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| Question Paper Name : | B TECH EU 25th Feb 2021 Shift 2 |
| Subject Name : | B TECH EU |
| Creation Date : | 2021-02-24 19:10:05 |
| Duration : | 180 |
| Number of Questions : | 90 |
| Total Marks : | 300 |
| Display Marks: | Yes |

B TECH EU

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|--------------------------------------|-----------|
| Group Number : | 1 |
| Group Id : | 708191214 |
| 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 : | 708191862 |
| Section Number : | 1 |
| Section type : | Online |

| | |
|---------------------------------------|------------|
| Mandatory or Optional : | Mandatory |
| Number of Questions : | 20 |
| Number of Questions to be attempted : | 20 |
| Section Marks : | 80 |
| Mark As Answered Required? : | Yes |
| Sub-Section Number : | 1 |
| Sub-Section Id : | 7081911142 |
| Question Shuffling Allowed : | Yes |

Question Number : 1 Question Id : 70819119834 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If e is the electronic charge, c is the speed of light in free space and h is Planck's constant, the

quantity $\frac{1}{4\pi\epsilon_0} \frac{|e|^2}{\hbar c}$ has dimensions of :

Options :

70819164651. $[M L T^0]$

70819164652. $[M L T^{-1}]$

70819164653. $[M^0 L^0 T^0]$

70819164654. $[L C^{-1}]$

Question Number : 1 Question Id : 70819119834 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

اگر e الیکٹرون کا برقی بار، c ہوا میں نور کی رفتار اور h پلانک کا مستقلہ ہو تب مقدار $\frac{1}{4\pi\epsilon_0} \frac{|e|^2}{\hbar c}$ کی ابعادی مساوات :

Options :

70819164651. [M L T⁰]

70819164652. [M L T⁻¹]

70819164653. [M⁰ L⁰ T⁰]

70819164654. [L C⁻¹]

Question Number : 2 Question Id : 70819119835 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A stone is dropped from the top of a building. When it crosses a point 5 m below the top, another stone starts to fall from a point 25 m below the top. Both stones reach the bottom of building simultaneously. The height of the building is :

Options :

70819164655. 45 m

70819164656. 25 m

70819164657. 35 m

70819164658. 50 m

Question Number : 2 Question Id : 70819119835 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ایک پتھر کو ایک بلڈنگ کے سب سے اوپری حصے سے چھوڑا گیا۔ جب وہ پتھر اوپر سے 5 m کا فاصلہ طے کرتا ہے تب دوسرا پتھر کو بلڈنگ کے سب سے اوپری حصے سے 25 m نیچے کے مقام سے چھوڑا جاتا ہے۔ اگر دونوں پتھر ایک ساتھ نیچے پہنچتے ہوں تب بلڈنگ کی اونچائی ہوگی :

Options :

70819164655. 45 m

70819164656. 25 m

70819164657. 35 m

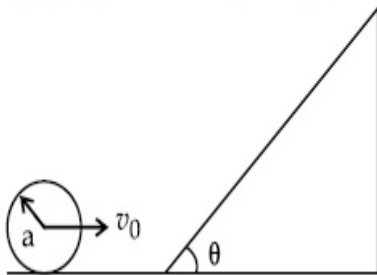
70819164658. 50 m

Question Number : 3 Question Id : 70819119836 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A sphere of radius 'a' and mass 'm' rolls along a horizontal plane with constant speed v_0 . It encounters an inclined plane at angle θ and climbs upward. Assuming that it rolls without slipping, how far up the sphere will travel ?



Options :

70819164659. $\frac{v_0^2}{2g \sin\theta}$

70819164660. $\frac{v_0^2}{5g \sin\theta}$

70819164661. $\frac{10v_0^2}{7g \sin\theta}$

70819164662. $\frac{2}{5} \frac{v_0^2}{g \sin\theta}$

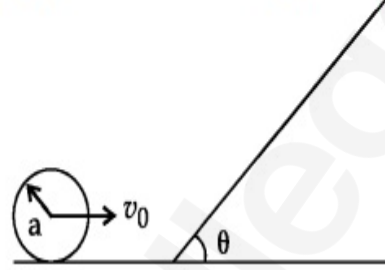
Question Number : 3 Question Id : 70819119836 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

'm' کمیت اور 'a' نصف قطر رکھنے والا ایک کرہ ایک افقی سطح پر v_0 مستقل چال سے لڑھکتا ہے۔ اس کے راستے میں اوپر کی طرف θ زاویہ پر پائی

جانے والی ایک انحرافی مائل مستوی سطح آتی ہے تب بتائیے کہ وہ کرہ بنا پھسے اس پر کتنی بلندی تک جائے گا ؟



Options :

70819164659. $\frac{v_0^2}{2g \sin\theta}$

70819164660. $\frac{v_0^2}{5g \sin\theta}$

70819164661. $\frac{10v_0^2}{7g \sin\theta}$

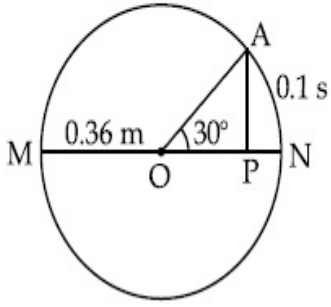
70819164662. $\frac{2}{5} \frac{v_0^2}{g \sin\theta}$

Question Number : 4 Question Id : 70819119837 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The point A moves with a uniform speed along the circumference of a circle of radius 0.36 m and covers 30° in 0.1 s. The perpendicular projection 'P' from 'A' on the diameter MN represents the simple harmonic motion of 'P'. The restoration force per unit mass when P touches M will be :



Options :

70819164663. 100 N

70819164664. 9.87 N

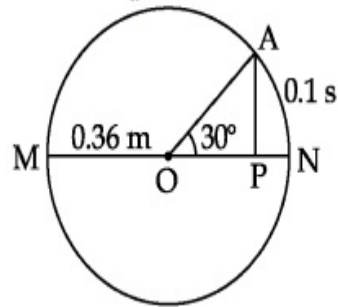
70819164665. 50 N

70819164666. 0.49 N

Question Number : 4 Question Id : 70819119837 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ایک نقطہ A یکساں چال سے 0.36 m نصف قطر کے دائرے کے محیط پر 30° کا زاویہ 0.1 s میں طے کرتا ہے۔ اس صورت میں نقطہ 'A' سے دائرے کے قطر MN پر بننے والا عمودی نکتہ 'P' خط سادہ ہارمونی حرکت کرتا ہے۔ جب نقطہ P نقطہ M کو مس کرتا ہو تب اس پر عامل بحالی قوت فی اکائی کیت کیا ہوگی ؟



Options :

70819164663. 100 N

70819164664. 9.87 N

70819164665. 50 N

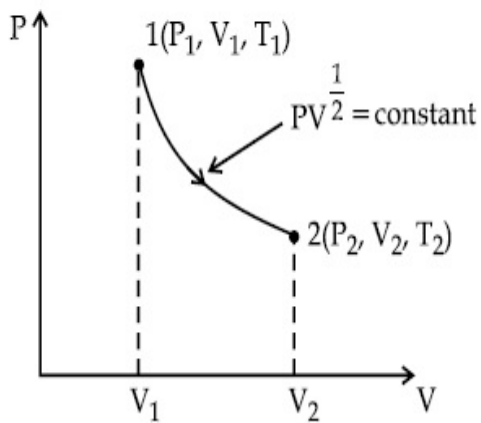
70819164666. 0.49 N

Question Number : 5 Question Id : 70819119838 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Thermodynamic process is shown below on a P-V diagram for one mole of an ideal gas. If $V_2 = 2V_1$ then the ratio of temperature T_2/T_1 is :



Options :

70819164667. $\frac{1}{\sqrt{2}}$

70819164668. $\sqrt{2}$

70819164669. $\frac{1}{2}$

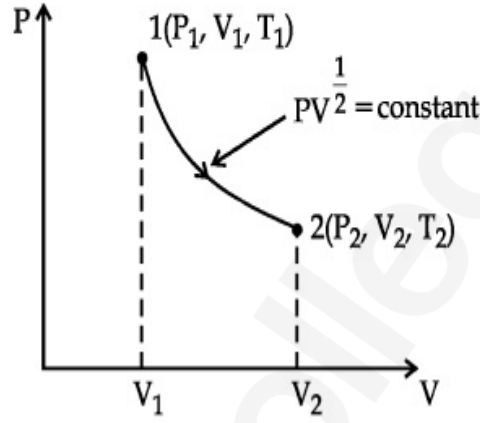
70819164670. 2

Question Number : 5 Question Id : 70819119838 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

شکل میں ایک مول (1 mole) کی مثالی گیس کے لیے حرکیاتی عمل کا P-V ترسیم دکھایا گیا ہے۔ اگر $V_2 = 2V_1$ ہو تب درجہ حرارت T_2/T_1 کی نسبت :



Options :

70819164667. $\frac{1}{\sqrt{2}}$

70819164668. $\sqrt{2}$

70819164669. $\frac{1}{2}$

70819164670. 2

Question Number : 6 Question Id : 70819119839 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Given below are two statements :

Statement I : In a diatomic molecule, the rotational energy at a given temperature obeys Maxwell's distribution.

Statement II : In a diatomic molecule, the rotational energy at a given temperature equals the translational kinetic energy for each molecule.

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

Options :

70819164671. Both Statement I and Statement II are true.

70819164672. Both Statement I and Statement II are false.

70819164673. Statement I is true but Statement II is false.

70819164674. Statement I is false but Statement II is true.

Question Number : 6 Question Id : 70819119839 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ذیل میں دو بیان دیئے گئے ہیں۔

I - بیان : دو سالماتی گیس کی دی گئی درجہ حرارت پر گردش تو انائی میسکویل کی تقسیم کے اصول پر عمل کرتی ہے۔

II - بیان : دو سالماتی گیس کی دی گئی درجہ حرارت پر گردش تو انائی ہر ایک سالمہ کی خطی تو انائی بالحرکت کے مساوی ہوتی ہے۔

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

Options :

70819164671. دونوں بیان I اور II صحیح ہیں۔

70819164672. دونوں بیان I اور II غلط ہیں۔

70819164673. بیان I صحیح ہے اور بیان II غلط ہے۔

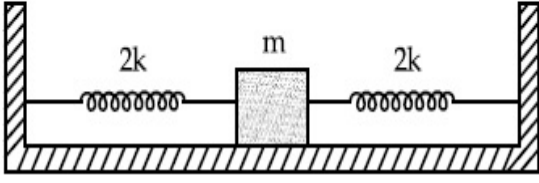
70819164674. بیان I غلط ہے اور بیان II صحیح ہے۔

Question Number : 7 Question Id : 70819119840 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Two identical springs of spring constant '2k' are attached to a block of mass m and to fixed support (see figure). When the mass is displaced from equilibrium position on either side, it executes simple harmonic motion. The time period of oscillations of this system is :



Options :

70819164675. $2\pi \sqrt{\frac{m}{2k}}$

70819164676. $2\pi \sqrt{\frac{m}{k}}$

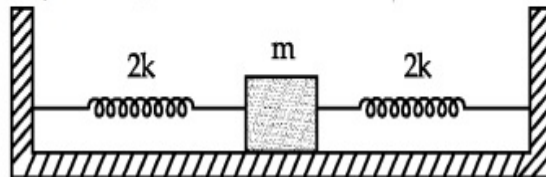
70819164677. $\pi \sqrt{\frac{m}{k}}$

70819164678. $\pi \sqrt{\frac{m}{2k}}$

Question Number : 7 Question Id : 70819119840 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

