصل ضرب کی تعدد دو ضرب فی سیکنڈ (2 beats/second) ہو جاتی ہو تب دو شاخہ A کا تعدد ہوگا :

**Options :**

70819171679. 335 Hz

70819171680. 338 Hz

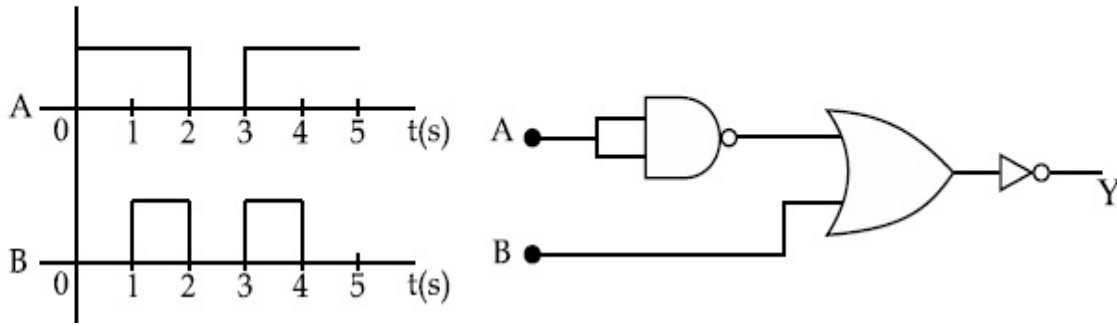
70819171681. 345 Hz

70819171682. 342 Hz

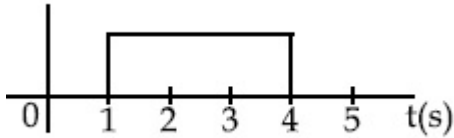
**Question Number : 4 Question Id : 70819122177 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

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

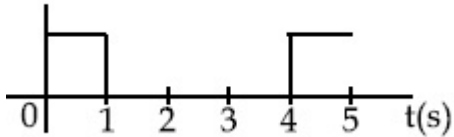
Draw the output signal Y in the given combination of gates.



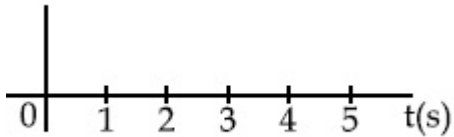
Options :



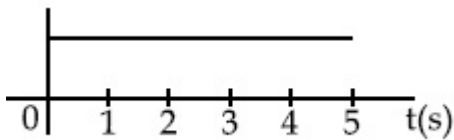
70819171683.



70819171684.



70819171685.

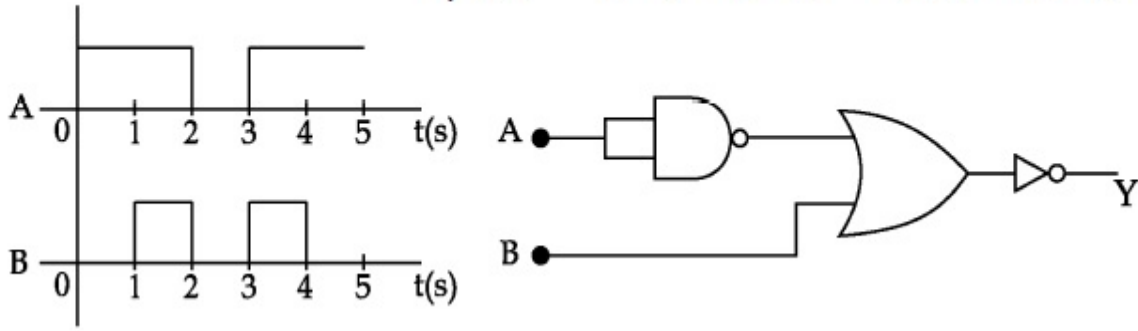


70819171686.

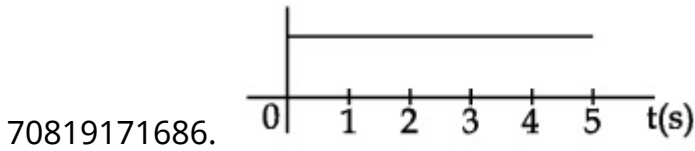
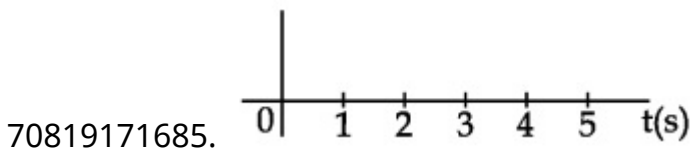
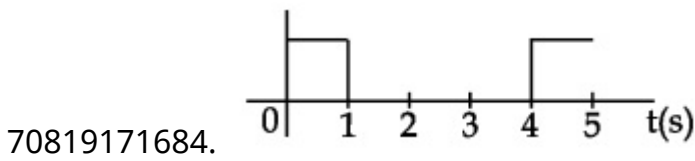
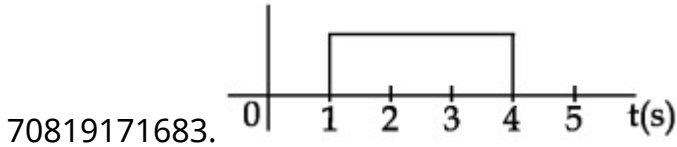
Question Number : 4 Question Id : 70819122177 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

دیئے گئے گیٹ کے برقی سرکٹ کے لیے حاصل آؤٹ پٹ سگنل Y کی شکل کھینچئے۔



Options :



Question Number : 5 Question Id : 70819122178 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 :

70819171687. Both Statement I and Statement II are true

70819171688. Both Statement I and Statement II are false

70819171689. Statement I is true but Statement II is false

70819171690. Statement I is false but Statement II is true

Question Number : 5 Question Id : 70819122178 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ذیل میں دو بیانات دیئے گئے ہیں :

بیان - I : سکینڈ کے پنڈولم (second's pendulum) کا دور ایک سیکنڈ (1 s) ہوتا ہے۔

بیان - II : وہ اپنے دو انتہائی مقام کے درمیان حرکت کرنے کے لیے ایک سیکنڈ (1 s) لیتا ہے۔

اوپر دیئے گئے بیان - I اور بیان - II سے متعلق متبادلات نیچے دیئے گئے ہیں۔ ان میں صحیح متبادل چنیے :

Options :

70819171687. دونوں بیان I اور بیان II صحیح ہیں۔

70819171688. دونوں بیان I اور بیان II غلط ہیں۔

70819171689. بیان I صحیح ہے اور بیان II غلط ہے۔

70819171690. بیان I غلط ہے اور بیان II صحیح ہے۔

Question Number : 6 Question Id : 70819122179 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  $\lambda$  where  $C/V = \lambda$  ?

**Options :**

70819171691.  $[M^{-2} L^{-3} I^2 T^6]$

70819171692.  $[M^{-3} L^{-4} I^3 T^7]$

70819171693.  $[M^{-2} L^{-4} I^3 T^7]$

70819171694.  $[M^{-1} L^{-3} I^{-2} T^{-7}]$

**Question Number : 6 Question Id : 70819122179 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

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

اگر 'C' اور 'V' بالترتیب برقی گنجائش اور برقی قومی کونڈکٹنس ہوتے ہوں تب  $\lambda$  کی ابعاد کیا ہوں گی جبکہ  $\lambda = C/V$

**Options :**

70819171691.  $[M^{-2} L^{-3} I^2 T^6]$

70819171692.  $[M^{-3} L^{-4} I^3 T^7]$

70819171693.  $[M^{-2} L^{-4} I^3 T^7]$

70819171694.  $[M^{-1} L^{-3} I^{-2} T^{-7}]$

**Question Number : 7 Question Id : 70819122180 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  $2.5 \times 10^{-4}$  Wb/m<sup>2</sup> and the angle of dip is 60°. The emf induced between the tips of the plane wings will be \_\_\_\_\_.

**Options :**

70819171695. 108.25 mV

70819171696. 62.50 mV

70819171697. 88.37 mV

70819171698. 54.125 mV

**Question Number : 7 Question Id : 70819122180 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

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

ایک ہوائی جہاز کے پروں کا پھیلاؤ 10 m ہے۔ وہ 180 km/h کی چال سے افقی سطح میں اڑ رہا ہے۔ اگر اس مقام پر زمین کے مقناطیسی میدان کا مالہ  $2.5 \times 10^{-4}$  Wb/m<sup>2</sup> اور زاویہ میلان 60° ہو تب اس کے پروں (wings) کے سروں کے درمیان میں نفوذ پذیر قوت محرکہ برقی (emf) ہوگی \_\_\_\_\_

**Options :**

70819171695. 108.25 mV

70819171696. 62.50 mV

70819171697. 88.37 mV

70819171698. 54.125 mV

**Question Number : 8 Question Id : 70819122181 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 :**

70819171699.  $2gh$

70819171700.  $\frac{2gh}{I + mr^2}$

70819171701.  $\frac{2mgh}{I + mr^2}$

70819171702.  $\frac{2mgh}{I + 2mr^2}$

**Question Number : 8 Question Id : 70819122181 Question Type : MCQ Option Shuffling : Yes Is**

**Question Mandatory : No**

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

$r$  نصف قطر کے پیسے کے محیط کے اطراف ایک ڈوری کو باندھا گیا۔ اس پیسے کا گردش کا محور افقی سطح میں اور اس محور کے اطراف جمود کا معیار اثر  $I$  ہے۔  
لپٹی ڈوری کے ایک سرے کو وزن  $mg$  پر لٹکا یا گیا۔ وہ وزن حالت سکون سے شروع ہو کر 'h' بلندی سے گرتا ہو تب اس پیسے کی زاویائی رفتار کے مربع کی قدر ہوگی :

**Options :**

70819171699.  $2gh$

70819171700.  $\frac{2gh}{I + mr^2}$

70819171701.  $\frac{2mgh}{I + mr^2}$

70819171702.  $\frac{2mgh}{I + 2mr^2}$

**Question Number : 9 Question Id : 70819122182 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  $\alpha$  and  $\beta$  are constants and  $x$  &  $y$  are respectively the horizontal and vertical distances of the projectile from the point of projection. The angle of projection  $\theta$  and the maximum height attained  $H$  are respectively given by :

**Options :**

70819171703.  $\tan^{-1}\beta, \frac{\alpha^2}{2\beta}$

70819171704.  $\tan^{-1}\left(\frac{\beta}{\alpha}\right), \frac{\alpha^2}{\beta}$

70819171705.  $\tan^{-1}\alpha, \frac{\alpha^2}{4\beta}$

70819171706.  $\tan^{-1}\alpha, \frac{4\alpha^2}{\beta}$

**Question Number : 9 Question Id : 70819122182 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

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

کسی پروجیکٹائل (projectile) کی عمودی سطح میں راہ trajectory کی مساوات  $y = \alpha x - \beta x^2$  ہے جہاں  $\alpha$  اور  $\beta$  مستقل ہیں۔ جبکہ  $x$  اور  $y$  بالترتیب افقی سمت اور عمودی سمت میں داغنے کے مقام سے فاصلے ہیں۔ تب اگر  $\theta$  داغنے کا زاویہ اور  $H$  اس پروجیکٹائل کے ذریعہ حاصل کی گئی انتہائی بلندی ہو تو  $\theta$  اور  $H$  کی اقدار ہوں گی :

**Options :**

70819171703.  $\frac{\alpha^2}{2\beta}, \tan^{-1}\beta$

70819171704.  $\frac{\alpha^2}{\beta}, \tan^{-1}\left(\frac{\beta}{\alpha}\right)$

70819171705.  $\frac{\alpha^2}{4\beta}, \tan^{-1}\alpha$

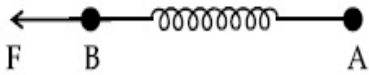
70819171706.  $\frac{4\alpha^2}{\beta}, \tan^{-1}\alpha$

**Question Number : 10 Question Id : 70819122183 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 :**

70819171707.  $\frac{MF}{F + Ma}$

70819171708.  $\frac{F + Ma}{M}$

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

70819171709.

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

70819171710.

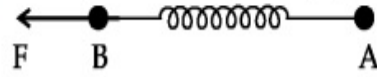
Question Number : 10 Question Id : 70819122183 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

M کیت رکھنے والے اجسام A اور B کو بے کیت اسپرنگ کے ذریعے جوڑا گیا۔ شکل میں دکھائے گئے انداز میں جسم B پر قوت F عمل کرتی

ہو تب جسم A اسراع a کے ساتھ جسم B سے دور جاتا ہے تب جسم B کا اسراع :



Options :

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

70819171707.

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

70819171708.

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

70819171709.

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

70819171710.

Question Number : 11 Question Id : 70819122184 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 :**

70819171711. Both Statement I and Statement II are true

70819171712. Both Statement I and Statement II are false

70819171713. Statement I is true but Statement II is false

70819171714. Statement I is false but Statement II is true

**Question Number : 11 Question Id : 70819122184 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

ذیل میں دو بیانات دئے گئے ہیں :

**بیان - I** : ایک برقی دو قطبی کو کھوکھلے کرہ کے مرکز میں رکھا گیا۔ اس کرہ سے حاصل برقی فلکس صفر ہوتا ہے۔ لیکن کرہ کے اندر کسی بھی مقام پر برقی میدان صفر نہیں ہوتا۔

**بیان - II** : اگر کسی ٹھوس دھاتی کرہ کا نصف قطر  $R$  اور  $Q$  اس موجود برقی بار ہے۔ اس سے ہم مرکز  $r$  ( $< R$ ) نصف قطر کے کروی سطح کے کسی بھی نقطہ پر برقی میدان صفر ہوتا ہے۔ لیکن اس  $r$  نصف قطر کی بند کروی سطح سے برقی فلکس غیر صفر ہوتا ہے۔ اوپر دیئے گئے بیان - I اور بیان - II سے متعلق متبادلات نیچے دئے گئے ہیں۔ ان میں سے صحیح متبادل چنیے :

**Options :**

70819171711. دونوں بیان I اور بیان II صحیح ہیں۔

70819171712. دونوں بیان I اور بیان II غلط ہیں۔

70819171713. بیان I صحیح ہے اور بیان II غلط ہے۔

70819171714. بیان I غلط ہے اور بیان II صحیح ہے۔

Question Number : 12 Question Id : 70819122185 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 :

70819171715.  $\frac{a_1}{a_2}$

70819171716.  $\frac{a_2}{a_1}$

70819171717.  $\frac{a_1 + a_2}{a_1}$

70819171718.  $\frac{a_1 + a_2}{a_2}$

Question Number : 12 Question Id : 70819122185 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1



ایک اسکوڑ حالت سکون میں وقت  $t_1$  کے لیے مستقل شرح کے اسراع  $a_1$  سے حرکت کرتا ہے۔ پھر وہ وقفہ  $t_2$  کے لیے مستقل شرح کا منفی اسراع  $a_2$  سے حرکت کرتے ہوئے حالت سکون میں آتا ہے۔ تب  $\frac{t_1}{t_2}$  کی نسبت ہوگی :

**Options :**

70819171715.  $\frac{a_1}{a_2}$

70819171716.  $\frac{a_2}{a_1}$

70819171717.  $\frac{a_1 + a_2}{a_1}$

70819171718.  $\frac{a_1 + a_2}{a_2}$

**Question Number : 13 Question Id : 70819122186 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 :**

70819171719. monoatomic only.

70819171720. diatomic only.

70819171721. polyatomic only.

70819171722. either monoatomic or diatomic.

Question Number : 13 Question Id : 70819122186 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

کسی مثالی گیس کے لیے اندرونی توانائی (U)، دباؤ (P) اور حجم (V) کے درمیان تعلق کی مساوات  $U = 3PV + 4$  ہو تب وہ گیس ہے :

Options :

70819171719. فقط یک سالماتی گیس (monoatomic gas)

70819171720. فقط دو سالماتی گیس (diatomic gas)

70819171721. فقط کثیر سالماتی گیس (polyatomic gas)

70819171722. یک سالماتی گیس یا دو سالماتی گیس

Question Number : 14 Question Id : 70819122187 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 :

70819171723. 4.34 m/s

70819171724. 4.17 m/s

70819171725. 3.25 m/s

70819171726. 2.19 m/s

Question Number : 14 Question Id : 70819122187 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ہائڈروجن ایٹم ایک فوٹان کو خارج کر کے  $n=1$  سے  $n=5$  والے مدار میں واپس جاتا ہے۔ اس دوران ایٹم کی واپس لوٹنے والی رفتار  
- \_\_\_\_\_ m/s ہوگی

Options :

70819171723. 4.34 m/s

70819171724. 4.17 m/s

70819171725. 3.25 m/s

70819171726. 2.19 m/s

Question Number : 15 Question Id : 70819122188 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 :

70819171727.  $\frac{l_1 + l_2}{2}$

70819171728.  $\frac{T_2 l_1 + T_1 l_2}{T_1 + T_2}$

70819171729.  $\frac{T_1 l_1 - T_2 l_2}{T_2 - T_1}$

70819171730. 
$$\frac{T_2 l_1 - T_1 l_2}{T_2 - T_1}$$

**Question Number : 15 Question Id : 70819122188 Question Type : MCQ Option Shuffling : Yes**  
**Is Question Mandatory : No**

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

جب کسی دھاتی تار کو تناؤ  $T_1$  لگائیں تب اس کی لمبائی  $l_1$  ہوتی ہے۔ اگر تناؤ کو  $T_2$  کر دیں تب لمبائی  $l_2$  ہو جاتی ہے تو تار کی اصل لمبائی ہوگی

**Options :**

70819171727. 
$$\frac{l_1 + l_2}{2}$$

70819171728. 
$$\frac{T_2 l_1 + T_1 l_2}{T_1 + T_2}$$

70819171729. 
$$\frac{T_1 l_1 - T_2 l_2}{T_2 - T_1}$$

70819171730. 
$$\frac{T_2 l_1 - T_1 l_2}{T_2 - T_1}$$

**Question Number : 16 Question Id : 70819122189 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 :**

70819171731. a circle.

70819171732. a parabola.

70819171733. an ellipse.

70819171734. a helix.

**Question Number : 16 Question Id : 70819122189 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

جب ایک ذرہ خطی سادہ ہارمونی حرکت (S.H.M.) کرتا ہے تب رفتار اور ہٹاؤ (Displacement) کے درمیان کی ترتیب :

**Options :**

70819171731. ایک دائرہ (a circle)

70819171732. ایک شاپم (a parabola)

70819171733. ایک بیضوی (an ellipse)

70819171734. ایک زنجیر نما (a helix)

**Question Number : 17 Question Id : 70819122190 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 :**

70819171735.  $\vec{b} = \vec{a} - \vec{c}$

70819171736.  $\vec{b} = \vec{a} - 2(\vec{a} \cdot \vec{c})\vec{c}$

70819171737.  $\vec{b} = \vec{a} + 2\vec{c}$

70819171738.  $\vec{b} = 2\vec{a} + \vec{c}$

Question Number : 17 Question Id : 70819122190 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

اگر دو شعاع شعاع (incident ray) ، منعکس شعاع (reflected ray) اور باہر کی جانب عمل کرتا ہوا عمود کو بالترتیب اکائی سمتیے  $\vec{a}$  ،  $\vec{b}$  اور  $\vec{c}$  کی مدد سے ظاہر کریں تب ان سمتیوں کے درمیان صحیح تعلق :

Options :

70819171735.  $\vec{b} = \vec{a} - \vec{c}$

70819171736.  $\vec{b} = \vec{a} - 2(\vec{a} \cdot \vec{c})\vec{c}$

70819171737.  $\vec{b} = \vec{a} + 2\vec{c}$

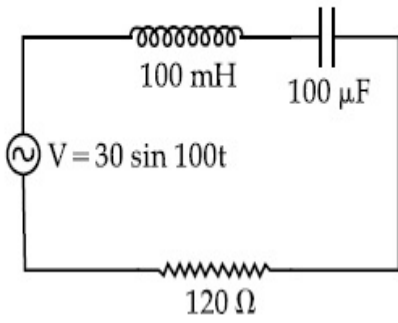
70819171738.  $\vec{b} = 2\vec{a} + \vec{c}$

Question Number : 18 Question Id : 70819122191 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 :**

70819171739. 2 A and 50 Hz

70819171740. 0.2 A and 50 Hz

70819171741. 2 A and 100 Hz

70819171742. 0.2 A and 100 Hz

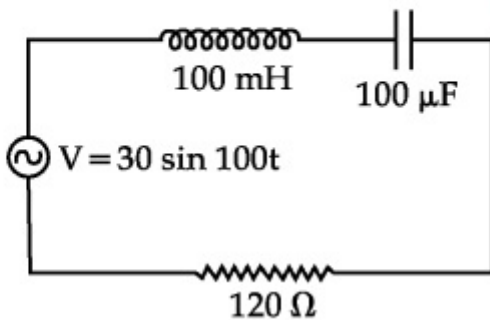
**Question Number : 18 Question Id : 70819122191 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

دئے گئے برقی سرکٹ میں بننے والی اعظم برقی رو کی قدر اور گمگ کی تعدد (resonant frequency) کی قدر:

(برقی سرکٹ کو شکل میں دکھایا گیا ہے)۔



**Options :**

70819171739. 50 Hz اور 2 A

70819171740. 50 Hz اور 0.2 A

70819171741. 100 Hz اور 2 A

70819171742. 100 Hz اور 0.2 A

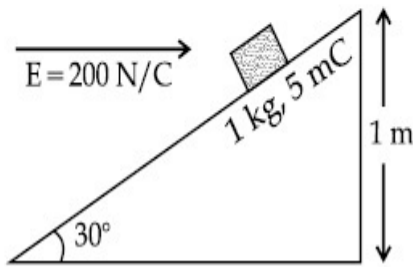
**Question Number : 19 Question Id : 70819122192 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

An inclined plane making an angle of  $30^\circ$  with the horizontal is placed in a uniform horizontal electric field  $200 \frac{\text{N}}{\text{C}}$  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.

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



**Options :**

70819171743. 2.3 s

70819171744. 1.3 s

70819171745. 0.92 s

70819171746. 0.46 s

**Question Number : 19 Question Id : 70819122192 Question Type : MCQ Option Shuffling : Yes**

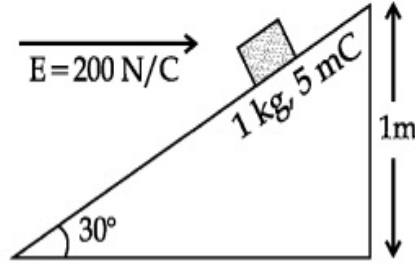


Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ایک انحرافی مائل مستوی سطح جو افقی سطح کے ساتھ  $30^\circ$  کا زاویہ بناتی ہے اس کو  $200 \frac{N}{C}$  کے افقی برقی میدان میں رکھا گیا ہے۔ اس انحرافی سطح سے 1 kg کمیت اور 5 mC برقی بار والے جسم کو حالت سکون سے 1 m کی بلندی سے چھوڑا گیا۔ اگر گڑ کا ضریب 0.2 ہو تب اس جسم کے نیچے کنارے کی تہہ تک پہنچنے کے لیے درکار وقت \_\_\_\_\_ s ہوگا۔

[ جبکہ ترتیب کو شکل میں دکھایا گیا ہے اور  $g = 9.8 \text{ m/s}^2$ ;  $\sin 30^\circ = \frac{1}{2}$ ;  $\cos 30^\circ = \frac{\sqrt{3}}{2}$  ]



Options :

70819171743. 2.3 s

70819171744. 1.3 s

70819171745. 0.92 s

70819171746. 0.46 s

Question Number : 20 Question Id : 70819122193 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A wire of  $1 \Omega$  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 :

70819171747. 76 %

70819171748. 56 %

70819171749. 25%

70819171750. 12.5%

**Question Number : 20 Question Id : 70819122193 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

ایک تار کی لمبائی 1 m اور مزاحمت  $1 \Omega$  ہے۔ اس کی لمبائی کو یکساں کھینچاؤ کے ذریعے 25% سے بڑھایا گیا ہو تب اس کی مزاحمت میں فیصد تبدیلی \_\_\_\_\_ ہوگی۔ (تقریباً مکمل صحیح عدد کے قریب)