اگر '2k' اسپرنگ کا مستقلہ رکھنے والے دو اسپرنگ کی مدد سے ایک m کمیت کے کندے کو شکل کے مطابق باندھ کر ٹھوس سہارے سے باندھا گیا۔ اگر کمیت کو وسطی مقام سے کسی بھی سمت میں ہٹائیں تب وہ خطی مادہ ہارمونی حرکت (SHM) کرتا ہو تب اس نظام کا اتہزاز کا دور :



Options :

70819164675. $2\pi \sqrt{\frac{m}{2k}}$

70819164676. $2\pi \sqrt{\frac{m}{k}}$

70819164677. $\pi \sqrt{\frac{m}{k}}$

70819164678. $\pi \sqrt{\frac{m}{2k}}$

Question Number : 8 Question Id : 70819119841 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$Y = A \sin(\omega t + \phi_0)$ is the time-displacement equation of a SHM. At $t=0$ the displacement of the particle is $Y = \frac{A}{2}$ and it is moving along negative x -direction. Then the initial phase angle ϕ_0 will be :

Options :

70819164679. $\frac{\pi}{3}$

70819164680. $\frac{5\pi}{6}$

70819164681. $\frac{\pi}{6}$

70819164682. $\frac{2\pi}{3}$

Question Number : 8 Question Id : 70819119841 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

خطی سادہ موسیقی حرکت کرنے والے ذرہ کے ہٹاؤ کی مساوات $Y = A \sin(\omega t + \phi_0)$ ہے۔ اگر وقفہ $t = 0$ پر ذرہ کا ہٹاؤ $Y = \frac{A}{2}$ ہوتا

ہے وہ ذرہ x محور کے منفی (-ve) سمت میں حرکت کر رہا ہو تب ابتدائی ہیٹ ϕ_0 کی قدر ہوگی :

Options :

70819164679. $\frac{\pi}{3}$

70819164680. $\frac{5\pi}{6}$

70819164681. $\frac{\pi}{6}$

70819164682. $\frac{2\pi}{3}$

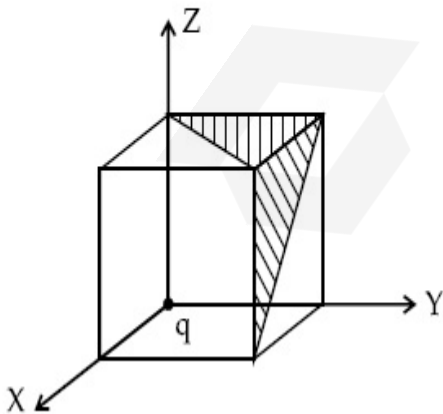
Question Number : 9 Question Id : 70819119842 Question Type : MCQ Option Shuffling : Yes Is

Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A charge 'q' is placed at one corner of a cube as shown in figure. The flux of electrostatic field

\vec{E} through the shaded area is :



Options :

70819164683. $\frac{q}{48\epsilon_0}$

70819164684. $\frac{q}{4\epsilon_0}$

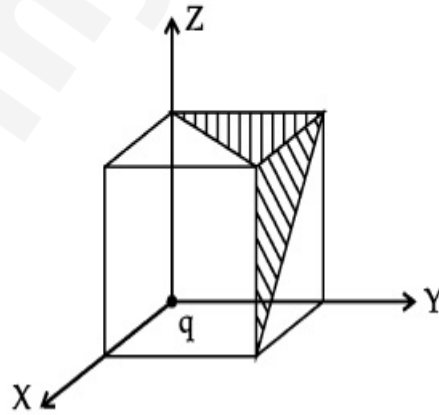
70819164685. $\frac{q}{8\epsilon_0}$

70819164686. $\frac{q}{24\epsilon_0}$

Question Number : 9 Question Id : 70819119842 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ایک برقی بار 'q' کو مکعب کے ایک کنارے پر رکھا گیا جیسا کہ شکل میں دکھایا گیا ہے۔ بتائیے شکل میں خط کشیدہ shaded حصہ کا رقبہ سے گزرنے والا برقی سکونی میدان \vec{E} کی وجہ سے فلکس :



Options :

70819164683. $\frac{q}{48\epsilon_0}$

70819164684. $\frac{q}{4\epsilon_0}$

70819164685. $\frac{q}{8\epsilon_0}$

$$\frac{q}{24\epsilon_0}$$

70819164686.

Question Number : 10 Question Id : 70819119843 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

An electron with kinetic energy K_1 enters between parallel plates of a capacitor at an angle ' α ' with the plates. It leaves the plates at angle ' β ' with kinetic energy K_2 . Then the ratio of kinetic energies $K_1 : K_2$ will be :

Options :

70819164687. $\frac{\cos\beta}{\cos\alpha}$

70819164688. $\frac{\cos\beta}{\sin\alpha}$

70819164689. $\frac{\sin^2\beta}{\cos^2\alpha}$

70819164690. $\frac{\cos^2\beta}{\cos^2\alpha}$

Question Number : 10 Question Id : 70819119843 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ایک الیکٹرون حرکیاتی توانائی K_1 کے ساتھ متوازی تختیوں والے مکلفہ کے تختیوں کے درمیان تختی کے ساتھ α زاویے بناتے ہوئے داخل ہوتا ہے اور وہ β زاویہ بناتے ہوئے تختیوں سے K_2 حرکیاتی توانائی سے باہر نکلتا ہو تب حرکیاتی توانائی $K_1 : K_2$ کی نسبت ہوگی :

Options :

70819164687. $\frac{\cos\beta}{\cos\alpha}$

70819164688. $\frac{\cos\beta}{\sin\alpha}$

70819164689. $\frac{\sin^2\beta}{\cos^2\alpha}$

70819164690. $\frac{\cos^2\beta}{\cos^2\alpha}$

Question Number : 11 Question Id : 70819119844 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

In a ferromagnetic material, below the curie temperature, a domain is defined as :

Options :

70819164691. a macroscopic region with zero magnetization.

70819164692. a macroscopic region with saturation magnetization.

70819164693. a macroscopic region with randomly oriented magnetic dipoles.

70819164694. a macroscopic region with consecutive magnetic dipoles oriented in opposite direction.

Question Number : 11 Question Id : 70819119844 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

فیرومقناطیسی مادہ میں کیوری تپش سے نیچے اس کے ڈومین (Domain) کی تعریف ہوگی :

Options :

70819164691. ایک ایسا حصہ جس کی مقناطیسیت صفر ہوتی ہے

70819164692. ایک ایسا حصہ جس کی مقناطیسیت سیر شدہ ہوتی ہے

70819164693. ایک ایسا حصہ جس کی مقناطیسی دو قطبی بے ترتیب ہوتے ہیں

70819164694. ایک ایسا حصہ جس میں تسلسل میں آنے والے حصوں کے مقناطیسی دو قطبی ایک دوسرے کے مخالف سمت میں ہوتے ہیں

Question Number : 12 Question Id : 70819119845 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

An LCR circuit contains resistance of 110Ω and a supply of 220 V at 300 rad/s angular frequency. If only capacitance is removed from the circuit, current lags behind the voltage by 45° . If on the other hand, only inductor is removed the current leads by 45° with the applied voltage. The rms current flowing in the circuit will be :

Options :

70819164695. 1 A

70819164696. 1.5 A

70819164697. 2 A

70819164698. 2.5 A

Question Number : 12 Question Id : 70819119845 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ایک LCR سرکٹ میں 110Ω کی مزاحمت ہے۔ اس کے اطراف 220 V کا قومی کافرک جس کی زاویائی تعدد 300 rad/s ہے، کو جوڑا گیا۔ اگر اس برقی دور سے مکثے کو نکال دیں تب حاصل برقی کرنٹ لگے برقی قومی کے فرق سے 45° سے پیچھے ہوتی ہے۔ اگر صرف امالی لچھا نکال دیں تب حاصل برقی کرنٹ لگے برقی قومی کے فرق سے 45° سے آگے ہو جاتی ہے۔ تب اس صورت میں ہنے والی برقی رو :

Options :

70819164695. 1 A

70819164696. 1.5 A

70819164697. 2 A

70819164698. 2.5 A

Question Number : 13 Question Id : 70819119846 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The stopping potential for electrons emitted from a photosensitive surface illuminated by light of wavelength 491 nm is 0.710 V . When the incident wavelength is changed to a new value, the stopping potential is 1.43 V . The new wavelength is :

Options :

70819164699. 309 nm

70819164700. 329 nm

70819164701. 382 nm

70819164702. 400 nm

Question Number : 13 Question Id : 70819119846 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

جب کسی ضیا برقی حساس مادہ کی سطح پر 491 nm طول لہروالی روشنی کو وقوع کریں تب خارج الیکٹرون کے لیے روکنے والا قومی 0.710 V درکار ہوتا ہے۔ اگر وقوع پذیر نوور کی طول لہر کو تبدیل کریں تب خارج الیکٹرون کے لیے روکنے والا قومی 1.43 V درکار ہوتا ہو تب نئی استعمال طول لہر _____ ہوگی۔

Options :

70819164699. 309 nm

70819164700. 329 nm

70819164701. 382 nm

70819164702. 400 nm

Question Number : 14 Question Id : 70819119847 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Consider the diffraction pattern obtained from the sunlight incident on a pinhole of diameter $0.1 \mu\text{m}$. If the diameter of the pinhole is slightly increased, it will affect the diffraction pattern such that :

Options :

70819164703. its size increases, and intensity increases

70819164704. its size increases, but intensity decreases

70819164705. its size decreases, but intensity increases

70819164706. its size decreases, and intensity decreases

Question Number : 14 Question Id : 70819119847 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

0.1 μm چوڑائی والے باریک سوراخ پر سورج کی روشنی وقوع کرنے سے حاصل انکساری نمونے (diffraction pattern) کو فرض کیجئے۔
اگر اس سوراخ کے قطر کو تھوڑا سا بڑھا دیں تب حاصل انکساری نمونہ کی :

Options :

70819164703. جسامت بڑھتی، حدت بڑھتی

70819164704. جسامت بڑھتی ہے، حدت کم ہوتی

70819164705. جسامت کم، حدت بڑھتی

70819164706. جسامت کم، حدت کم

Question Number : 15 Question Id : 70819119848 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

An electron of mass m_e and a proton of mass $m_p = 1836 m_e$ are moving with the same speed.

The ratio of their de Broglie wavelength $\frac{\lambda_{\text{electron}}}{\lambda_{\text{proton}}}$ will be :

Options :

70819164707. 1

70819164708. 1836

70819164709. $\frac{1}{1836}$

70819164710. 918

Question Number : 15 Question Id : 70819119848 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

کمیت کا ایک الیکٹرون اور $m_p = 1836 m_e$ کمیت کا ایک پروٹون ایک ہی چال سے حرکت کر رہے ہوں تب ان کی ڈی بروگلی طول لہر کی نسبت

$$\frac{\lambda_{\text{electron}}}{\lambda_{\text{proton}}}$$

ہوگی :

Options :

70819164707. 1

70819164708. 1836

70819164709. $\frac{1}{1836}$

70819164710. 918

Question Number : 16 Question Id : 70819119849 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The wavelength of the photon emitted by a hydrogen atom when an electron makes a transition from $n=2$ to $n=1$ state is :

Options :

70819164711. 121.8 nm

70819164712. 194.8 nm

70819164713. 490.7 nm

70819164714. 913.3 nm

Question Number : 16 Question Id : 70819119849 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ہائیڈروجن جو ہر میں جب ایک الیکٹرون مدار $n=2$ سے مدار $n=1$ میں منتقل ہوتا ہے تب خارج ہونے والے ضیائیہ کی طول لہر _____ ہوگا۔

Options :

70819164711. 121.8 nm

70819164712. 194.8 nm

70819164713. 490.7 nm

70819164714. 913.3 nm

Question Number : 17 Question Id : 70819119850 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If a message signal of frequency ' f_m ' is amplitude modulated with a carrier signal of frequency ' f_c ' and radiated through an antenna, the wavelength of the corresponding signal in air is :

Options :

70819164715. $\frac{c}{f_c - f_m}$

70819164716. $\frac{c}{f_c + f_m}$

70819164717. $\frac{c}{f_c}$

70819164718. $\frac{c}{f_m}$

Question Number : 17 Question Id : 70819119850 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

(amplitude اگر 'f_m' تعدد والے پیغام سگنل (message signal) کو 'f_c' تعدد والے پیغام بردار سگنل کے اوپر چھپا موڈولیشن modulation) کر کے ایٹنا سے اشاعت کریں تو ہوا میں اس سگنل کی طول لہر :

Options :

70819164715. $\frac{c}{f_c - f_m}$

70819164716. $\frac{c}{f_c + f_m}$

70819164717. $\frac{c}{f_c}$

70819164718. $\frac{c}{f_m}$

Question Number : 18 Question Id : 70819119851 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

For extrinsic semiconductors; when doping level is increased;

Options :

70819164719. Fermi-level of p-type semiconductor will go upward and Fermi-level of n-type semiconductors will go downward.

Fermi-level of p-type semiconductors will go downward and Fermi level of n-type semiconductor will go upward.

70819164720.

70819164721. Fermi-level of p and n-type semiconductors will not be affected.

Fermi-level of both p-type and n-type semiconductors will go upward for $T > T_F$ K and downward for $T < T_F$ K, where T_F is Fermi temperature.

70819164722.

Question Number : 18 Question Id : 70819119851 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

جب کسی آمیزش والے نیم موصل میں آمیزش (doping) کو بڑھادیں تب :

Options :

70819164719. -p قسم کے نیم موصل کی فرمی سطح اوپر جائیگی اور n-قسم کے نیم موصل کی فرمی سطح نیچے جائیگی۔

70819164720. -p قسم کے نیم موصل کی فرمی سطح نیچے جائیگی اور n-قسم کے نیم موصل کی فرمی سطح اوپر جائیگی۔

70819164721. n اور p قسم کے نیم موصل کی فرمی سطح تبدیل نہیں ہوگی۔

70819164722. n اور p قسم کے نیم موصل کی فرمی سطح پیش $T > T_F$ K کے لیے اوپر جائیگی اور $T < T_F$ K کے لیے نیچے جائے گی جہاں پر T_F فرمی پیش ہے۔

70819164722.

Question Number : 19 Question Id : 70819119852 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) Rectifier | (i) Used either for stepping up or stepping down the a.c. voltage |
| (b) Stabilizer | (ii) Used to convert a.c. voltage into d.c. voltage |
| (c) Transformer | (iii) Used to remove any ripple in the rectified output voltage |
| (d) Filter | (iv) Used for constant output voltage even when the input voltage or load current change |

Choose the correct answer from the options given below :

Options :

70819164723. (a)-(ii), (b)-(i), (c)-(iii), (d)-(iv)

70819164724. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

70819164725. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

70819164726. (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)

Question Number : 19 Question Id : 70819119852 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

فہرست - I اور فہرست - II کو مناسب طور پر جوڑیے :

فہرست - II

فہرست - I

| | |
|---|------------------------------|
| (i) اس کا استعمال وولٹیج کو زیادہ کرنے یا قومی کو کم کرنے کے لیے کیا جاتا ہے۔ | (a) راست گر (Rectifier) |
| (ii) a.c. وولٹیج کو d.c. وولٹیج میں تبدیل کرنے کے لیے استعمال کیا جاتا ہے۔ | (b) قرار گر (Stabilizer) |
| (iii) راست گر سے حاصل آؤٹ پٹ وولٹیج میں موجود لہروں کو کم کرنے کے لیے استعمال کرتے ہیں۔ | (c) ٹرانسفارمر (Transformer) |
| (iv) جب ان پٹ وولٹیج کم زیادہ ہوتا ہے تب مستقل آؤٹ پٹ وولٹیج حاصل کرنے کے لیے استعمال کرتے ہیں۔ | (d) فلٹر (Filter) |

درج ذیل میں دیے گئے متبادلات میں صحیح متبادل چنیے :

Options :

70819164723. (a)-(ii), (b)-(i), (c)-(iii), (d)-(iv)

70819164724. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

70819164725. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

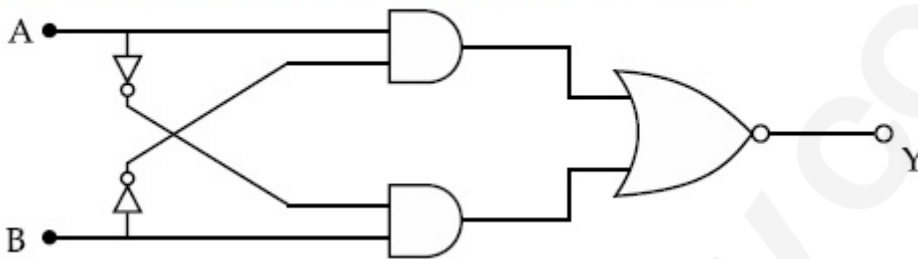
70819164726. (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)

Question Number : 20 Question Id : 70819119853 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The truth table for the following logic circuit is :



Options :

| A | B | Y |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

70819164727.

| A | B | Y |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

70819164728.

70819164729.

| A | B | Y |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 0 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

| A | B | Y |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

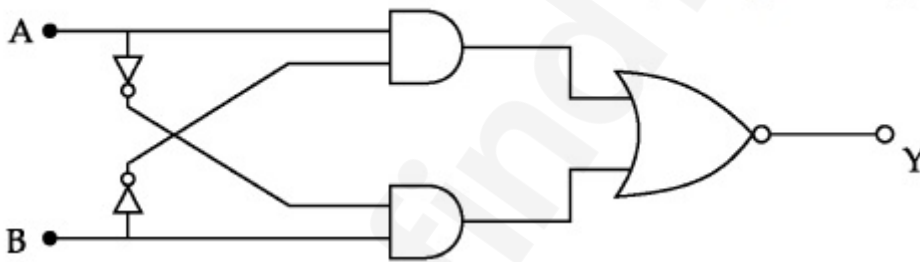
70819164730.

Question Number : 20 Question Id : 70819119853 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

دیے گئے لو جک سرکٹ کے لیے صدیقی جدول کون سا ہوگا ؟



Options :

| A | B | Y |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

70819164727.

70819164728.

| A | B | Y |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

| A | B | Y |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 0 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

70819164729.

| A | B | Y |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

70819164730.

Physics Section B

| | |
|--|-----------|
| Section Id : | 708191863 |
| Section Number : | 2 |
| Section type : | Online |
| Mandatory or Optional : | Mandatory |
| Number of Questions : | 10 |
| Number of Questions to be attempted : | 5 |
| Section Marks : | 20 |
| Mark As Answered Required? : | Yes |
| Sub-Section Number : | 1 |

Sub-Section Id :

708191112

Question Shuffling Allowed :

Yes

Question Number : 21 Question Id : 70819119854 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Two particles having masses 4 g and 16 g respectively are moving with equal kinetic energies. The ratio of the magnitudes of their linear momentum is $n : 2$. The value of n will be _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 21 Question Id : 70819119854 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

4 g اور 16 g کی دو کمیتیں یکساں حرکیاتی توانائی کے ساتھ حرکت کرتے ہوں تب ان کے خطی معیار حرکت کی نسبت $n : 2$ ہوتی ہو تب n کی قیمت _____ 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 : 70819119855 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The initial velocity v_i required to project a body vertically upward from the surface of the earth to reach a height of $10R$, where R is the radius of the earth, may be described in terms

of escape velocity v_e such that $v_i = \sqrt{\frac{x}{y}} \times v_e$. The value of x will be _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 22 **Question Id :** 70819119855 **Question Type :** SA

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

سطح زمین سے کس شے کو ابتدائی رفتار v_i سے اس طرح داغا جاتا ہے کہ وہ زمین کی سطح سے $10R$ کی بلندی تک جائے (جہاں R زمین کا نصف

قطر ہے)۔ اگر فراری رفتار اس طرح ہے کہ $v_i = \sqrt{\frac{x}{y}} \times v_e$ (جہاں v_e فراری رفتار ہے) تو 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 : 23 **Question Id :** 70819119856 **Question Type :** SA

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

The percentage increase in the speed of transverse waves produced in a stretched string if the tension is increased by 4%, will be _____%.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 23 Question Id : 70819119856 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

کسی تے ہوئے تار کے تناؤ کو 4% بڑھادیں تب اس تار پر پیدا ہروں کی چال میں ہونے والا فیصد اضافہ % _____ 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 : 24 Question Id : 70819119857 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If $\vec{P} \times \vec{Q} = \vec{Q} \times \vec{P}$, the angle between \vec{P} and \vec{Q} is θ ($0^\circ < \theta < 360^\circ$). The value of ' θ ' will be _____°.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 24 Question Id : 70819119857 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

اگر $\vec{P} \times \vec{Q} = \vec{Q} \times \vec{P}$ ہو تب \vec{P} اور \vec{Q} کے درمیان بننے والا زاویہ θ ($0^\circ < \theta < 360^\circ$) ہوگا۔ اس صورت میں θ 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 : 25 Question Id : 70819119858 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A reversible heat engine converts one-fourth of the heat input into work. When the temperature of the sink is reduced by 52 K, its efficiency is doubled. The temperature in Kelvin of the source will be _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 25 Question Id : 70819119858 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ایک مراجعی حرارتی انجن دی گئی حرارت کی ایک چوتھائی مقدار کو کام میں تبدیل کرتا ہے۔ اگر اس انجن کے سنک (sink) کے درجہ حرارت کو 52 K سے کم کریں تب اس کی صلاحیت دوگنی ہو جاتی ہے۔ تب اس انجن کے منبع (source) کی درجہ حرارت کیلون (K) میں _____ 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 : 26 Question Id : 70819119859 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Two small spheres each of mass 10 mg are suspended from a point by threads 0.5 m long. They are equally charged and repel each other to a distance of 0.20 m. The charge on each of

the sphere is $\frac{a}{21} \times 10^{-8}$ C. The value of 'a' will be _____.

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

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 26 Question Id : 70819119859 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

دو چھوٹے کرہ جن کی کمیت 10 mg ہے ان کو 0.5 m لمبائی رکھنے والی ڈوری سے باندھ کر لٹکا یا گیا۔ اگر ان کرہوں کو مساوی برقی بار دیں تب ان کے درمیان عامل قوت دفع کی وجہ سے وہ 0.20 m کے فاصلے تک دور ہو جاتے ہیں۔ اس صورت میں ہر وہ کرہ کو دیا گیا برقی بار $\frac{a}{21} \times 10^{-8}$ C

ہو تب اس صورت میں a کی قدر _____ ہوگی۔

[دیا گیا ہے $g = 10 \text{ ms}^{-2}$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 27 Question Id : 70819119860 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Two identical conducting spheres with negligible volume have 2.1 nC and -0.1 nC charges, respectively. They are brought into contact and then separated by a distance of 0.5 m. The electrostatic force acting between the spheres is _____ $\times 10^{-9}$ N.