**Options :**

70819171747. 76%

70819171748. 56%

70819171749. 25%

70819171750. 12.5%

## Physics Section B

<b>Section Id :</b>	7081911019
<b>Section Number :</b>	2
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	10
<b>Number of Questions to be attempted :</b>	5
<b>Section Marks :</b>	20
<b>Mark As Answered Required? :</b>	Yes

Sub-Section Number :

1

Sub-Section Id :

7081911299

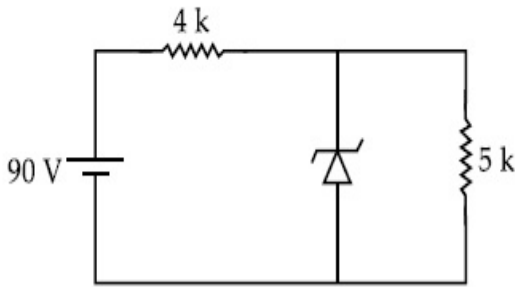
Question Shuffling Allowed :

Yes

Question Number : 21 Question Id : 70819122194 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 :

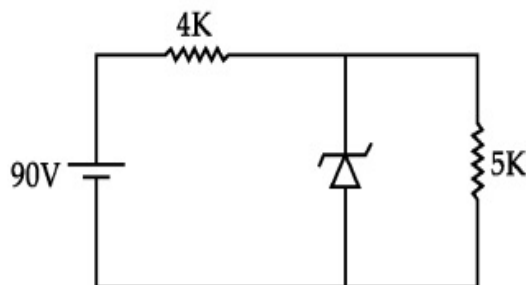
5 to 5.001

Question Number : 21 Question Id : 70819122194 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

\_\_\_\_\_ mA کرنٹ کے لیے  $V_z = 30$  V ہو تب دے گے برقی سرکٹ میں ڈائیوڈ سے بننے والی برقی کرنٹ

ہوگی۔



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 :** 70819122195 **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  $\alpha$  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 :** 70819122195 **Question Type :** SA

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

کسی سادہ پنڈولم کا اہتزاز کا دور  $T$  ہے۔ اس سادہ پنڈولم کو وسطی مقام سے اہتزاز شروع کر کے  $\frac{5}{8}$  اہتزاز کرنے کے لیے وقت  $\frac{\alpha}{\beta}T$  ہو تب  $\alpha$  کی قدر \_\_\_\_\_ ہوگی۔

**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 : 70819122196 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 : 70819122196 Question Type : SA**

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

کسی ایک سالماتی گیس (monoatomic gas) کے حجم  $V$  اور پش  $T$  کے درمیان میں تعلق کی مساوات  $V = KT^{\frac{2}{3}}$  ہے۔ اگر پش تبدیل ہو کر 90 K ہو تب کیا گیا کام  $xR$  ہوگا۔  $x$  کی قدر \_\_\_\_\_ ہوگی۔

[ $R$  = کائناتی گیس کا مستقلہ]

**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 : 70819122197 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 : 70819122197 Question Type : SA**

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

کسی ضیاء حساس مادہ کی سطح پر اس کے ضیاء برقی تفاعل (work function) کے دو گنی توانائی اور دس گنا توانائی والے دو ضیائیوں (photons) کو وقوع کیا گیا ہے۔ ان دو صورتوں میں خارج ہونے والے ضیاء الیکٹرون کی اعظم رفتار کے درمیان نسبت  $x : y$  ہے۔  
 $x$  \_\_\_\_\_ ہوں گی۔

**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 : 70819122198 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 :** 70819122198 **Question Type :** SA

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

کسی پیغام بردار لہر (carrier) کی اعظم ترین موڈولیشن کی تعدد 5 kHz ہے تب 90 kHz تو اتر کے حلقہ کی چوڑائی (Frequency band width رکھنے میں \_\_\_\_\_ (اے ایم ایف) اشاعتی اسٹیشن پائے جائیں گے۔

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

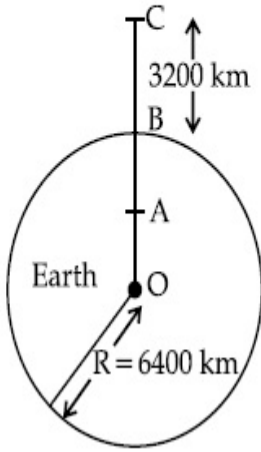
**Possible Answers :**

5 to 5.001

**Question Number :** 26 **Question Id :** 70819122199 **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

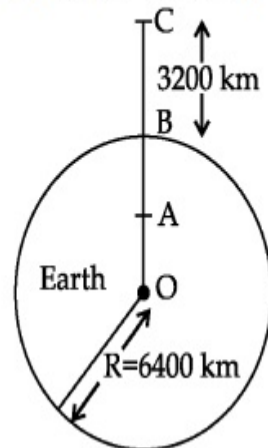
**Possible Answers :**

5 to 5.001

**Question Number :** 26 **Question Id :** 70819122199 **Question Type :** SA

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

دی گئی شکل میں نقاط A اور C پر اسراع بدوچ کشش ثقل کی قدر مساوی ہے۔ اور وہ نقطہ B پر کی قدر (سطح زمین) سے کم ہے۔ اگر  $OA : AB$  کی قدر  $x : y$  ہو تب  $x$  کی قدر \_\_\_\_\_ ہوگی۔



**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 :** 70819122200 **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 :** 70819122200 **Question Type :** SA

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

جب ایک مول کی ٹھوس دو سالماتی گیس (diatomic gas) کو  $Q$  حرارت دیں تب وہ  $\frac{Q}{5}$  کام کرتی ہے۔ اگر اس تبدیلی کے دوران گیس کی

سالماتی گنجائش  $\frac{xR}{8}$  ہے تو  $x$  کی قدر \_\_\_\_\_ ہوگی۔

[ $R$  = کائناتی گیس کا مستقلہ]

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

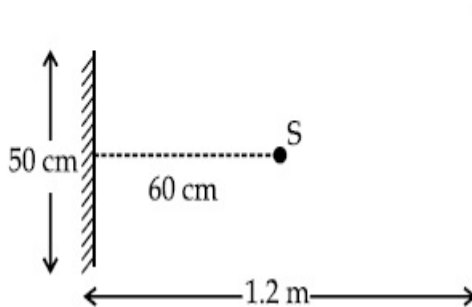
**Possible Answers :**

5 to 5.001

**Question Number : 28 Question Id : 70819122201 Question Type : SA**

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

A point source of light  $S$ , placed at a distance 60 cm in front of the centre of a plane mirror of width 50 cm, hangs vertically on a wall. A man walks in front 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

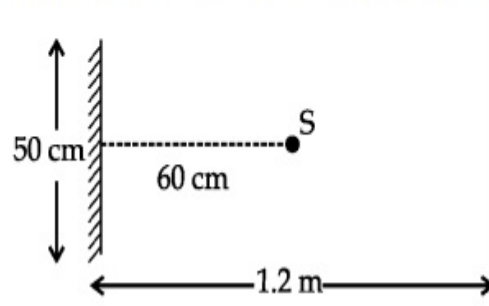
**Possible Answers :**

5 to 5.001

**Question Number : 28 Question Id : 70819122201 Question Type : SA**

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

دیوار میں عمودی لٹکے ہوئے 50 cm چوڑائی والے ایک مسطح آئینہ کے مرکز سے 60 cm کے فاصلے کی دوری پر ایک نقطہ سی منع نور S کو رکھا گیا ہے۔ ایک شخص 1.2 m فاصلے کی دوری سے آئینے کے سامنے متوازی کھینچے گئے خط کے ساتھ چلتا ہے (جیسا کہ شکل میں دکھایا گیا ہے)۔ اس شخص کے ذریعہ آئینہ میں ان دو نقطوں کا درمیانی فاصلہ جہاں وہ منع نور کا عکس دیکھ سکتا ہے \_\_\_\_\_ میٹر ہوگا۔



**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 :** 70819122202 **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 :** 70819122202 **Question Type :** SA

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

ایک سادہ ہارمونی حرکت (S.H.M.) کرنے والے ذرہ کا دور T اور حیظ 'a' ہے۔ جب ذرہ کی رفتار اعظم ترین رفتار کی نصف ہے تو اس کا ہٹاؤ  $\frac{\sqrt{x} a}{2}$  ہے۔ x کی قدر \_\_\_\_\_ ہے۔

**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 : 70819122203 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 : 70819122203 Question Type : SA**

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

پارہ کے 27 مکمل یکساں قطرات ہیں۔ ہر قطرہ پر 10 V کا قوی پایا جاتا ہے۔ یہ تمام قطرات مل کر ایک بڑا قطرہ بناتے ہیں۔ تب بڑے قطرے پر موجود قوی توانائی چھوٹے قطرے کی قوی توانائی کا \_\_\_\_\_ گنا ہوگا۔

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

## Chemistry Section A

<b>Section Id :</b>	7081911020
<b>Section Number :</b>	3
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	20
<b>Number of Questions to be attempted :</b>	20
<b>Section Marks :</b>	80
<b>Mark As Answered Required? :</b>	Yes
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	7081911300
<b>Question Shuffling Allowed :</b>	Yes

**Question Number : 31 Question Id : 70819122204 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 <sub>2</sub>	(i) 1
(b) N <sub>2</sub>	(ii) 2
(c) F <sub>2</sub>	(iii) 0
(d) O <sub>2</sub>	(iv) 3

Choose the correct answer from the options given below :

**Options :**

70819171761. (a) → (i), (b) → (ii), (c) → (iii), (d) → (iv)

70819171762. (a) → (iv), (b) → (iii), (c) → (ii), (d) → (i)

70819171763. (a) → (ii), (b) → (i), (c) → (iv), (d) → (iii)

70819171764. (a) → (iii), (b) → (iv), (c) → (i), (d) → (ii)

Question Number : 31 Question Id : 70819122204 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

فہرست-I اور فہرست-II کا موازنہ کیجئے :

فہرست-II

فہرست-I

(بندشی سلسلہ)

(سالہ)

1 (i) Ne<sub>2</sub> (a)

2 (ii) N<sub>2</sub> (b)

0 (iii) F<sub>2</sub> (c)

3 (iv) O<sub>2</sub> (d)

مندرجہ ذیل میں سے صحیح جواب چن کر لکھئے :

Options :

70819171761. (a) → (i), (b) → (ii), (c) → (iii), (d) → (iv)

70819171762. (a) → (iv), (b) → (iii), (c) → (ii), (d) → (i)

70819171763. (a) → (ii), (b) → (i), (c) → (iv), (d) → (iii)

70819171764. (a) → (iii), (b) → (iv), (c) → (i), (d) → (ii)

Question Number : 32 Question Id : 70819122205 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  $\text{FeCl}_3$  is added to excess of hot water is :

Options :

70819171765. positive

70819171766. negative

70819171767. neutral

70819171768. sometimes positive and sometimes negative

Question Number : 32 Question Id : 70819122205 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

جب  $\text{FeCl}_3$  میں زائد مقدار میں گرم پانی ملا یا جائے تو نتیجہً لسنوئی کے ذرات میں باردار کی نوعیت ہوتی ہے۔

Options :

70819171765. مثبت (positive)

70819171766. منفی (negative)

70819171767. معتدل (neutral)

70819171768. کچھ وقت میں مثبت اور کچھ وقت میں منفی

Question Number : 33 Question Id : 70819122206 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 :**

70819171769.  $O > S > Se > Te$

70819171770.  $Te > Se > S > O$

70819171771.  $S > O > Se > Te$

70819171772.  $S > Se > Te > O$

**Question Number : 33 Question Id : 70819122206 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

کو صحیح ترتیب میں کیجئے : electron gain enthalpy

**Options :**

70819171769.  $O > S > Se > Te$

70819171770.  $Te > Se > S > O$

70819171771.  $S > O > Se > Te$

70819171772.  $S > Se > Te > O$

**Question Number : 34 Question Id : 70819122207 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 :**

70819171773. (a) → (i), (b) → (ii), (c) → (v), (d) → (iii)

70819171774. (a) → (iii), (b) → (v), (c) → (i), (d) → (iv)

70819171775. (a) → (i), (b) → (ii), (c) → (iii), (d) → (iv)

70819171776. (a) → (iii), (b) → (i), (c) → (v), (d) → (ii)

**Question Number : 34 Question Id : 70819122207 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

فہرست-I اور فہرست-II کا موازنہ کیجئے :

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

مندرجہ ذیل میں سے صحیح جواب چن کر لکھئے :

**Options :**

70819171773. (a) → (i), (b) → (ii), (c) → (v), (d) → (iii)

70819171774. (a) → (iii), (b) → (v), (c) → (i), (d) → (iv)

70819171775. (a) → (i), (b) → (ii), (c) → (iii), (d) → (iv)

70819171776. (a) → (iii), (b) → (i), (c) → (v), (d) → (ii)

**Question Number : 35 Question Id : 70819122208 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  $\beta^-$  particles ?