[Given : $4\pi\epsilon_0 = \frac{1}{9 \times 10^9}$ SI unit]

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 : 70819119860 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

دو قابل نظر انداز حجم رکھنے والے کروں پر بالترتیب 2.1 nC اور -0.1 nC برقی بار پایا جاتا ہے۔ ان کروں کو ایک دوسرے سے مس (touch) کرنے کے بعد 0.5 m کے فاصلے تک لے جایا گیا ہو تب ان کے درمیان میں عامل برقی سکونی کی قوت _____ $\times 10^{-9}$ N ہوگی۔

[جب کہ $4\pi\epsilon_0 = \frac{1}{9 \times 10^9}$ SI unit]

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 : 70819119861 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The peak electric field produced by the radiation coming from the 8 W bulb at a distance of

10 m is $\frac{x}{10} \sqrt{\frac{\mu_0 c}{\pi}} \frac{V}{m}$. The efficiency of the bulb is 10% and it is a point source. 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 : 28 Question Id : 70819119861 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

8 W کے ایک برقی بلب کی صلاحیت 10% ہے۔ تب اس سے 10 m کے فاصلے پر پیدا ہونے والا عظیم برقی میدان کی قیمت $\frac{x}{10} \sqrt{\frac{\mu_0 c}{\pi}} \frac{V}{m}$ ہوگی۔ اس صورت میں x کی قدر _____ ہوگی جبکہ برقی بلب کو تقطی منبع نور مانا جائے۔

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

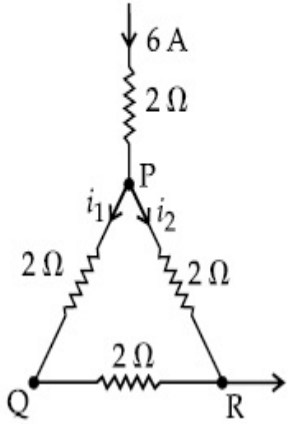
Possible Answers :

5 to 5.001

Question Number : 29 Question Id : 70819119862 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A current of 6 A enters one corner P of an equilateral triangle PQR having 3 wires of resistance $2\ \Omega$ each and leaves by the corner R. The currents i_1 in ampere is _____ .



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

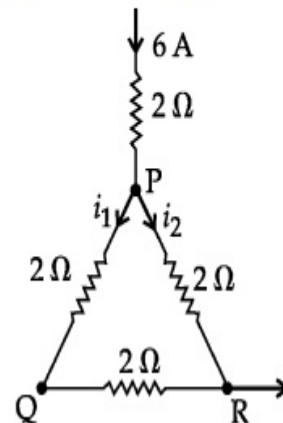
Possible Answers :

5 to 5.001

Question Number : 29 Question Id : 70819119862 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

کسی مساوی الاضلاع مثلث PQR، جس میں 3 تار ہیں، کے ایک بازو P سے برقی رو 6 A داخل ہوتی ہے اور وہ مثلث کے دوسرے کنارے R سے باہر نکلتی ہے۔ اگر مثلث کے ہر بازو میں جوڑے تار کی مزاحمت $2\ \Omega$ ہو تب برقی رو i_1 کی _____ 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 : 30 Question Id : 70819119863 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The wavelength of an X-ray beam is 10 \AA . The mass of a fictitious particle having the same energy as that of the X-ray photons is $\frac{x}{3}h \text{ kg}$. The value of x is _____.
(h = Planck's 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 : 30 Question Id : 70819119863 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ایک x شعاع کی طول لہر 10 \AA ہے۔ X شعاع کے فوٹان کے مساوی توانائی رکھنے والے کسی فرضی ذرہ کی کمیت $\frac{x}{3}h \text{ kg}$ ہوتی ہوگی اس صورت میں x کی قدر _____ ہوگی۔
[پلانک کا مستقلہ h =]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Chemistry Section A

| | |
|---------------------------------------|------------|
| Section Id : | 708191864 |
| Section Number : | 3 |
| Section type : | Online |
| Mandatory or Optional : | Mandatory |
| Number of Questions : | 20 |
| Number of Questions to be attempted : | 20 |
| Section Marks : | 80 |
| Mark As Answered Required? : | Yes |
| Sub-Section Number : | 1 |
| Sub-Section Id : | 7081911144 |
| Question Shuffling Allowed : | Yes |

Question Number : 31 Question Id : 70819119864 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which among the following species has unequal bond lengths ?

Options :

70819164741. XeF_4

70819164742. SiF_4

70819164743. SF_4

70819164744. BF_4^-

Question Number : 31 Question Id : 70819119864 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

مندرجہ ذیل میں کون سے شے جو میں غیر مساوی بندشی لمبائی ہوگی ؟

Options :

70819164741. XeF_4

70819164742. SiF_4

70819164743. SF_4

70819164744. BF_4^-

Question Number : 32 Question Id : 70819119865 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The solubility of Ca(OH)_2 in water is :

[Given : The solubility product of Ca(OH)_2 in water = 5.5×10^{-6}]

Options :

70819164745. 1.11×10^{-2}

70819164746. 1.11×10^{-6}

70819164747. 1.77×10^{-2}

70819164748. 1.77×10^{-6}

Question Number : 32 Question Id : 70819119865 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

پانی میں Ca(OH)_2 کی حل پذیری ہے۔

[$5.5 \times 10^{-6} =$ پانی میں Ca(OH)_2 کی حل پذیری ضربہ]

Options :

70819164745. 1.11×10^{-2}

70819164746. 1.11×10^{-6}

70819164747. 1.77×10^{-2}

70819164748. 1.77×10^{-6}

Question Number : 33 Question Id : 70819119866 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which one of the following statements is FALSE for hydrophilic sols ?

Options :

70819164749. They do not require electrolytes for stability.

70819164750. These sols are reversible in nature.

70819164751. Their viscosity is of the order of that of H_2O .

70819164752. The sols cannot be easily coagulated.

Question Number : 33 Question Id : 70819119866 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

مندرجہ ذیل میں کونسا ایک hydrophilic sols کیلئے غلط بیان ہے ؟

Options :

70819164749. اپنے استحکام کے لیے انھیں برق گزار کی ضرورت نہیں ہوتی۔

70819164750. ان کا Coagulation مراجعی ہیں۔

70819164751. ان کی viscosity ، H₂O کے درجہ پر ہوتی ہے۔

70819164752. ان sols کو آسانی سے جمع (coagulated) نہیں کیا جاسکتا۔

Question Number : 34 Question Id : 70819119867 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The correct order of bond dissociation enthalpy of halogens is :

Options :

70819164753. F₂ > Cl₂ > Br₂ > I₂

70819164754. I₂ > Br₂ > Cl₂ > F₂

70819164755. Cl₂ > Br₂ > F₂ > I₂

70819164756. Cl₂ > F₂ > Br₂ > I₂

Question Number : 34 Question Id : 70819119867 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

بلو جن کی بندشی انتشاری انتہائی کی صحیح ترتیب ہے :

Options :

70819164753. $F_2 > Cl_2 > Br_2 > I_2$

70819164754. $I_2 > Br_2 > Cl_2 > F_2$

70819164755. $Cl_2 > Br_2 > F_2 > I_2$

70819164756. $Cl_2 > F_2 > Br_2 > I_2$

Question Number : 35 Question Id : 70819119868 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The method used for the purification of Indium is :

Options :

70819164757. van Arkel method

70819164758. liquation

70819164759. zone refining

70819164760. vapour phase refining

Question Number : 35 Question Id : 70819119868 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

انڈیم (Indium) کی صفائی (purification) کیلئے طریقہ استعمال کرتے ہیں :

Options :

70819164757. وان آرکل میتھڈ (van Arkel method)

70819164758. مائع پذیری liquation

70819164759. ذون کے طریقے سے خالص کرنا zone refining

70819164760. بھاپ کی شکل میں خالص کرنے کا عمل vapour phase refining

Question Number : 36 Question Id : 70819119869 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Water does not produce CO on reacting with :

Options :

70819164761. CH_4

70819164762. C

70819164763. CO_2

70819164764. C_3H_8

Question Number : 36 Question Id : 70819119869 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ذیل کے ساتھ پانی تعامل کر کے CO نہیں بناتا ہے۔

Options :

70819164761. CH_4

70819164762. C

70819164763. CO_2

70819164764. C_3H_8

Question Number : 37 Question Id : 70819119870 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Given below are two statements :

Statement I :

α and β forms of sulphur can change reversibly between themselves with slow heating or slow cooling.

Statement II :

At room temperature the stable crystalline form of sulphur is monoclinic sulphur.

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

Options :

70819164765. Both Statement I and Statement II are true.

70819164766. Both Statement I and Statement II are false.

70819164767. Statement I is true but Statement II is false.

70819164768. Statement I is false but Statement II is true.

Question Number : 37 Question Id : 70819119870 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

مندرجہ ذیل میں دو بیان دیئے گئے ہیں :

بیان - I : سلفر کی α اور β قسمیں ہلکا گرم یا ہلکا ٹھنڈا کرنے پر ایک دوسرے میں معکوس حالت میں تبدیل ہوتی رہتی ہیں۔

بیان - II : کمرے کی درجہ حرارت پر قیام پذیر سلفر کی قسم monoclinic سلفر ہوتی ہے۔

مندرجہ بالا بیانات کی روشنی میں مندرجہ ذیل میں سے صحیح جواب چن کر لکھئے۔

Options :

70819164765. دونوں بیان I اور بیان II صحیح ہیں۔

70819164766. دونوں بیان I اور بیان II غلط ہیں۔

70819164767. بیان I صحیح ہے لیکن بیان II غلط ہے۔

70819164768. بیان I غلط ہے لیکن بیان II صحیح ہے۔

Question Number : 38 Question Id : 70819119871 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The major components of German Silver are :

Options :

70819164769. Cu, Zn and Ag

70819164770. Cu, Zn and Ni

70819164771. Ge, Cu and Ag

Question Number : 38 Question Id : 70819119871 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

جرمن چاندی (German Silver) کے اہم اجزاء ہیں :

Options :

70819164769. Cu, Zn اور Ag

70819164770. Cu, Zn اور Ni

70819164771. Ge, Cu اور Ag

70819164772. Zn, Ni اور Ag

Question Number : 39 Question Id : 70819119872 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

In which of the following order the given complex ions are arranged correctly with respect to their decreasing spin only magnetic moment ?

(i) $[\text{FeF}_6]^{3-}$ (ii) $[\text{Co}(\text{NH}_3)_6]^{3+}$ (iii) $[\text{NiCl}_4]^{2-}$ (iv) $[\text{Cu}(\text{NH}_3)_4]^{2+}$

Options :

70819164773. (i) > (iii) > (iv) > (ii)

70819164774. (ii) > (iii) > (i) > (iv)

70819164775. (iii) > (iv) > (ii) > (i)

70819164776. (ii) > (i) > (iii) > (iv)

Question Number : 39 Question Id : 70819119872 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

صرف گھماؤ متناطسی معیار اثر کی بنا پر مندرجہ ذیل کے پیچیدہ آئن کو ترتیب دیجئے :



Options :

70819164773. (i) > (iii) > (iv) > (ii)

70819164774. (ii) > (iii) > (i) > (iv)

70819164775. (iii) > (iv) > (ii) > (i)

70819164776. (ii) > (i) > (iii) > (iv)

Question Number : 40 Question Id : 70819119873 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Given below are two statements :

Statement I :

The pH of rain water is normally ~5.6.

Statement II :

If the pH of rain water drops below 5.6, it is called acid rain.