**Options :**

70819171777. Proton  $H^+$

70819171778. Protium  ${}^1_1H$

70819171779. Deuterium  ${}^2_1H$

70819171780. Tritium  ${}^3_1H$

**Question Number : 35 Question Id : 70819122208 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

مندرجہ ذیل ہائیڈروجن کی شکلوں میں کون سی شکل کم توانائی کی  $\beta^-$  ذرات خارج کرتی ہے ؟

**Options :**

70819171777. Proton  $H^+$

70819171778. Protium  ${}^1_1H$

70819171779. Deuterium  ${}^2_1\text{H}$

70819171780. Tritium  ${}^3_1\text{H}$

**Question Number : 36 Question Id : 70819122209 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 :**

70819171781. (a)  $\rightarrow$  (iv), (b)  $\rightarrow$  (iii), (c)  $\rightarrow$  (i), (d)  $\rightarrow$  (ii)

70819171782. (a)  $\rightarrow$  (iv), (b)  $\rightarrow$  (i), (c)  $\rightarrow$  (ii), (d)  $\rightarrow$  (iii)

70819171783. (a)  $\rightarrow$  (i), (b)  $\rightarrow$  (iii), (c)  $\rightarrow$  (iv), (d)  $\rightarrow$  (ii)

70819171784. (a)  $\rightarrow$  (iii), (b)  $\rightarrow$  (ii), (c)  $\rightarrow$  (i), (d)  $\rightarrow$  (iv)

**Question Number : 36 Question Id : 70819122209 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

فہرست I اور فہرست II میں موازنہ کیجئے :

فہرست II-

فہرست I-

Deacon (i)

Sodium Carbonate (a)

Castner-Kellner (ii)

Titanium (b)

van-Arkel (iii)

Chlorine (c)

Solvay (iv)

Sodium hydroxide (d)

مندرجہ ذیل میں سے صحیح جواب چُن کر لکھئے :

**Options :**

70819171781. (a) → (iv), (b) → (iii), (c) → (i), (d) → (ii)

70819171782. (a) → (iv), (b) → (i), (c) → (ii), (d) → (iii)

70819171783. (a) → (i), (b) → (iii), (c) → (iv), (d) → (ii)

70819171784. (a) → (iii), (b) → (ii), (c) → (i), (d) → (iv)

**Question Number : 37 Question Id : 70819122210 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 :**

70819171785.  $B_2O_3, SiO_2$

70819171786.  $B_2O_3, CaO$

70819171787.  $N_2O, BaO$

70819171788.  $CaO, SiO_2$

Question Number : 37 Question Id : 70819122210 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

مندرجہ ذیل میں سے کوئی جوڑی میں آکسائیڈس کی تیزابی نوعیت پائی جاتی ہے ؟

Options :

70819171785.  $B_2O_3, SiO_2$

70819171786.  $B_2O_3, CaO$

70819171787.  $N_2O, BaO$

70819171788.  $CaO, SiO_2$

Question Number : 38 Question Id : 70819122211 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 :

70819171789. Both A and R are correct and R is the correct explanation of A

70819171790. Both A and R are correct but R is NOT the correct explanation of A

70819171791. A is correct but R is not correct

70819171792. A is not correct but R is correct

Question Number : 38 Question Id : 70819122211 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

مندرجہ ذیل میں دو بیانات دیئے گئے ہیں۔ ایک کو نامزد کرتے ہے دعویٰ- A (Assertion A) کے طور پر دوسرے کو نامزد کیا گیا ہے وجہ- R (Reason-R) کے طور پر

Assertion A :  $TlI_3$  جو کہ  $CsI_3$  کی ہم شکل ہے، میں دھات کی تکسیدی حالت +1 ہے۔

Reason R :  $Tl$  دھات کی الیکٹرانئی تشکیل میں چودہ  $f$  الیکٹرون ہوتے ہیں۔

اوپر دیئے گئے بیانات کی روشنی میں مندرجہ ذیل خیالات میں سے صحیح جواب چن کر لکھئے :

Options :

70819171789. یہاں پر دونوں A اور R صحیح ہے۔ اور R یہاں پر A کی صحیح وضاحت کرتا ہے

70819171790. دونوں بھی A اور R صحیح ہیں۔ لیکن یہاں پر R، A کی صحیح وضاحت نہیں کرتا۔

70819171791. A صحیح ہے، لیکن R غلط ہے۔

70819171792. A صحیح نہیں ہے، لیکن R صحیح ہے۔

Question Number : 39 Question Id : 70819122212 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 :

70819171793. Calgon contains the 2<sup>nd</sup> most abundant element by weight in the Earth's crust.

70819171794. It is polymeric compound and is water soluble.

70819171795. It is also known as Graham's salt.

70819171796. It doesnot remove  $Ca^{2+}$  ion by precipitation.

**Question Number : 39 Question Id : 70819122212 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

Calgon کا استعمال پانی کے عمل کیلئے (treatment) کیا جاتا ہے۔  
مندرجہ ذیل میں سے کونسا بیان Calgon کے لئے درست نہیں ہے ؟

**Options :**

70819171793. سطح زمین پر Calgon وزن کے اعتبار سے دوسرا سب سے زیادہ پایا جانے والا عنصر ہے۔

70819171794. یہ ایک پالمریک مرکب ہے اور جو پانی میں حل پذیر ہوتا ہے۔

70819171795. اس کو عام طور پر Graham's salt سے بھی جانا جاتا ہے۔

70819171796. یہ  $Ca^{2+}$  آئن کو رسوب طریقے سے نہیں علاحدہ کرتا ہے۔

**Question Number : 40 Question Id : 70819122213 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 :**

70819171797. alcohol, amine

70819171798. amine, alcohol

70819171799. alcohol, phenol

70819171800. amine, phenol

**Question Number : 40 Question Id : 70819122213 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

اور \_\_\_\_\_ بالترتیب  $\text{CHCl}_3/\text{alc. KOH}$  اور Ferric ammonium nitrate کو استعمال کرتے۔  
میں تقابلی گروپ کی شناخت میں۔ \_\_\_\_\_

**Options :**

70819171797. alcohol, amine

70819171798. amine, alcohol

70819171799. alcohol, phenol

70819171800. amine, phenol

**Question Number : 41 Question Id : 70819122214 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

In  $\overset{1}{\text{CH}_2}=\overset{2}{\text{C}}=\overset{3}{\text{CH}}-\overset{4}{\text{CH}_3}$  molecule, the hybridization of carbon 1, 2, 3 and 4 respectively, are :

**Options :**

70819171801.  $sp^2, sp^2, sp^2, sp^3$



70819171802.  $sp^3, sp, sp^3, sp^3$

70819171803.  $sp^2, sp, sp^2, sp^3$

70819171804.  $sp^2, sp^3, sp^2, sp^3$

**Question Number : 41 Question Id : 70819122214 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

: بالترتیب 1, 2, 3 اور 4 کے لیے کاربن کی مخلوطی  $\overset{1}{\text{C}}\text{H}_2 = \overset{2}{\text{C}} = \overset{3}{\text{C}}\text{H} - \overset{4}{\text{C}}\text{H}_3$  سالے کے لیے کاربن کی مخلوطی 4 اور 3، 2، 1 بالترتیب ہیں :

**Options :**

70819171801.  $sp^2, sp^2, sp^2, sp^3$

70819171802.  $sp^3, sp, sp^3, sp^3$

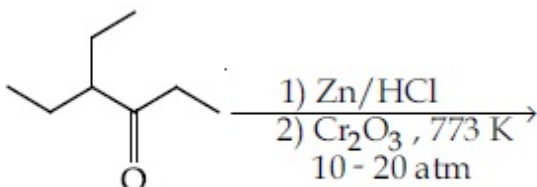
70819171803.  $sp^2, sp, sp^2, sp^3$

70819171804.  $sp^2, sp^3, sp^2, sp^3$

**Question Number : 42 Question Id : 70819122215 Question Type : MCQ Option Shuffling : Yes**

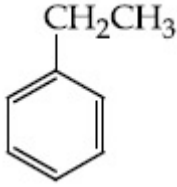
**Is Question Mandatory : No**

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

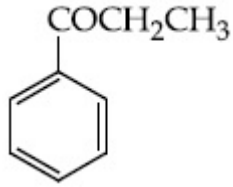


Considering the above reaction, the major product among the following is :

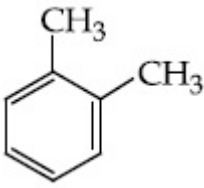
Options :



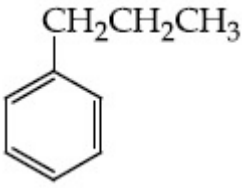
70819171805.



70819171806.



70819171807.

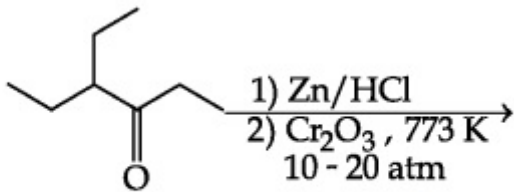


70819171808.

Question Number : 42 Question Id : 70819122215 Question Type : MCQ Option Shuffling : Yes

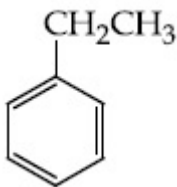
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1



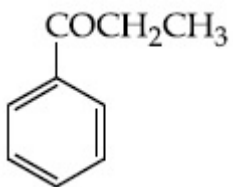
مندرجہ بالا عمل میں حاصل شدہ شے کا زیادہ مقدار والا حصہ ہے :

Options :

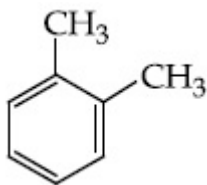


70819171805.

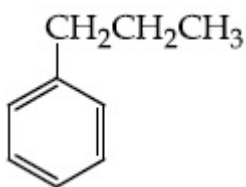
70819171806.



70819171807.



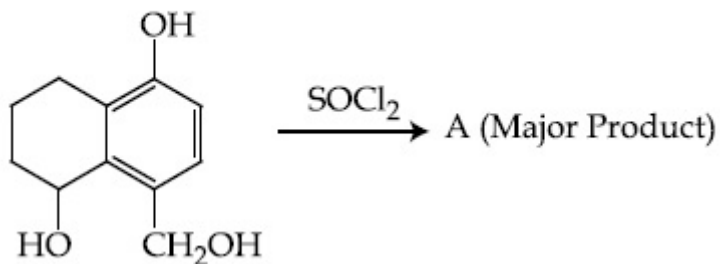
70819171808.



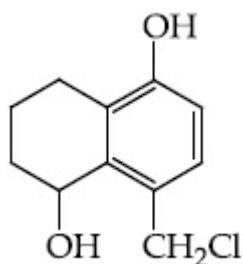
**Question Number : 43 Question Id : 70819122216 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

Identify A in the given reaction.

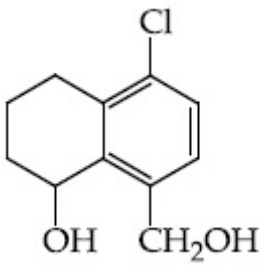


**Options :**

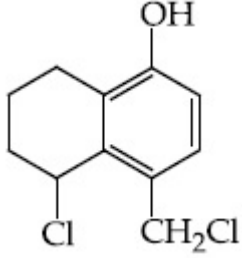


70819171809.

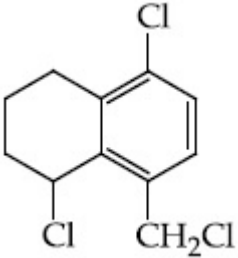
70819171810.