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

Options :

70819164777. Both Statement I and Statement II are true.

70819164778. Both Statement I and Statement II are false.

70819164779. Statement I is true but Statement II is false.

70819164780. Statement I is false but Statement II is true.

Question Number : 40 Question Id : 70819119873 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ذیل میں دو بیان دیئے گئے ہیں :

بیان - I : بارش کے پانی کا pH ~ 5.6 ہے۔

بیان - II : اگر بارش کا پانی کا pH 5.6 سے کم ہو تو اسے تیزابی بارش کہتے ہیں۔
مندرجہ بالا بیانات کی روشنی کی بنا پر مندرجہ ذیل متبادل میں سے صحیح جواب چن کر لکھئے۔

Options :

70819164777. دونوں بیان - I اور بیان - II دونوں بھی صحیح ہیں۔

70819164778. دونوں بیان - I اور بیان - II دونوں بھی غلط ہیں۔

70819164779. بیان - I صحیح ہے لیکن بیان - II غلط ہے۔

70819164780. بیان - I غلط ہے لیکن بیان - II صحیح ہے۔

Question Number : 41 Question Id : 70819119874 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Which of the following compound is added to the sodium extract before addition of silver nitrate for testing of halogens ?

Options :

70819164781. Hydrochloric acid

70819164782. Sodium hydroxide

70819164783. Nitric acid

70819164784. Ammonia

Question Number : 41 Question Id : 70819119874 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ہیلوجن کی جانچ میں سلور نائٹریٹ ملانے سے پہلے سوڈیم کے آخذ (sodium extract) میں ذیل میں سے کونسا مرکب ملایا جاتا ہے ؟

Options :

70819164781. Hydrochloric acid

70819164782. Sodium hydroxide

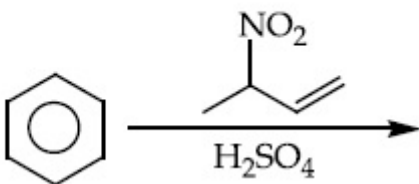
70819164783. Nitric acid

70819164784. Ammonia

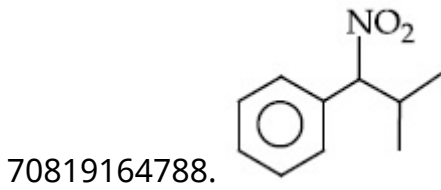
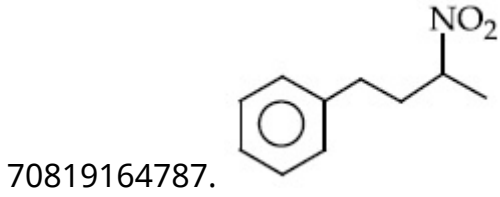
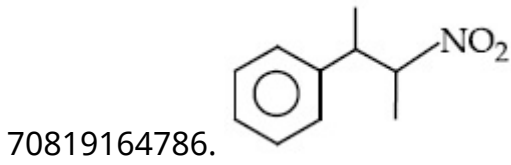
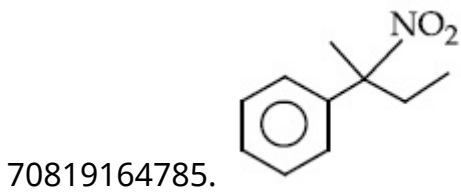
Question Number : 42 Question Id : 70819119875 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The major product of the following reaction is :



Options :

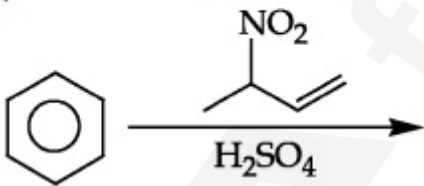


Question Number : 42 Question Id : 70819119875 Question Type : MCQ Option Shuffling : Yes

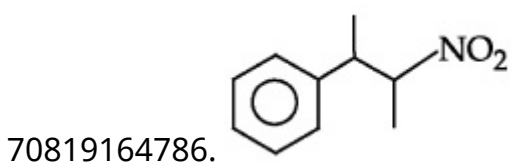
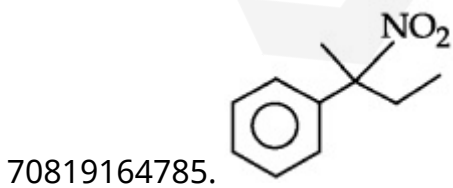
Is Question Mandatory : No

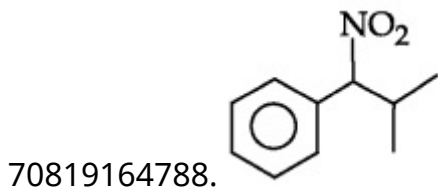
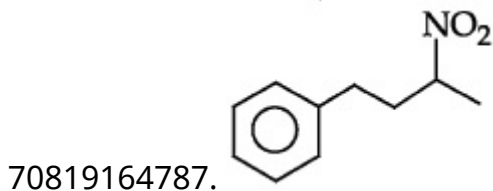
Correct Marks : 4 Wrong Marks : 1

مندرجہ ذیل تعامل میں زیادہ حاصل شدہ شے ہے :



Options :

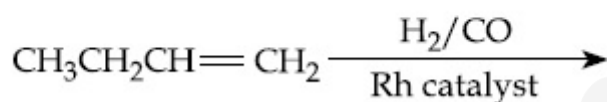




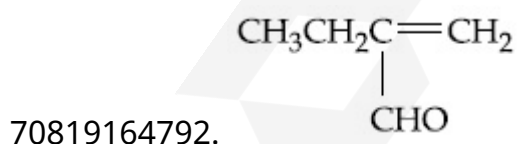
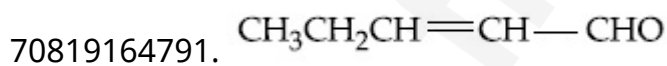
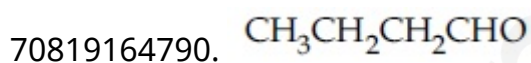
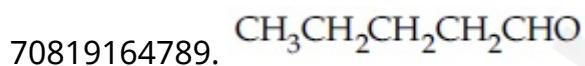
Question Number : 43 Question Id : 70819119876 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The major product of the following reaction is :



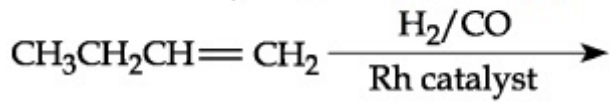
Options :



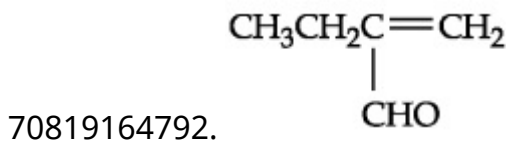
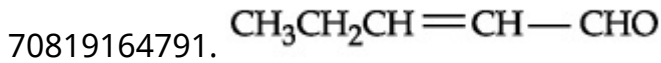
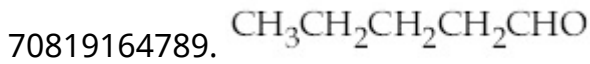
Question Number : 43 Question Id : 70819119876 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

مندرجہ ذیل تعامل میں زیادہ حاصل شدہ ہے :



Options :



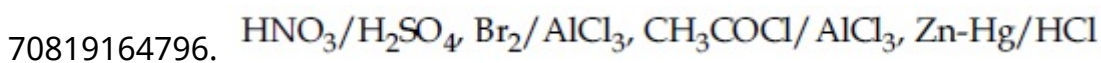
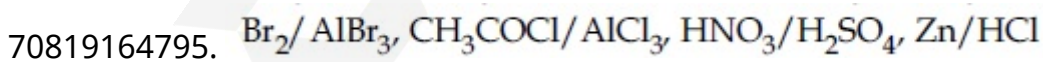
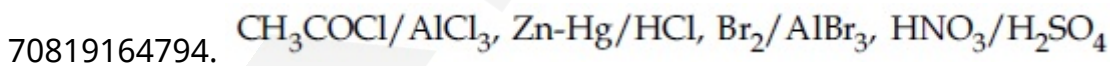
Question Number : 44 Question Id : 70819119877 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The correct sequence of reagents used in the preparation of 4-bromo-2-nitroethyl benzene from benzene is :

Options :



Question Number : 44 Question Id : 70819119877 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

بزین سے 4-bromo-2-nitroethyl benzene استعمال شدہ متعامل کا صحیح سلسلہ بتائیے۔

Options :

70819164793. $\text{CH}_3\text{COCl}/\text{AlCl}_3, \text{Br}_2/\text{AlBr}_3, \text{HNO}_3/\text{H}_2\text{SO}_4, \text{Zn}/\text{HCl}$

70819164794. $\text{CH}_3\text{COCl}/\text{AlCl}_3, \text{Zn-Hg}/\text{HCl}, \text{Br}_2/\text{AlBr}_3, \text{HNO}_3/\text{H}_2\text{SO}_4$

70819164795. $\text{Br}_2/\text{AlBr}_3, \text{CH}_3\text{COCl}/\text{AlCl}_3, \text{HNO}_3/\text{H}_2\text{SO}_4, \text{Zn}/\text{HCl}$

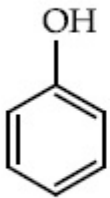
70819164796. $\text{HNO}_3/\text{H}_2\text{SO}_4, \text{Br}_2/\text{AlCl}_3, \text{CH}_3\text{COCl}/\text{AlCl}_3, \text{Zn-Hg}/\text{HCl}$

Question Number : 45 Question Id : 70819119878 Question Type : MCQ Option Shuffling : Yes

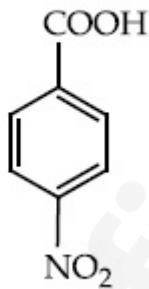
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

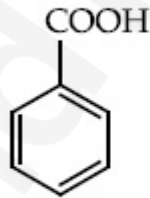
The correct order of acid character of the following compounds is :



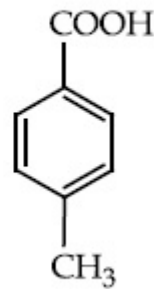
I



II



III



IV

Options :

70819164797. I > II > III > IV

70819164798. III > II > I > IV

70819164799. II > III > IV > I

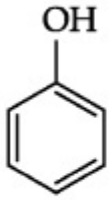
70819164800. IV > III > II > I

Question Number : 45 Question Id : 70819119878 Question Type : MCQ Option Shuffling : Yes

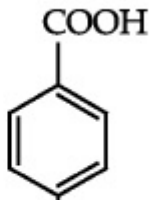
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

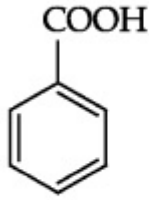
مندرجہ ذیل مرکبات کے تیزابی خاصیت کا صحیح سلسلہ ہے۔



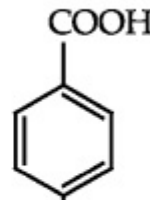
I



II



III



IV

Options :

70819164797. I > II > III > IV

70819164798. III > II > I > IV

70819164799. II > III > IV > I

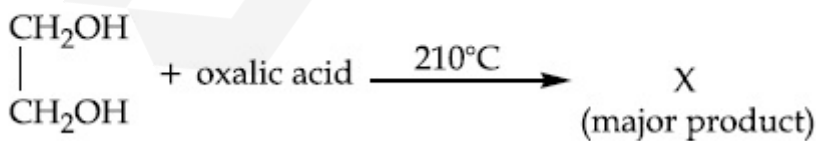
70819164800. IV > III > II > I

Question Number : 46 Question Id : 70819119879 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

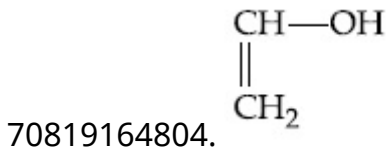
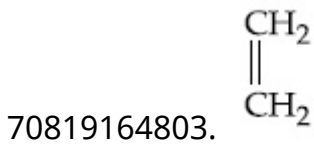
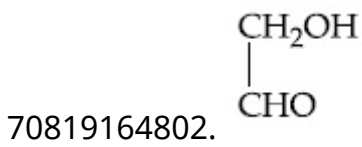
Correct Marks : 4 Wrong Marks : 1

What is 'X' in the given reaction ?



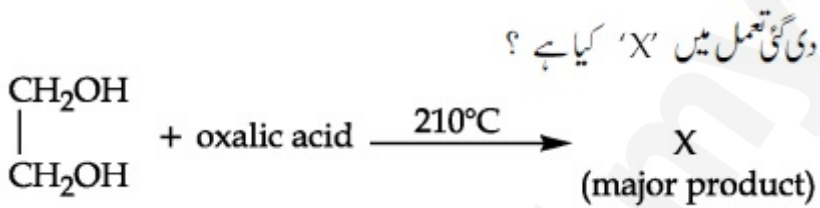
Options :

70819164801. $\begin{array}{c} \text{CHO} \\ | \\ \text{CHO} \end{array}$

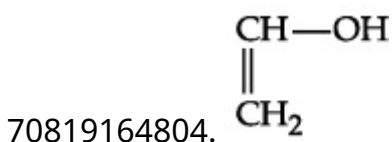
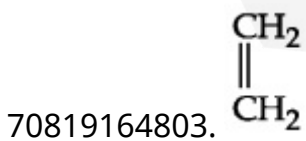
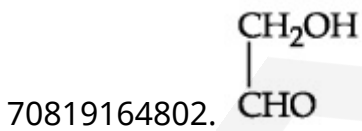
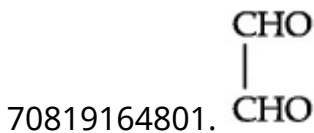


Question Number : 46 Question Id : 70819119879 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1



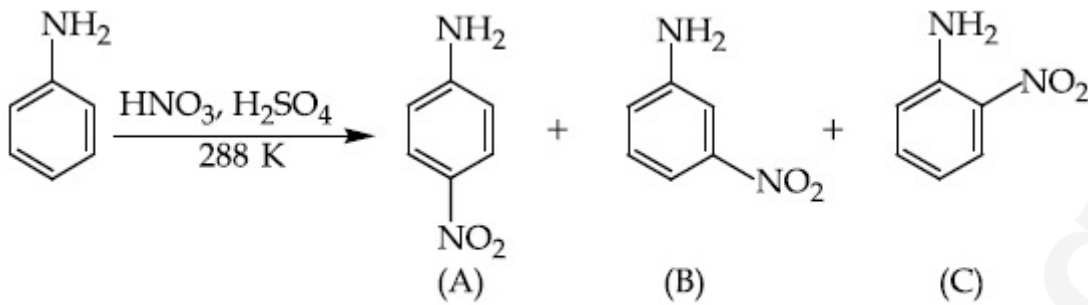
Options :



Question Number : 47 Question Id : 70819119880 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1



Correct statement about the given chemical reaction is :

Options :

70819164805. $-\ddot{\text{N}}\text{H}_2$ group is *ortho* and *para* directive, so product (B) is not possible.

70819164806. Reaction is possible and compound (B) will be the major product.

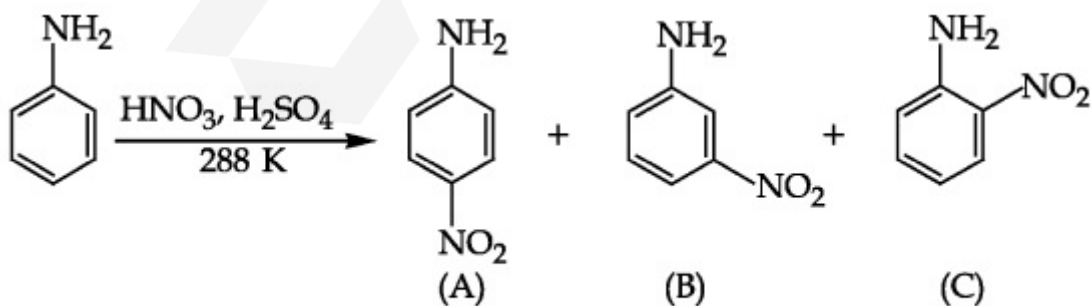
70819164807. The reaction will form sulphonated product instead of nitration.

70819164808. Reaction is possible and compound (A) will be major product.

Question Number : 47 Question Id : 70819119880 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1



دی گئی کیمیائی تعامل میں صحیح بیان کو نئے :

Options :

70819164805. اور ortho اور para مقام پر دعویٰ پزیر ہوتا ہے۔ اس لئے (B) کا بننا ممکن نہیں۔

70819164806. تعمل ممکن ہے۔ (B) مرکب میں زیادہ حاصل شدہ شے ہوگی۔

70819164807. تعمل میں سلفونائیڈ (sulphonated) حاصل شدہ شے ملتی ہے بجائے نائٹریشن (nitration) کے

70819164808. تعمل ممکن ہے (A) مرکب کی زیادہ حاصل شدہ شے ہوگی۔

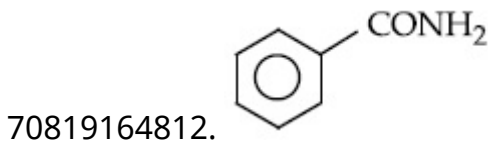
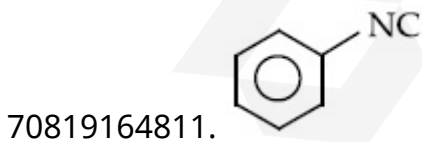
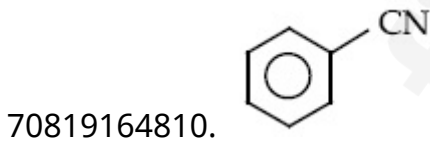
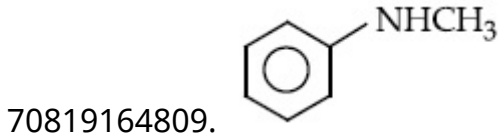
Question Number : 48 Question Id : 70819119881 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Carbylamine test is used to detect the presence of primary amino group in an organic compound. Which of the following compound is formed when this test is performed with aniline ?

Options :



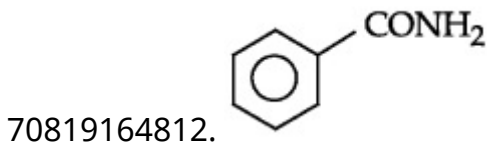
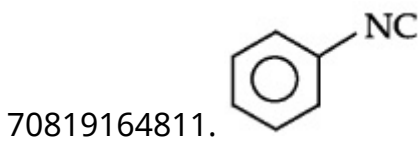
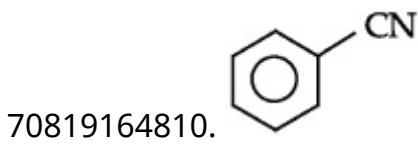
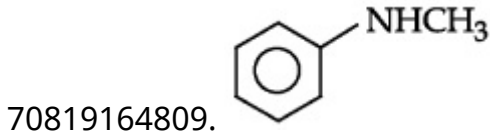
Question Number : 48 Question Id : 70819119881 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

نامیاتی مرکبات میں کاربل امائن (Carbylamine test) پرائمری امائنوگروپ کی شناخت میں استعمال ہوتا ہے۔ اگر اپنی لین (aniline) کے لیے یہ جانچ کرائی جائے تو ذیل میں سے کون سا مرکب حاصل ہوتا ہے ؟

Options :



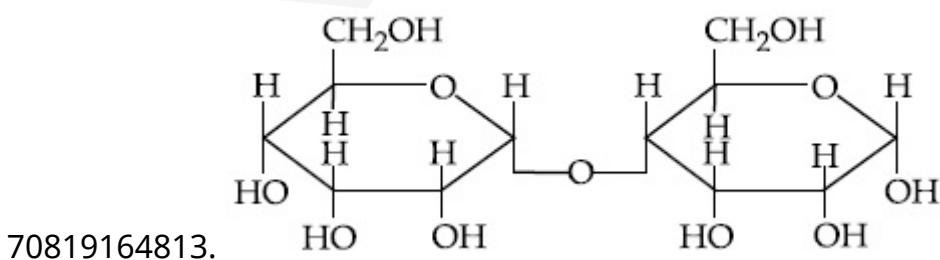
Question Number : 49 Question Id : 70819119882 Question Type : MCQ Option Shuffling : Yes

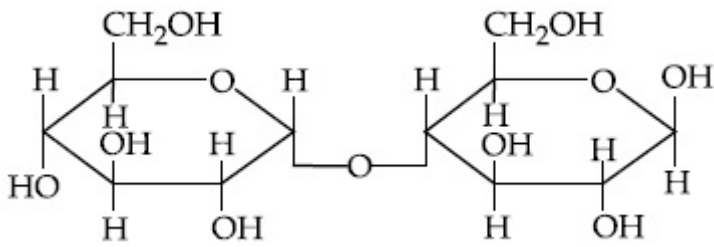
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

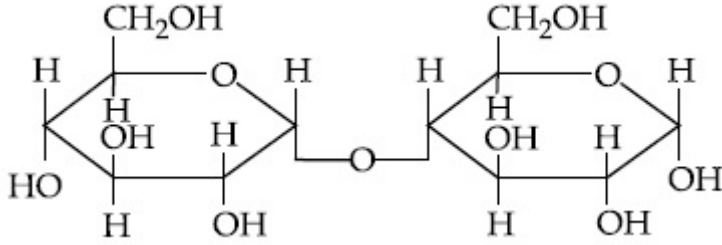
Which of the following is correct structure of α -anomer of maltose ?

Options :

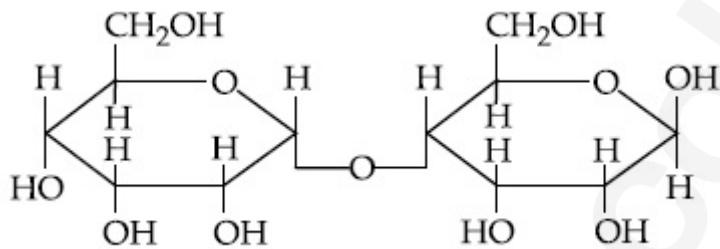




70819164814.



70819164815.



70819164816.

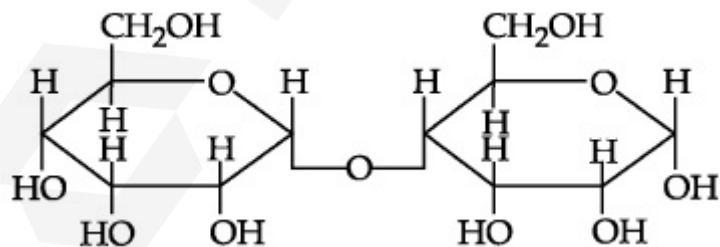
Question Number : 49 Question Id : 70819119882 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

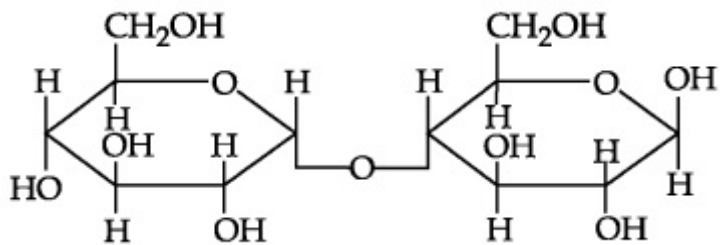
Correct Marks : 4 Wrong Marks : 1

ذیل میں مالٹوز کے α -اینومر کی صحیح ساخت کونسی ہے ؟

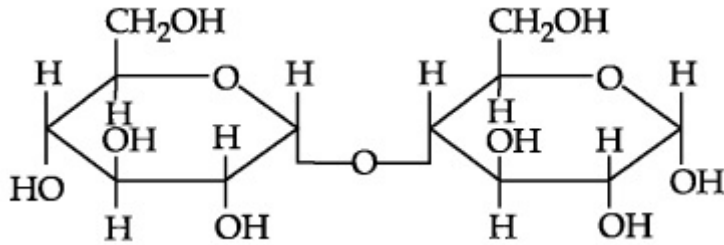
Options :



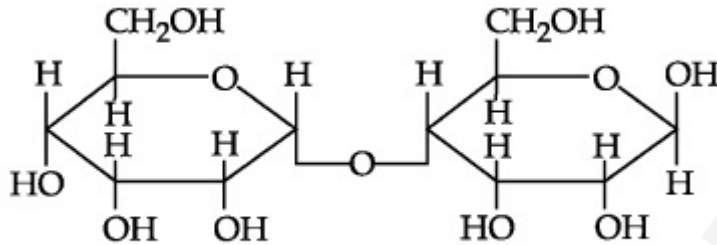
70819164813.