70819171811.



70819171812.

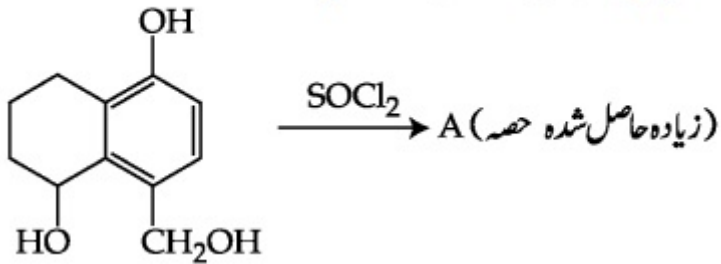


Question Number : 43 Question Id : 70819122216 Question Type : MCQ Option Shuffling : Yes

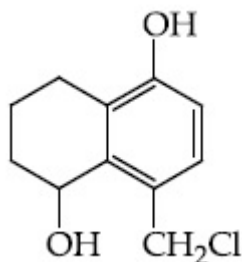
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

مندرجہ ذیل تعامل میں 'A' کی شناخت کیجئے :

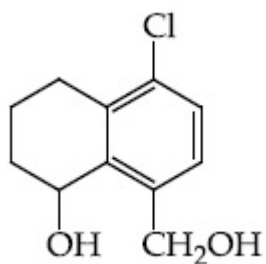


Options :

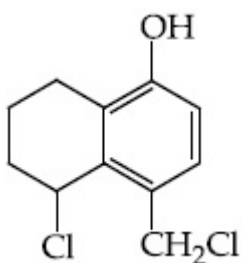


70819171809.

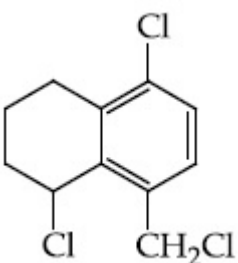
70819171810.



70819171811.



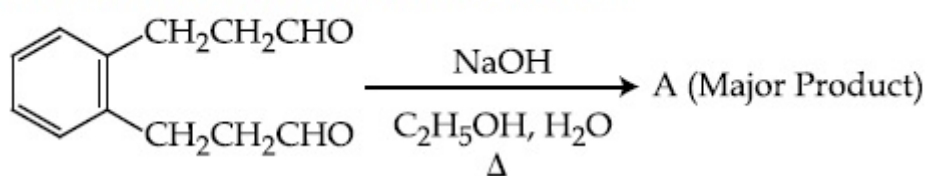
70819171812.



**Question Number : 44 Question Id : 70819122217 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

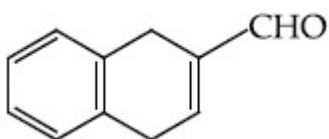
**Correct Marks : 4 Wrong Marks : 1**

Identify A in the given chemical reaction.

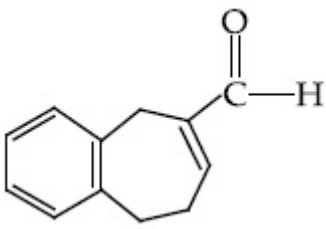


**Options :**

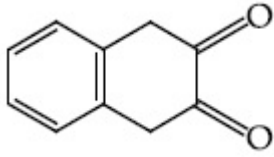
70819171813.



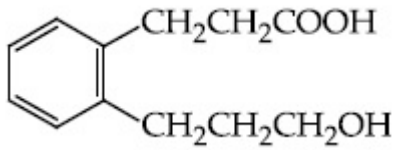
70819171814.



70819171815.



70819171816.

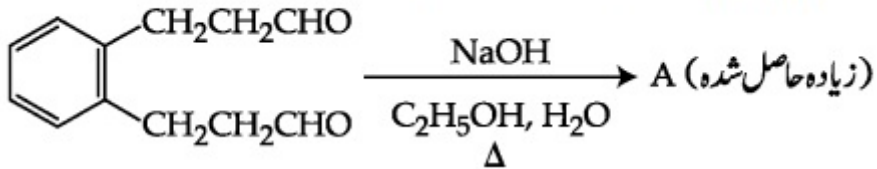


Question Number : 44 Question Id : 70819122217 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

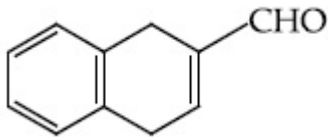
Correct Marks : 4 Wrong Marks : 1

مندرجہ ذیل کیمیائی تعامل میں 'A' کی شناخت کیجئے :

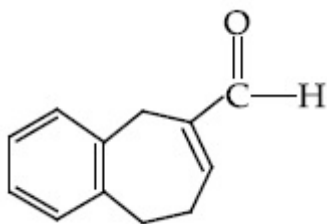


Options :

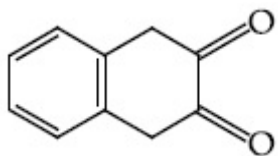
70819171813.



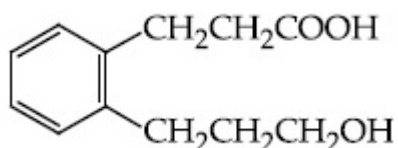
70819171814.



70819171815.



70819171816.

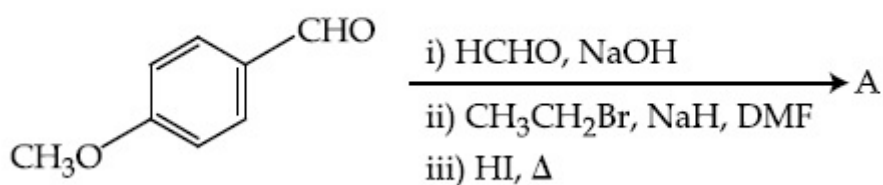


Question Number : 45 Question Id : 70819122218 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

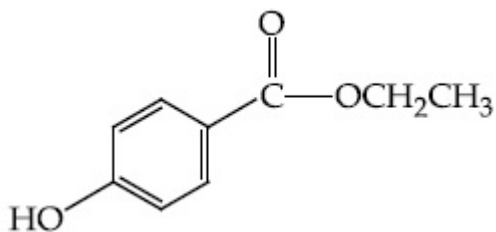
Correct Marks : 4 Wrong Marks : 1

Identify A in the following chemical reaction.

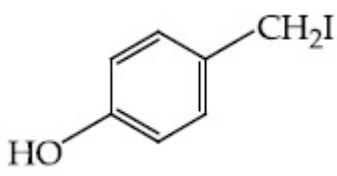


Options :

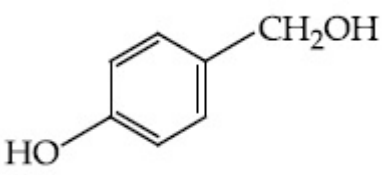
70819171817.



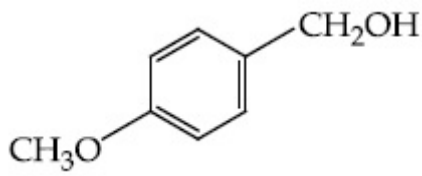
70819171818.



70819171819.



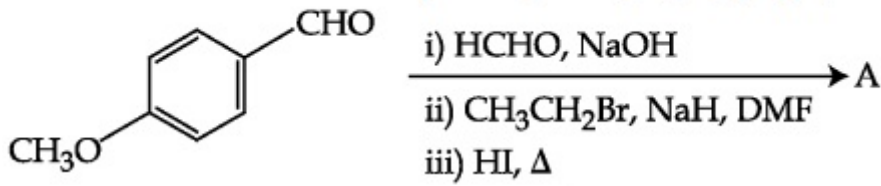
70819171820.



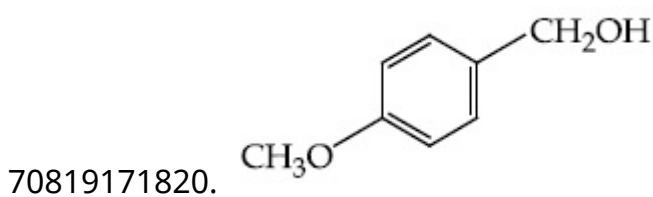
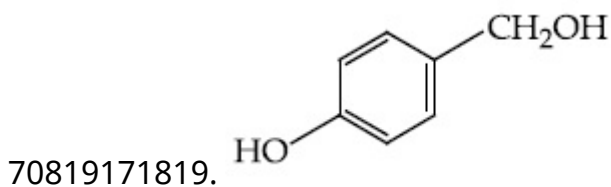
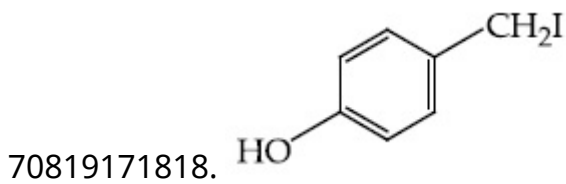
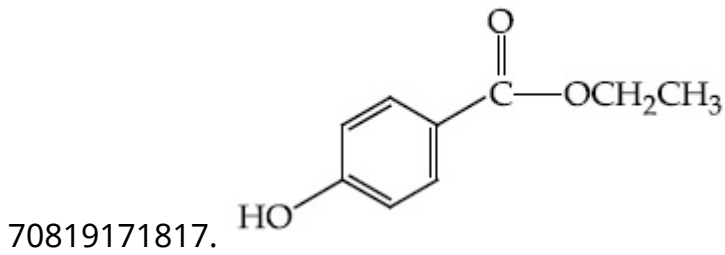
Question Number : 45 Question Id : 70819122218 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

مندرجہ ذیل کیمیائی تعامل میں 'A' کی شناخت کیجئے :



Options :



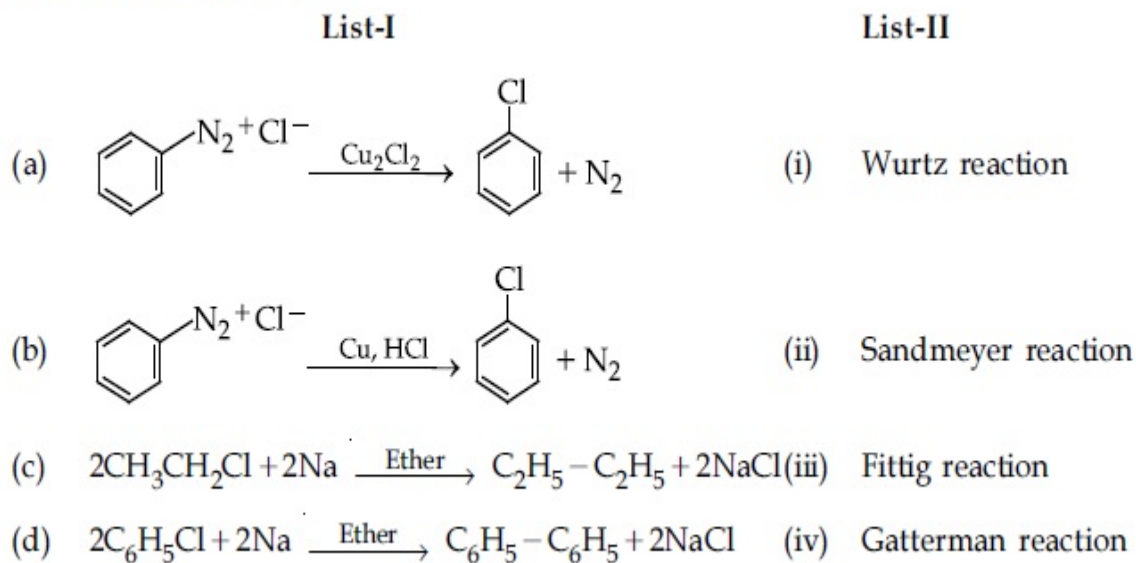


Question Number : 46 Question Id : 70819122219 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Match List-I with List-II.