70819164814.



70819164815.



70819164816.

Question Number : 50 Question Id : 70819119883 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Given below are two statements :

Statement I :

The identification of Ni^{2+} is carried out by dimethyl glyoxime in the presence of NH_4OH .

Statement II :

The dimethyl glyoxime is a bidentate neutral ligand.

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

Options :

70819164817. Both Statement I and Statement II are true.

70819164818. Both Statement I and Statement II are false.

70819164819. Statement I is true but Statement II is false.

70819164820. Statement I is false but Statement II is true.

Question Number : 50 Question Id : 70819119883 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 : Ni^{2+} کی شناخت dimethyl glyoxime سے کی جاتی ہے NH_4OH کی موجودگی میں۔

بیان - II : dimethyl glyoxime ایک معتدل bidentate لکینڈ ہے۔

مندرجہ بالا بیانات کی روشنی میں مندرجہ ذیل میں سے صحیح جواب چن کر لکھئے۔

Options :

70819164817. دونوں بیان - I اور بیان - II صحیح ہیں۔

70819164818. دونوں بیان - I اور بیان - II غلط ہیں۔

70819164819. بیان - I صحیح ہے لیکن بیان - II غلط ہے۔

70819164820. بیان - I غلط ہے لیکن بیان - II صحیح ہے۔

Chemistry Section B

| | |
|---------------------------------------|-----------|
| Section Id : | 708191865 |
| 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 |

Question Number : 51 Question Id : 70819119884 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Consider titration of NaOH solution versus 1.25 M oxalic acid solution. At the end point following burette readings were obtained.

- | | | |
|-------------|-------------|--------------|
| (i) 4.5 mL | (ii) 4.5 mL | (iii) 4.4 mL |
| (iv) 4.4 mL | (v) 4.4 mL | |

If the volume of oxalic acid taken was 10.0 mL then the molarity of the NaOH solution is _____ M. (Rounded-off to the nearest integer)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 51 Question Id : 70819119884 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

فرض کیجئے کہ NaOH کے محلول کے (titration) عمل 1.25 M آکسلیک ایسڈ (oxalic acid) کا محلول بمقابلہ سوڈیم ہائیڈرو

آکسائیڈ کے محلول درمیان ہوا۔ تو مندرجہ ذیل burette کے نشانات (readings) حاصل ہوتی ہے ان کے نقطہ آخر پر (end point)

| | | | | | |
|--------|-------|--------|------|--------|-----|
| 4.4 mL | (iii) | 4.5 mL | (ii) | 4.5 mL | (i) |
|--------|-------|--------|------|--------|-----|

| | | | |
|--------|-----|--------|------|
| 4.4 mL | (v) | 4.4 mL | (iv) |
|--------|-----|--------|------|

اگر oxalic acid کا حجم 10.0 mL لیا گیا تھا تو NaOH کی مولریت (molarity) M ہے۔

(قریب ترین 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 : 52 Question Id : 70819119885 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The unit cell of copper corresponds to a face centered cube of edge length 3.596 \AA with one copper atom at each lattice point. The calculated density of copper in kg/m^3 is _____.

[Molar mass of Cu : 63.54 g ; Avogadro Number = 6.022×10^{23}]

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 : 70819119885 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

کاپر کے اکائی خاند کے رُخ مرکز مکعبی کے مطابق کنارے کی لمبائی 3.596 \AA ہے جس میں جو جالی کے نقطے پر ایک کاپر جوہر لگا ہوا ہے۔ تب کاپر کی کثافت kg/m^3 ہے۔

[دیا گیا کاپر کی مولر کمیت = 63.54 g ؛ ایواگادرو نمبر (Avogadro number) = 6.022×10^{23}]

(جواب 4 عدد میں ہوں)

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 : 70819119886 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Electromagnetic radiation of wavelength 663 nm is just sufficient to ionise the atom of metal A. The ionization energy of metal A in kJ mol^{-1} is _____. (Rounded-off to the nearest integer)

[$h = 6.63 \times 10^{-34} \text{ Js}$, $c = 3.00 \times 10^8 \text{ ms}^{-1}$, $N_A = 6.02 \times 10^{23} \text{ mol}^{-1}$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 53 Question Id : 70819119886 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

دھات کے جوہر کو آئن زدہ کرنے کے لئے کافی (Electromagnetic radiation) اشعاع A کا الیکٹرومقناطیسی اشعاع 663 nm طول موج کا الیکٹرومقناطیسی اشعاع ہے۔ دھات کی آئین شدگی تو انا کی kJ mol^{-1} ہے۔

[$h = 6.63 \times 10^{-34} \text{ Js}$, $c = 3.00 \times 10^8 \text{ ms}^{-1}$, $N_A = 6.02 \times 10^{23} \text{ mol}^{-1}$]

(جواب تین عدد میں ہوں)

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 : 70819119887 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Five moles of an ideal gas at 293 K is expanded isothermally from an initial pressure of 2.1 MPa to 1.3 MPa against a constant external pressure of 4.3 MPa. The heat transferred in this process is _____ kJ mol⁻¹. (Rounded-off to the nearest integer)

[Use $R = 8.314 \text{ J mol}^{-1}\text{K}^{-1}$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 54 **Question Id :** 70819119887 **Question Type :** SA

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

2.1 MPa سے 1.3 MPa تک پھیلتی ہے۔ تو اس عمل میں حرارت کی منتقلی _____ kJ mol⁻¹ ہے۔ (قریب ترین عدد میں)

[$R = 8.314 \text{ J mol}^{-1}\text{K}^{-1}$: استعمال کریں]

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 :** 70819119888 **Question Type :** SA

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

If a compound AB dissociates to the extent of 75% in an aqueous solution, the molality of the solution which shows a 2.5 K rise in the boiling point of the solution is _____ molal. (Rounded-off to the nearest integer)

[$K_b = 0.52 \text{ K kg mol}^{-1}$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 55 Question Id : 70819119888 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

آب آمیز محلول میں ایک مرکب AB 75% تک منتشر ہوتا ہے۔ تو محلول کی مولریت پر نقطہ جوش کا 2.5 K اضافہ ہوتا ہے۔ وہ مولل (قریب ترین عدد میں) ہے۔ _____ molal
[$K_b = 0.52 \text{ K kg mol}^{-1}$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 56 Question Id : 70819119889 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Copper reduces NO_3^- into NO and NO_2 depending upon the concentration of HNO_3 in solution. (Assuming fixed $[\text{Cu}^{2+}]$ and $P_{\text{NO}} = P_{\text{NO}_2}$), the HNO_3 concentration at which the thermodynamic tendency for reduction of NO_3^- into NO and NO_2 by copper is same is 10^x M . The value of $2x$ is _____. (Rounded-off to the nearest integer)

[Given, $E_{\text{Cu}^{2+}/\text{Cu}}^0 = 0.34 \text{ V}$, $E_{\text{NO}_3^-/\text{NO}}^0 = 0.96 \text{ V}$, $E_{\text{NO}_3^-/\text{NO}_2}^0 = 0.79 \text{ V}$ and at 298 K,

$\frac{RT}{F} (2.303) = 0.059$]

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 : 56 Question Id : 70819119889 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

کا پر NO_3^- کی تحویل سے NO اور NO_2 دیتا ہے جو HNO_3 کے محلول کے ارتکاز پر منحصر رہتا ہے۔ (فرض کرتے ہیں کہ $[\text{Cu}^{2+}]$ غیر

متغیر ہے اور $P_{\text{NO}} = P_{\text{NO}_2}$ کی ارتکاز جس پر NO_3^- کی NO_2 اور NO میں تحویل ہونے کا حرکتیاتی رجحان یکساں ہو 10^x M ہے۔

تب $2x$ کی قیمت _____ ہے۔ (قریب ترین عدد میں)

[دیا گیا :

$E^\circ_{\text{Cu}^{2+}/\text{Cu}} = 0.34 \text{ V}$, $E^\circ_{\text{NO}_3^-/\text{NO}} = 0.96 \text{ V}$, $E^\circ_{\text{NO}_3^-/\text{NO}_2} = 0.79 \text{ V}$, at 298 K, $\frac{RT}{F} (2.303) = 0.059$]

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 : 70819119890 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The rate constant of a reaction increases by five times on increase in temperature from 27°C to 52°C . The value of activation energy in kJ mol^{-1} is _____. (Rounded-off to the nearest integer)

[$R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 57 Question Id : 70819119890 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ایک عمل کی رفتار کے مستقلہ میں پانچ گنا اضافہ ہوتا ہے۔ جب اس کے درجہ حرارت کو 27°C سے 52°C تک بڑھایا جاتا ہے۔ تو اس کی کارکردگی کی توانائی kJ mol^{-1} ہے۔ (قریب ترین عدد دیں)

$$[R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}]$$

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 58 Question Id : 70819119891 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Among the following, number of metal/s which can be used as electrodes in the photoelectric cell is _____. (Integer answer)

- (A) Li (B) Na (C) Rb (D) Cs

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 : 70819119891 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

فوٹو الیکٹریک برقی خانے (photoelectric cells) میں دھات / دھاتوں کو بطور برقیہ استعمال کرتے ہیں۔ نیچے دی گئی دھاتوں میں سے ان کی تعداد _____ ہے۔

Cs (D)

Rb (C)

Na (B)

Li (A)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 59 Question Id : 70819119892 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The spin only magnetic moment of a divalent ion in aqueous solution (atomic number 29) is _____ BM.