Choose the correct answer from the options given below :

Options :

70819171821. (a)  $\rightarrow$  (ii), (b)  $\rightarrow$  (iv), (c)  $\rightarrow$  (i), (d)  $\rightarrow$  (iii)

70819171822. (a)  $\rightarrow$  (ii), (b)  $\rightarrow$  (i), (c)  $\rightarrow$  (iv), (d)  $\rightarrow$  (iii)

70819171823. (a)  $\rightarrow$  (iii), (b)  $\rightarrow$  (i), (c)  $\rightarrow$  (iv), (d)  $\rightarrow$  (ii)

70819171824. (a)  $\rightarrow$  (iii), (b)  $\rightarrow$  (iv), (c)  $\rightarrow$  (i), (d)  $\rightarrow$  (ii)

Question Number : 46 Question Id : 70819122219 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

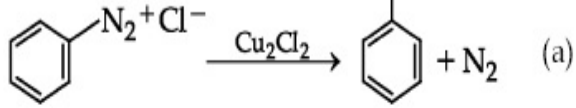
Correct Marks : 4 Wrong Marks : 1

فہرست I اور فہرست II کا موازنہ کیجئے :

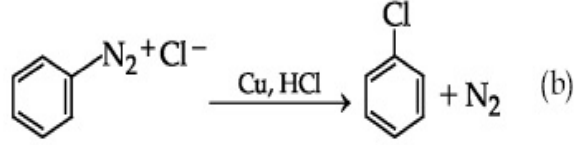
فہرست II

فہرست I

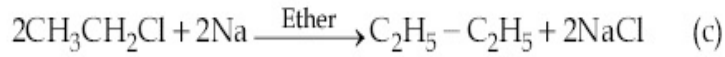
ورٹز تعامل  
(Wurtz reaction)



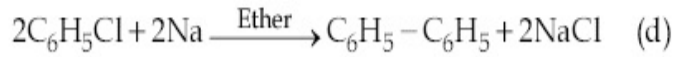
سینڈمیر تعامل  
(Sandmeyer reaction)



فٹنگ تعامل  
(Fittig reaction)



گیٹرمین تعامل  
(Gatterman reaction)



مندرجہ ذیل میں سے صحیح جواب چن کر لکھئے :

**Options :**

70819171821. (a) → (ii), (b) → (iv), (c) → (i), (d) → (iii)

70819171822. (a) → (ii), (b) → (i), (c) → (iv), (d) → (iii)

70819171823. (a) → (iii), (b) → (i), (c) → (iv), (d) → (ii)

70819171824. (a) → (iii), (b) → (iv), (c) → (i), (d) → (ii)

**Question Number : 47 Question Id : 70819122220 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 :**

70819171825. aldoses, ketoses

70819171826. ketoses, aldoses

70819171827. ketoses, proteins

70819171828. proteins, ketoses

**Question Number : 47 Question Id : 70819122220 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

Xanthoproteic test اور Seliwanoff test کو استعمال کرتے ہیں \_\_\_\_\_ اور \_\_\_\_\_ کی شناخت کے لئے  
بالترتیب

**Options :**

70819171825. aldoses, ketoses

70819171826. ketoses, aldoses

70819171827. ketoses, proteins

70819171828. proteins, ketoses

**Question Number : 48 Question Id : 70819122221 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) $\beta$ -D-Galactose and $\beta$ -D-Glucose
(b) Lactose	(ii) $\alpha$ -D-Glucose and $\beta$ -D-Fructose
(c) Maltose	(iii) $\alpha$ -D-Glucose and $\alpha$ -D-Glucose

Choose the correct answer from the options given below :

**Options :**

70819171829. (a)  $\rightarrow$  (ii), (b)  $\rightarrow$  (i), (c)  $\rightarrow$  (iii)

70819171830. (a)  $\rightarrow$  (iii), (b)  $\rightarrow$  (ii), (c)  $\rightarrow$  (i)

70819171831. (a)  $\rightarrow$  (i), (b)  $\rightarrow$  (iii), (c)  $\rightarrow$  (ii)

70819171832. (a)  $\rightarrow$  (iii), (b)  $\rightarrow$  (i), (c)  $\rightarrow$  (ii)

**Question Number : 48 Question Id : 70819122221 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

فہرست-I اور فہرست-II کا موازنہ کیجئے :

فہرست-II	فہرست-I
$\beta$ -D-Galactose and $\beta$ -D-Glucose (i)	Sucrose (a)
$\alpha$ -D-Glucose and $\beta$ -D-Fructose (ii)	Lactose (b)
$\alpha$ -D-Glucose and $\alpha$ -D-Glucose (iii)	Maltose (c)

مندرجہ ذیل میں سے صحیح جواب چن کر لکھئے :

**Options :**

70819171829. (a)  $\rightarrow$  (ii), (b)  $\rightarrow$  (i), (c)  $\rightarrow$  (iii)

70819171830. (a)  $\rightarrow$  (iii), (b)  $\rightarrow$  (ii), (c)  $\rightarrow$  (i)

70819171831. (a)  $\rightarrow$  (i), (b)  $\rightarrow$  (iii), (c)  $\rightarrow$  (ii)

70819171832. (a) → (iii), (b) → (i), (c) → (ii)

**Question Number : 49 Question Id : 70819122222 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 :**

70819171833. halogens

70819171834. aldehyde

70819171835. amine

70819171836. ether

**Question Number : 49 Question Id : 70819122222 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

2,4-DNP جانچ کو مندرجہ ذیل کی جانچ میں استعمال کر سکتے

**Options :**

70819171833. halogens

70819171834. aldehyde

70819171835. amine

70819171836. ether

Question Number : 50 Question Id : 70819122223 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 :

70819171837.  $A > B > C > D$

70819171838.  $D > C > B > A$

70819171839.  $A > C > B > D$

70819171840.  $D > B > C > A$

Question Number : 50 Question Id : 70819122223 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-Methylaniline

D. Benzenamine

مندرجہ بالا امانس میں سے صحیح اساسی نوعیت کے درجے کو منتخب کیجئے :

Options :

70819171837.  $A > B > C > D$

70819171838.  $D > C > B > A$

70819171839.  $A > C > B > D$

70819171840. D > B > C > A

## Chemistry Section B

Section Id :	7081911021
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 :	7081911301
Question Shuffling Allowed :	Yes

Question Number : 51 Question Id : 70819122224 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The  $\text{NaNO}_3$  weighed out to make 50 mL of an aqueous solution containing 70.0 mg  $\text{Na}^+$  per mL is \_\_\_\_\_ g. (Rounded off to the nearest integer)

[Given : Atomic weight in  $\text{g mol}^{-1}$  - 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 : 70819122224 Question Type : SA**

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

g \_\_\_\_\_ فی ملی لیٹر ہے  $\text{Na}^+$  70.0 mg میں 50 mL آب آمیز مخلول تیار کیا گیا جس میں  $\text{NaNO}_3$  کا وزن جس کو لے کر ہے۔ (قریب ترین مکمل عدد)

[Na: 23 ; N : 14 ; O : 16 میں ہیں  $\text{g mol}^{-1}$  دیا گیا: جوہری وزن]

**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 : 70819122225 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 : 70819122225 Question Type : SA**

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

\_\_\_\_\_ ہے۔ lattice کے site میں octahedral خالی کی تعداد فی lattice ہوتی ہے۔ (قریب ترین مکمل عدد میں)



**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 : 70819122226 Question Type : SA**

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

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

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

**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 : 70819122226 Question Type : SA**

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

ایک گیند کی کمیت 10 g ہے جو  $90 \text{ ms}^{-1}$  کی رفتار حرکت کرتا ہے تو اس کی غیر یقینی رفتار 5% ہے۔ تب اس کی غیر یقینی حالت \_\_\_\_\_  $\times 10^{-33} \text{ m}$  ہے۔ (جواب قریب ترین مکمل عدد میں)

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

**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 : 70819122227 Question Type : SA**

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

The average S–F bond energy in  $\text{kJ mol}^{-1}$  of  $\text{SF}_6$  is \_\_\_\_\_. (Rounded off to the nearest integer)

[Given : The values of standard enthalpy of formation of  $\text{SF}_6(\text{g})$ ,  $\text{S}(\text{g})$  and  $\text{F}(\text{g})$  are - 1100, 275 and  $80 \text{ kJ mol}^{-1}$  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 : 70819122227 Question Type : SA**

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

$\text{SF}_6$  کی اوسط S–F بندش توانائی  $\text{kJ mol}^{-1}$  میں \_\_\_\_\_ ہے۔ (قریب ترین مکمل عدد میں)

[دیا گیا : تیاری کی معیاری انتھالپی

$-1100 \text{ kJ mol}^{-1} = \text{SF}_6(\text{g})$

$275 \text{ kJ mol}^{-1} = \text{S}(\text{g})$

$80 \text{ kJ mol}^{-1} = \text{F}(\text{g})$  ]

**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 : 70819122228 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  $-0.93^{\circ}\text{C}$  ( $K_f(\text{H}_2\text{O}) = 1.86 \text{ K kg mol}^{-1}$ ). 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 : 70819122228 Question Type : SA**

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

جب 12.2 g بنزویک ایسڈ (benzoic acid) کو 100 g پانی میں حل کیا جاتا ہے تو محلول کا نقطہ انجماد  $-0.93^{\circ}\text{C}$  پایا گیا تھا۔

$(K_f(\text{H}_2\text{O}) = 1.86 \text{ K kg mol}^{-1})$ ۔ بنزویک ایسڈ کے جڑے ہوئے سالمات کی تعداد (n) \_\_\_\_\_ ہے۔

(100% جڑے ہوئے فرض کیجئے)

**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 : 70819122229 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 : 70819122229 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

اگر  $pK_a$  فاسفورک ایسڈ کا اور  $pK_b$  امونیم ہائیڈروآکسائیڈ کا pH بالترتیب 5.23 اور 4.75 ہے تو امونیم فاسفیٹ محلول کا pH \_\_\_\_\_ ہے۔

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

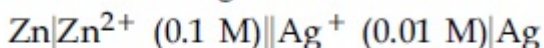
Possible Answers :

5 to 5.001

Question Number : 57 Question Id : 70819122230 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

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



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

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

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

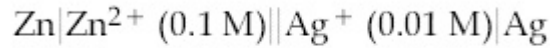
**Possible Answers :**

5 to 5.001

**Question Number : 57 Question Id : 70819122230 Question Type : SA**

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

298 K پر ذیل کے برقی خانے کا V Emf میں  $x \times 10^{-2}$  ہے۔



x کی قدر \_\_\_\_\_ ہے۔ (جواب قریب ترین مکمل عدد میں)

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

**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 : 70819122231 Question Type : SA**

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

If the activation energy of a reaction is  $80.9 \text{ kJ mol}^{-1}$ , 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  $R = 8.31 \text{ J K}^{-1} \text{ mol}^{-1}$ ]

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 58 **Question Id :** 70819122231 **Question Type :** SA

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

ایک عمل کی کارکردگی کی توانائی  $80.9 \text{ kJ mol}^{-1}$  ہے۔  $700 \text{ K}$  پر جول کی کثیر تعداد میں بہت زیادہ توانائی عمل کرتی ہے  $e^{-x}$  کے حاصل شدہ شکل میں۔ تو  $x$  کی قیمت \_\_\_\_\_ ہے۔ (قریب ترین مکمل عدد میں)  
[استعمال کریں :  $R = 8.31 \text{ J K}^{-1} \text{ mol}^{-1}$ ]

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001

**Question Number :** 59 **Question Id :** 70819122232 **Question Type :** SA

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

In mildly alkaline medium, thiosulphate ion is oxidized by  $\text{MnO}_4^-$  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 : 70819122232 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

معمولی اساسی واسطے میں تھائیوسلفیٹ آئن  $\text{MnO}_4^-$  کے ساتھ تکسید ہو کر "A" بناتا ہے۔ "A" میں سلفر کی تکسیدی حالت \_\_\_\_\_ ہے۔

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 : 70819122233 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The number of stereoisomers possible for  $[\text{Co}(\text{ox})_2(\text{Br})(\text{NH}_3)]^{2-}$  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 : 70819122233 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

\_\_\_\_\_ ہے / ہیں۔ کی تعداد (stereoisomers) کے لیے ممکنہ اسٹریو آئسومرس  $[\text{Co}(\text{ox})_2(\text{Br})(\text{NH}_3)]^{2-}$

[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

## Mathematics Section A

<b>Section Id :</b>	7081911022
<b>Section Number :</b>	5
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	20
<b>Number of Questions to be attempted :</b>	20
<b>Section Marks :</b>	80
<b>Mark As Answered Required? :</b>	Yes
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	7081911302
<b>Question Shuffling Allowed :</b>	Yes

**Question Number : 61 Question Id : 70819122234 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  $(\alpha, \beta, \gamma)$ , then  $5(\alpha + \beta + \gamma)$  equals :

**Options :**

70819171851. 39



70819171852. 41

70819171853. 43

70819171854. 47

**Question Number : 61 Question Id : 70819122234 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

اگر نقطہ  $(1, 3, 5)$  کا آئینہ عکس (mirror image) مستوی  $4x - 5y + 2z = 8$  (plane) کے لحاظ سے  $(\alpha, \beta, \gamma)$  ہے تو  
\_\_\_\_\_  $5(\alpha + \beta + \gamma)$  کے برابر ہے۔

**Options :**

70819171851. 39

70819171852. 41

70819171853. 43

70819171854. 47

**Question Number : 62 Question Id : 70819122235 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

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

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

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

**Options :**

70819171855. 5!

70819171856.  $^{10}C_5$

70819171857.  $5^5$

70819171858.  $10^5$

**Question Number : 62 Question Id : 70819122235 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

فرض کیجئے  $A = \{1, 2, 3, \dots, 10\}$  اور  $f: A \rightarrow A$

کو اس طرح بیان کیا گیا کہ

$$f(k) = \begin{cases} k + 1 & \text{اگر } k \text{ طاق (odd) ہے} \\ k & \text{اگر } k \text{ جفت (even) ہے} \end{cases}$$

تو تفاعل  $g: A \rightarrow A$  کی ممکن تعداد \_\_\_\_\_ ہے۔

اس طرح  $g \circ f = f$  ہے :

**Options :**

70819171855. 5!

70819171856.  $^{10}C_5$

70819171857.  $5^5$

70819171858.  $10^5$

**Question Number : 63 Question Id : 70819122236 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 :**

70819171859.  $A_1 : A_2 = 1 : 2$  and  $A_1 + A_2 = 1$

70819171860.  $A_1 : A_2 = 1 : \sqrt{2}$  and  $A_1 + A_2 = 1$

70819171861.  $A_1 = A_2$  and  $A_1 + A_2 = \sqrt{2}$

70819171862.  $2A_1 = A_2$  and  $A_1 + A_2 = 1 + \sqrt{2}$

**Question Number : 63 Question Id : 70819122236 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

فرض کیجئے  $A_1$  یہ منحنی  $y = \sin x$ ،  $y = \cos x$  اور  $y$ -محور سے پہلے ربع میں گھیرے ہوئے علاقہ کا رقبہ ہے اور اس طرح  $A_2$  یہ منحنی  $y = \sin x$ ،  $y = \cos x$  اور  $x = \frac{\pi}{2}$  اور  $x$ -محور اور  $x = \frac{\pi}{2}$  سے پہلے ربع میں گھیرے ہوئے علاقہ کا رقبہ ہے تو :

**Options :**

70819171859.  $A_1 : A_2 = 1 : 2$  اور  $A_1 + A_2 = 1$

70819171860.  $A_1 : A_2 = 1 : \sqrt{2}$  اور  $A_1 + A_2 = 1$

70819171861.  $A_1 = A_2$  اور  $A_1 + A_2 = \sqrt{2}$

70819171862.  $2A_1 = A_2$  اور  $A_1 + A_2 = 1 + \sqrt{2}$

Question Number : 64 Question Id : 70819122237 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

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

Options :

70819171863.  $e$

70819171864.  $e^2 - 1$

70819171865.  $\log_e 2$

70819171866.  $\log_e \left(\frac{e}{2}\right)$

Question Number : 64 Question Id : 70819122237 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

اگر  $\tan^{-1}a + \tan^{-1}b = \frac{\pi}{4}$  اور  $0 < a, b < 1$  تو

$$(a + b) - \left(\frac{a^2 + b^2}{2}\right) + \left(\frac{a^3 + b^3}{3}\right) - \left(\frac{a^4 + b^4}{4}\right) + \dots$$

کی قیمت ہے \_\_\_\_\_

Options :

70819171863.  $e$

70819171864.  $e^2 - 1$

70819171865.  $\log_e 2$

70819171866.  $\log_e \left( \frac{e}{2} \right)$

**Question Number : 65 Question Id : 70819122238 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 :**

70819171867.  $-\frac{4}{3}$

70819171868.  $-\frac{18}{19}$

70819171869.  $\frac{18}{35}$

70819171870.  $-\frac{18}{11}$

**Question Number : 65 Question Id : 70819122238 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

فرض کیجئے منحنی (curve) پر کوئی بھی نقطہ  $P(x, y)$  کے مماس کا ڈھلان  $\frac{xy^2 + y}{x}$  دیا ہوا ہے۔ اگر منحنی، خط  $x + 2y = 4$  کو  $x = -2$  پر (intersect) قطع کرتا ہے تو نقطہ  $(3, y)$ ، منحنی پر واقع ہونے کے لئے  $y$  کی قیمت \_\_\_\_\_ ہے۔

**Options :**

70819171867.  $-\frac{4}{3}$

70819171868.  $-\frac{18}{19}$

70819171869.  $\frac{18}{35}$

70819171870.  $-\frac{18}{11}$

**Question Number : 66 Question Id : 70819122239 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 :**

70819171871.  $\frac{41}{8}e + \frac{19}{8}e^{-1} - 10$

70819171872.  $\frac{41}{8}e + \frac{19}{8}e^{-1} + 10$

70819171873.  $-\frac{41}{8}e + \frac{19}{8}e^{-1} - 10$

70819171874.  $\frac{41}{8}e - \frac{19}{8}e^{-1} - 10$

Question Number : 66 Question Id : 70819122239 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$$\sum_{n=1}^{\infty} \frac{n^2 + 6n + 10}{(2n + 1)!}$$
 (series) مربوط سلسلہ  
کا مجموعہ (sum) کے برابر ہے۔

Options :

70819171871.  $\frac{41}{8}e + \frac{19}{8}e^{-1} - 10$

70819171872.  $\frac{41}{8}e + \frac{19}{8}e^{-1} + 10$

70819171873.  $-\frac{41}{8}e + \frac{19}{8}e^{-1} - 10$

70819171874.  $\frac{41}{8}e - \frac{19}{8}e^{-1} - 10$

Question Number : 67 Question Id : 70819122240 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  $x \in \mathbf{R}$ . Then  $f(x)$  equals :

Options :

70819171875.  $2e^{(e^x - 1)} - 1$

70819171876.  $e^{(e^x - 1)}$

70819171877.  $e^{e^x} - 1$

70819171878.  $2e^{e^x} - 1$

**Question Number : 67 Question Id : 70819122240 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

فرض کیجئے  $f(x) = \int_0^x e^t f(t) dt + e^x$  یہ تفریقی تعامل (differentiable function) ہے۔ سب کیلئے  $x \in \mathbb{R}$  تو \_\_\_\_\_ کے برابر ہے۔

**Options :**

70819171875.  $2e^{(e^x - 1)} - 1$

70819171876.  $e^{(e^x - 1)}$

70819171877.  $e^{e^x} - 1$

70819171878.  $2e^{e^x} - 1$

**Question Number : 68 Question Id : 70819122241 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  $\lim_{x \rightarrow a} \frac{xf(a) - af(x)}{x - a}$  equals :

**Options :**

70819171879.  $2a - 4$



70819171880.  $4 - 2a$

70819171881.  $2a + 4$

70819171882.  $a + 4$

**Question Number : 68 Question Id : 70819122241 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

فرض کیجئے  $f(x)$  یہ  $x=a$  پر تفریقی تفاعل (differentiable function) اور  $f'(a)=2$  کے ساتھ ہے تو  
\_\_\_\_\_ کے برابر ہے۔  $\lim_{x \rightarrow a} \frac{xf(a) - af(x)}{x - a}$

**Options :**

70819171879.  $2a - 4$

70819171880.  $4 - 2a$

70819171881.  $2a + 4$

70819171882.  $a + 4$

**Question Number : 69 Question Id : 70819122242 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  $g(2) = \lim_{x \rightarrow 2} g(x)$ , then the domain of the function  $f \circ g$  is :

**Options :**

70819171883.

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

70819171884.

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

70819171885.

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

70819171886.

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

**Question Number : 69 Question Id : 70819122242 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

(domain) کا ڈومین  $f \circ g$  تو متعلق  $g(2) = \lim_{x \rightarrow 2} g(x)$  اگر  $g(x) = \frac{x^2 - x - 2}{2x^2 - x - 6}$  اور  $f(x) = \sin^{-1} x$  کیجئے

← \_\_\_\_\_

**Options :**

70819171883.

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

70819171884.

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

70819171885.

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

70819171886.

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

**Question Number : 70 Question Id : 70819122243 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 :**

70819171887. an ellipse

70819171888. a hyperbola

70819171889. a parabola

70819171890. a straight line

**Question Number : 70 Question Id : 70819122243 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

فرض کیجئے A(1, 4) اور B(1, -5) دو نقاط ہیں۔ فرض کیجئے نقطہ P دائرہ  $(x-1)^2 + (y-1)^2 = 1$  پر اس طرح واقع ہے کہ  $(PA)^2 + (PB)^2$  کی زیادہ سے زیادہ (maximum) قیمت ہوگی تو نقاط P, A اور B \_\_\_\_\_ پر شامل ہیں۔

**Options :**

70819171887. ایک بیضوی (an ellipse)

70819171888. ایک ہذلولی (a hyperbola)

70819171889. ایک شاہجی (a parabola)

70819171890. ایک سیدھا خط (a straight line)

**Question Number : 71 Question Id : 70819122244 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 :**

70819171891.  $\frac{1}{\sqrt{2}} (-\hat{j} + \hat{k})$

70819171892.  $\frac{1}{\sqrt{3}} (\hat{i} - \hat{j} + \hat{k})$

70819171893.  $\frac{1}{\sqrt{3}} (\hat{i} + \hat{j} - \hat{k})$

70819171894.  $\frac{1}{\sqrt{2}} (\hat{i} - \hat{j})$

**Question Number : 71 Question Id : 70819122244 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

اگر سمتیں  $\vec{a}_1 = x\hat{i} - \hat{j} + \hat{k}$  اور  $\vec{a}_2 = \hat{i} + y\hat{j} + z\hat{k}$  ہم خطی (collinear) ہیں تو سمت  $x\hat{i} + y\hat{j} + z\hat{k}$  (vector) کے متوازی (parallel) ممکن اکائی سمت \_\_\_\_\_ ہے۔

**Options :**

70819171891.  $\frac{1}{\sqrt{2}} (-\hat{j} + \hat{k})$

70819171892.  $\frac{1}{\sqrt{3}} (\hat{i} - \hat{j} + \hat{k})$

70819171893.  $\frac{1}{\sqrt{3}} (\hat{i} + \hat{j} - \hat{k})$

70819171894.  $\frac{1}{\sqrt{2}} (\hat{i} - \hat{j})$

Question Number : 72 Question Id : 70819122245 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 :

70819171895.  $F_1$  and  $F_2$  both are tautologies

70819171896.  $F_1$  is a tautology but  $F_2$  is not a tautology

70819171897.  $F_1$  is not a tautology but  $F_2$  is a tautology

70819171898. Both  $F_1$  and  $F_2$  are not tautologies

Question Number : 72 Question Id : 70819122245 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$F_2(A, B) = (A \vee B) \vee (B \rightarrow \sim A)$  اور  $F_1(A, B, C) = (A \wedge \sim B) \vee [\sim C \wedge (A \vee B)] \vee \sim A$  فرض کیجئے  
دو لو جیکل جملے (logical expressions) ہیں تو :

Options :

70819171895.  $F_1$  اور  $F_2$  دونوں با معنی (tautologies) ہیں۔

70819171896.  $F_1$  با معنی ہے لیکن  $F_2$  با معنی نہیں ہے۔

70819171897.  $F_1$  با معنی نہیں ہے لیکن  $F_2$  با معنی ہے۔

70819171898.  $F_1$  اور  $F_2$  دونوں با معنی نہیں ہیں۔

**Question Number : 73 Question Id : 70819122246 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 :**

70819171899.  $\frac{3}{7}$

70819171900.  $\frac{6}{7}$

70819171901.  $\frac{1}{7}$

70819171902.  $\frac{4}{7}$

**Question Number : 73 Question Id : 70819122246 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

ہندسے 3، 3، 4، 4، 4، 5، 5 کا استعمال کر کے 7 ہندسی عدد (seven digit number) تیار کیا گیا ہے۔ حاصل ہونے والا عدد (number) 2 سے تقسیم ہونے کا احتمال \_\_\_\_\_ ہے۔

**Options :**

70819171899.  $\frac{3}{7}$

70819171900.  $\frac{6}{7}$

70819171901.  $\frac{1}{7}$

70819171902.  $\frac{4}{7}$

**Question Number : 74 Question Id : 70819122247 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 :**

70819171903. has a unique solution for all a, b and c

70819171904. has a unique solution when  $5a = 2b + c$

70819171905. has infinite number of solutions when  $5a = 2b + c$

70819171906. has no solution for all a, b and c

**Question Number : 74 Question Id : 70819122247 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No**

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

مساوات کے نظام کو مان لیجئے :

$$x + 2y - 3z = a$$

$$2x + 6y - 11z = b$$

$$x - 2y + 7z = c,$$

یہاں پر  $a, b$  اور  $c$  حقیقی مستقل (real constants) ہیں تو مساوات کا نظام :

**Options :**

70819171903.  $a, b$  اور  $c$  کے لئے ایک واحد حل ( unique solution ) ہے۔

70819171904. ایک واحد حل ہے جبکہ  $5a = 2b + c$

70819171905. لامحدود حل (infinite number of solutions) ہیں جبکہ  $5a = 2b + c$

70819171906.  $a, b$  اور  $c$  کے لئے کوئی بھی حل نہیں

**Question Number : 75 Question Id : 70819122248 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 :**

70819171907. An isosceles triangle with base equal to  $2r$ .

70819171908. A right angle triangle having two of its sides of length  $2r$  and  $r$ .

70819171909. An equilateral triangle of height  $\frac{2r}{3}$ .

70819171910. An equilateral triangle having each of its side of length  $\sqrt{3} r$ .



Question Number : 75 Question Id : 70819122248 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

دائرہ جس کا نصف قطر 'r' دیا ہوا ہے، اس کے اندر اعظم رقبہ والا مثلث بنایا گیا وہ \_\_\_\_\_ ہے۔

Options :

70819171907. متساوی الساقین مثلث جس کا قاعدہ  $2r$  ہے۔

70819171908. قائمہ الزاویہ مثلث جس کے دو اضلاع کی لمبائی  $r$  اور  $2r$  ہے۔

70819171909. متساوی الاضلاع مثلث جس کی اونچائی  $\frac{2r}{3}$  ہے۔

70819171910. متساوی الاضلاع مثلث جس کے ہر ایک ضلع کی لمبائی  $\sqrt{3} r$  ہے۔

Question Number : 76 Question Id : 70819122249 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 :

70819171911. 68

70819171912. 102

70819171913. 136

70819171914. 142

Question Number : 76 Question Id : 70819122249 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

فرض کیجئے: خط 'L' مستویوں  $x + 2y + z = 6$  اور  $y + 2z = 4$  کے انقطاع (intersection) سے حاصل کیا گیا۔ اگر خط 'L' پر نقطہ  $(3, 2, 1)$  سے کھینچے گئے عمود کا پایہ  $P(\alpha, \beta, \gamma)$  (foot) ہے تو  $21(\alpha + \beta + \gamma)$  کے برابر ہے۔

Options :

70819171911. 68

70819171912. 102

70819171913. 136

70819171914. 142

Question Number : 77 Question Id : 70819122250 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

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

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

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

Options :

70819171915. -3

70819171916. -1

70819171917. 1

70819171918. 3

Question Number : 77 Question Id : 70819122250 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

فرض کیجئے  $f: \mathbb{R} \rightarrow \mathbb{R}$  اس طرح بیان کیا کہ

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

اگر  $f(x)$   $\mathbb{R}$  پر مدا م (continuous) ہے تو  $a + b$  کے برابر ہے۔

Options :

70819171915. -3

70819171916. -1

70819171917. 1

70819171918. 3

Question Number : 78 Question Id : 70819122251 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 :

70819171919.  $\frac{1}{4}$

70819171920.  $\frac{1}{3}$

70819171921.  $\frac{1}{2}$

70819171922. 1

**Question Number : 78 Question Id : 70819122251 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

نقطہ (3, 2) سے دائرہ  $x^2 + y^2 = 1$  پر کوئی بھی نقطہ پر کھینچا گیا قطع خط کے وسطی نقطہ (mid-point) کے locus کی مساوات دائرہ ہے جس کا نصف قطر r ہے تو r \_\_\_\_\_ کے برابر ہے۔

**Options :**

70819171919.  $\frac{1}{4}$

70819171920.  $\frac{1}{3}$

70819171921.  $\frac{1}{2}$

70819171922. 1

**Question Number : 79 Question Id : 70819122252 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

A natural number has prime factorization given by  $n = 2^x 3^y 5^z$ , 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 :**

70819171923. 6

70819171924. 11

70819171925. 12

70819171926. 6x

**Question Number : 79 Question Id : 70819122252 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

حقیقی عدد جس کا منفرد جز و ضربی (prime factorization) دیا ہوا ہے،  $n = 2^x 3^y 5^z$  جہاں  $y$  اور  $z$  اس طرح ہیں کہ  $y + z = 5$  اور  $y > z$ ، تو  $n$  کے طاق تقسیم کرنے والے (odd divisor) کی تعداد (number) \_\_\_\_\_ ہے جس میں 1 شامل ہے۔

**Options :**

70819171923. 6

70819171924. 11

70819171925. 12

70819171926. 6x

**Question Number : 80 Question Id : 70819122253 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 :**

70819171927. 0

70819171928. 1

70819171929.  $\frac{1}{2}$

70819171930.  $-1$

**Question Number : 80 Question Id : 70819122253 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

\_\_\_\_\_ کے برابر ہے۔  $f(e) + f\left(\frac{1}{e}\right)$  ;  $f(x) = \int_1^x \frac{\log_e t}{(1+t)} dt$ , اگر  $x > 0$  کے لئے

**Options :**

70819171927. 0

70819171928. 1

70819171929.  $\frac{1}{2}$

70819171930.  $-1$

## Mathematics Section B

Section Id :	7081911023
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 :	7081911303
Question Shuffling Allowed :	Yes

Question Number : 81 Question Id : 70819122254 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  $\int_0^1 \frac{x^{m-1} + x^{n-1}}{(1+x)^{m+n}} dx = \alpha I_{m,n}$ ,  $\alpha \in \mathbb{R}$ , then  $\alpha$  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 : 70819122254 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$$\alpha \int_0^1 \frac{x^{m-1} + x^{n-1}}{(1+x)^{m+n}} dx = \alpha I_{m,n} \text{ اور } m, n \geq 1 \text{ کے لئے } I_{m,n} = \int_0^1 x^{m-1}(1-x)^{n-1} dx, \text{ اگر } \alpha \text{ کے برابر ہے۔}$$

**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 :** 70819122255 **Question Type :** SA

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

Let  $z$  be those complex numbers which satisfy

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

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 :** 70819122255 **Question Type :** SA

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

فرض کیجئے  $z$  ملتف اعداد (Complex numbers) ہیں جو  $|z+5| \leq 4$  اور

$$z(1+i) + \bar{z}(1-i) \geq -10, i = \sqrt{-1} \text{ کو مطمئن کرتا ہے۔ اگر } |z+1|^2 \text{ کی اعظم ترین قیمت (maximum value)}$$

$\alpha + \beta\sqrt{2}$  ہے تو  $(\alpha + \beta)$  ہے۔



**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 : 70819122256 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 : 70819122256 Question Type : SA**

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

فرض کیجئے منحنی (curve) ہر نقطہ پر نورمل خطوط (normals) نقطہ  $(a, b)$  سے گزرتے ہیں۔ اگر منحنی نقاط  $(3, -3)$  اور  $(4, -2\sqrt{2})$  میں سے گزرتی ہے اور دیا ہوا ہے،  $a - 2\sqrt{2}b = 3$  تو  $(a^2 + b^2 + ab)$  کے برابر ہے۔

**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 : 70819122257 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 : 70819122257 Question Type : SA**

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

فرض کیجئے 'a' ایک حقیقی عدد اس طرح ہے کہ کثیررکنی (polynomial)  $2x^5 + 5x^4 + 10x^3 + 10x^2 + 10x + 10$  کے تمام حقیقی جذر (real roots) وقفہ  $(a, a + 1)$  میں شامل (lie) ہیں تو  $|a|$  کے برابر ہے۔

**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 : 70819122258 Question Type : SA**

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

Let  $X_1, X_2, \dots, X_{18}$  be eighteen observations such that  $\sum_{i=1}^{18} (X_i - \alpha) = 36$  and  $\sum_{i=1}^{18} (X_i - \beta)^2 = 90$ ,

where  $\alpha$  and  $\beta$  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 :** 70819122258 **Question Type :** SA

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

فرض کیجئے :  $X_1, X_2, \dots, X_{18}$  18 مشاہدے اسطرح ہیں کہ  $\sum_{i=1}^{18} (X_i - \alpha) = 36$  اور  $\sum_{i=1}^{18} (X_i - \beta)^2 = 90$  جہاں پر  $\alpha$

اور  $\beta$  مختلف حقیقی اعداد ہیں۔ اگر مشاہدوں کا معیاری انحراف (standard deviation) ایک ہے تو  $|\alpha - \beta|$  کی قیمت \_\_\_\_\_ کے برابر ہے۔

**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 :** 70819122259 **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  $\alpha$  and  $\beta$ , 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 :** 70819122259 **Question Type :** SA

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

یہ مساوات اگر میٹرکس  $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 3 & 0 & -1 \end{bmatrix}$

کو پھر حقیقی اعداد  $\alpha$  اور  $\beta$  کیلئے مطمئن کرتا ہے تو  $\beta - \alpha$  کے برابر ہے۔  $A^{20} + \alpha A^{19} + \beta A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 4 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

**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 :** 70819122260 **Question Type :** SA

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

Let  $\alpha$  and  $\beta$  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 :** 70819122260 **Question Type :** SA

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

فرض کیجئے  $\alpha$  اور  $\beta$  دو حقیقی اعداد (real numbers) اس طرح ہیں کہ  $\alpha + \beta = 1$  اور  $\alpha\beta = -1$ ۔ فرض کیجئے  $p_n = (\alpha)^n + (\beta)^n$ ،  $p_{n-1} = 11$  اور  $p_{n+1} = 29$  کے صحیح عدد  $n \geq 1$  تو  $p_n^2$  ہے \_\_\_\_\_۔

**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 :** 70819122261 **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 : 70819122261 Question Type : SA**

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

4 ہندسی عدد (4-digit number) جس کا 18 کے ساتھ مقسوم علیہ عام (greatest common divisor) 3 ہے۔  
کی کل تعداد (total numbers) ہے۔ \_\_\_\_\_

**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 : 70819122262 Question Type : SA**

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

If the arithmetic mean and geometric mean of the  $p^{\text{th}}$  and  $q^{\text{th}}$  terms of the sequence  $-16, 8, -4, 2, \dots$  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 : 70819122262 Question Type : SA**

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

اگر سلسلہ (sequence)  $-16, 8, -4, 2, \dots$  کے  $p^{\text{th}}$  اور  $q^{\text{th}}$  ارکان (terms) کا حسابی اوسط (Arithmetic mean) \_\_\_\_\_ کے برابر ہے۔

اور جیومیٹری اوسط (geometric mean) مساوات  $4x^2 - 9x + 5 = 0$  کو مطمئن کرتا ہے تو  $p + q$  \_\_\_\_\_ کے برابر ہے۔

**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 :** 70819122263 **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 :** 70819122263 **Question Type :** SA

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

فرض کیجئے 'L' ایک منحنی  $4x^2 + 9y^2 = 36$  اور  $(2x)^2 + (2y)^2 = 31$  کا مشترک مماس (common tangent) ہے تو خط L کی ڈھلان (slope) کا مربع \_\_\_\_\_ ہے۔

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Range

**Text Areas :** PlainText

**Possible Answers :**

5 to 5.001