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 : 70819119892 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

آبی مخلول میں ایک دوگرتی آین (جوہری عدد 29) کی صرف گھماؤ متناطیسی معیار اثر (spin only magnetic moment) BM میں _____ ہے۔ (قریب ترین 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 : 60 Question Id : 70819119893 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The number of compound/s given below which contain/s —COOH group is _____.
(Integer answer)

- | | |
|----------------------|-------------------|
| (A) Sulphanilic acid | (B) Picric acid |
| (C) Aspirin | (D) Ascorbic acid |

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 : 70819119893 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

—COOH گروپ رکھنے والے مرکبات کی تعداد ذیل میں ہے۔

(قریب ترین عدد)

Picric acid (B)

Sulphanilic acid (A)

Ascorbic acid (D)

Aspirin (C)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Mathematics Section A

| | |
|--|------------|
| Section Id : | 708191866 |
| Section Number : | 5 |
| Section type : | Online |
| Mandatory or Optional : | Mandatory |
| Number of Questions : | 20 |
| Number of Questions to be attempted : | 20 |
| Section Marks : | 80 |
| Mark As Answered Required? : | Yes |
| Sub-Section Number : | 1 |
| Sub-Section Id : | 7081911146 |
| Question Shuffling Allowed : | Yes |

Question Number : 61 **Question Id :** 70819119894 **Question Type :** MCQ **Option Shuffling :** Yes

Is Question Mandatory : No

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

If for the matrix, $A = \begin{bmatrix} 1 & -\alpha \\ \alpha & \beta \end{bmatrix}$, $AA^T = I_2$, then the value of $\alpha^4 + \beta^4$ is :

Options :

70819164831. 4

70819164832. 1

70819164833. 2

70819164834. 3

Question Number : 61 Question Id : 70819119894 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

اگر میٹرکس $A = \begin{bmatrix} 1 & -\alpha \\ \alpha & \beta \end{bmatrix}$ کے لئے $AA^T = I_2$ تو $\alpha^4 + \beta^4$ کی قیمت _____ ہے۔

Options :

70819164831. 4

70819164832. 1

70819164833. 2

70819164834. 3

Question Number : 62 Question Id : 70819119895 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let A be a 3×3 matrix with $\det(A) = 4$. Let R_i denote the i^{th} row of A. If matrix B is obtained by performing the operation $R_2 \rightarrow 2R_2 + 5R_3$ on $2A$, then $\det(B)$ is equal to :

Options :

70819164835. 16

70819164836. 80

70819164837. 64

70819164838. 128

Question Number : 62 Question Id : 70819119895 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

فرض کیجئے A ایک 3×3 میٹرکس ہے جس کا $\det(A) = 4$ ہے۔ فرض کیجئے R_i میٹرکس A کے i^{th} صف (row) کو ظاہر کرتا ہے۔ اگر میٹرکس $2A$ پر عمل $R_2 \rightarrow 2R_2 + 5R_3$ کر کے میٹرکس B تیار کیا گیا تو $\det(B)$ کے _____ کے برابر ہے۔

Options :

70819164835. 16

70819164836. 80

70819164837. 64

70819164838. 128

Question Number : 63 Question Id : 70819119896 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The following system of linear equations

$$2x + 3y + 2z = 9$$

$$3x + 2y + 2z = 9$$

$$x - y + 4z = 8$$

Options :

70819164839. does not have any solution

70819164840. has a unique solution

70819164841. has infinitely many solutions

70819164842. has a solution (α, β, γ) satisfying $\alpha + \beta^2 + \gamma^3 = 12$

Question Number : 63 Question Id : 70819119896 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

یک درجی مساوات کے نظام

$$2x + 3y + 2z = 9$$

$$3x + 2y + 2z = 9$$

$$x - y + 4z = 8$$

کا

Options :

70819164839. کوئی بھی حل نہیں ہے۔

70819164840. منفرد حل (unique solution) ہے۔

70819164841. لامحدود حل (infinitely many solutions) ہیں۔

70819164842. $\alpha + \beta^2 + \gamma^3 = 12$ اس کا حل ہے جو (α, β, γ) کو مطمئن کرتا ہے۔

Question Number : 64 Question Id : 70819119897 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If $I_n = \int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \cot^n x \, dx$, then :

Options :

70819164843. $\frac{1}{I_2 + I_4}, \frac{1}{I_3 + I_5}, \frac{1}{I_4 + I_6}$ are in A.P.

70819164844. $I_2 + I_4, I_3 + I_5, I_4 + I_6$ are in A.P.

70819164845. $\frac{1}{I_2 + I_4}, \frac{1}{I_3 + I_5}, \frac{1}{I_4 + I_6}$ are in G.P.

70819164846. $I_2 + I_4, (I_3 + I_5)^2, I_4 + I_6$ are in G.P.

Question Number : 64 Question Id : 70819119897 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ج $I_n = \int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \cot^n x \, dx$ اگر

Options :

70819164843. $\frac{1}{I_2 + I_4}, \frac{1}{I_3 + I_5}, \frac{1}{I_4 + I_6}$ حسابی سلسلہ میں ہیں

70819164844. حسابی سلسلہ میں ہیں $I_2 + I_4, I_3 + I_5, I_4 + I_6$

70819164845. ہندی سلسلہ میں ہیں $\frac{1}{I_2 + I_4}, \frac{1}{I_3 + I_5}, \frac{1}{I_4 + I_6}$

70819164846. ہندی سلسلہ میں ہیں $I_2 + I_4, (I_3 + I_5)^2, I_4 + I_6$

Question Number : 65 Question Id : 70819119898 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A function $f(x)$ is given by $f(x) = \frac{5^x}{5^x + 5}$, then the sum of the series

$$f\left(\frac{1}{20}\right) + f\left(\frac{2}{20}\right) + f\left(\frac{3}{20}\right) + \dots + f\left(\frac{39}{20}\right)$$

is equal to :

Options :

70819164847. $\frac{29}{2}$

70819164848. $\frac{49}{2}$

70819164849. $\frac{39}{2}$

70819164850. $\frac{19}{2}$

Question Number : 65 Question Id : 70819119898 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ایک تفاعل $f(x)$ اس طرح دیا ہوا ہے :

$$f(x) = \frac{5^x}{5^x + 5} \text{ تو سلسلہ}$$

$$f\left(\frac{1}{20}\right) + f\left(\frac{2}{20}\right) + f\left(\frac{3}{20}\right) + \dots + f\left(\frac{39}{20}\right)$$

کا مجموعہ (sum) _____ کے برابر ہے۔

Options :

70819164847. $\frac{29}{2}$

70819164848. $\frac{49}{2}$

70819164849. $\frac{39}{2}$

70819164850. $\frac{19}{2}$

Question Number : 66 Question Id : 70819119899 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let α and β be the roots of $x^2 - 6x - 2 = 0$. If $a_n = \alpha^n - \beta^n$ for $n \geq 1$, then the value of $\frac{a_{10} - 2a_8}{3a_9}$

is :

Options :

70819164851. 4

70819164852. 3

70819164853. 2

70819164854. 1

Question Number : 66 Question Id : 70819119899 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

فرض کیجئے $x^2 - 6x - 2 = 0$ کے جذر α اور β ہیں۔ اگر $a_n = \alpha^n - \beta^n$ ، $n \geq 1$ کیلئے تو
کی قیمت $\frac{a_{10} - 2a_9}{3a_9}$ ہے۔

Options :

70819164851. 4

70819164852. 3

70819164853. 2

70819164854. 1

Question Number : 67 Question Id : 70819119900 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The minimum value of $f(x) = a^{a^x} + a^{1-a^x}$, where $a, x \in \mathbb{R}$ and $a > 0$, is equal to :

Options :

70819164855. $a + 1$

70819164856.

$$a + \frac{1}{a}$$

70819164857. $2\sqrt{a}$

70819164858. $2a$

Question Number : 67 Question Id : 70819119900 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

(minimum value) کی اقل ترین قیمت ، $a > 0$ اور $a, x \in \mathbb{R}$ جہاں $f(x) = a^{a^x} + a^{1-a^x}$ کے برابر ہے۔ _____

Options :

70819164855. $a + 1$

70819164856. $a + \frac{1}{a}$

70819164857. $2\sqrt{a}$

70819164858. $2a$

Question Number : 68 Question Id : 70819119901 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The integral $\int \frac{e^{3\log_e 2x} + 5e^{2\log_e 2x}}{e^{4\log_e x} + 5e^{3\log_e x} - 7e^{2\log_e x}} dx, x > 0$, is equal to :

(where c is a constant of integration)

Options :

70819164859. $\log_e |x^2 + 5x - 7| + c$

70819164860. $4\log_e |x^2 + 5x - 7| + c$

70819164861. $\frac{1}{4} \log_e |x^2 + 5x - 7| + c$

70819164862. $\log_e \sqrt{x^2 + 5x - 7} + c$

Question Number : 68 Question Id : 70819119901 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

(Integral) تکمیل

$$\int \frac{e^{3\log_e 2x} + 5e^{2\log_e 2x}}{e^{4\log_e x} + 5e^{3\log_e x} - 7e^{2\log_e x}} dx$$

جہاں $x > 0$ کے برابر ہے۔
(جہاں 'c' تکمیلی مستقل ہے)

Options :

70819164859. $\log_e |x^2 + 5x - 7| + c$

70819164860. $4\log_e |x^2 + 5x - 7| + c$

70819164861. $\frac{1}{4} \log_e |x^2 + 5x - 7| + c$

70819164862. $\log_e \sqrt{x^2 + 5x - 7} + c$

Question Number : 69 Question Id : 70819119902 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If $\alpha, \beta \in \mathbb{R}$ are such that $1 - 2i$ (here $i^2 = -1$) is a root of $z^2 + \alpha z + \beta = 0$, then $(\alpha - \beta)$ is equal to :

Options :

70819164863. 3

70819164864. -3

70819164865. 7

70819164866. -7

Question Number : 69 Question Id : 70819119902 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

اگر $\alpha, \beta \in \mathbb{R}$ اس طرح ہے کہ $1 - 2i$ (جہاں $i^2 = -1$)

$z^2 + \alpha z + \beta = 0$ کا جذر (root) ہے تو $(\alpha - \beta)$ کے برابر ہے۔

Options :

70819164863. 3

70819164864. -3

70819164865. 7

70819164866. -7

Question Number : 70 Question Id : 70819119903 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If the curve $x^2 + 2y^2 = 2$ intersects the line $x + y = 1$ at two points P and Q, then the angle subtended by the line segment PQ at the origin is :

Options :

70819164867. $\frac{\pi}{2} + \tan^{-1}\left(\frac{1}{4}\right)$

70819164868. $\frac{\pi}{2} - \tan^{-1}\left(\frac{1}{4}\right)$

70819164869. $\frac{\pi}{2} + \tan^{-1}\left(\frac{1}{3}\right)$

70819164870. $\frac{\pi}{2} - \tan^{-1}\left(\frac{1}{3}\right)$

Question Number : 70 Question Id : 70819119903 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

اگر منحنی $x^2 + 2y^2 = 2$ (curve) خط $x + y = 1$ کو دو نقاط P اور Q پر قطع کرتا ہے تو خط PQ کے ذریعے مبداء پر بنایا گیا

زاویہ _____ ہے۔

Options :

70819164867. $\frac{\pi}{2} + \tan^{-1}\left(\frac{1}{4}\right)$

70819164868. $\frac{\pi}{2} - \tan^{-1}\left(\frac{1}{4}\right)$

70819164869. $\frac{\pi}{2} + \tan^{-1}\left(\frac{1}{3}\right)$

70819164870. $\frac{\pi}{2} - \tan^{-1}\left(\frac{1}{3}\right)$

Question Number : 71 Question Id : 70819119904 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The shortest distance between the line $x - y = 1$ and the curve $x^2 = 2y$ is :

Options :

70819164871. $\frac{1}{\sqrt{2}}$

70819164872. $\frac{1}{2\sqrt{2}}$

70819164873. 0

70819164874. $\frac{1}{2}$

Question Number : 71 Question Id : 70819119904 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

_____ (shortest distance) کے درمیان کا مختصر فاصلہ $x^2 = 2y$ (curve) اور منحنی $x - y = 1$

-4-

Options :

70819164871. $\frac{1}{\sqrt{2}}$

70819164872. $\frac{1}{2\sqrt{2}}$

70819164873. 0

70819164874. $\frac{1}{2}$

**Question Number : 72 Question Id : 70819119905 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No**

Correct Marks : 4 Wrong Marks : 1

A hyperbola passes through the foci of the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$ and its transverse and conjugate axes coincide with major and minor axes of the ellipse, respectively. If the product of their eccentricities is one, then the equation of the hyperbola is :

Options :

70819164875. $\frac{x^2}{9} - \frac{y^2}{16} = 1$

70819164876. $\frac{x^2}{9} - \frac{y^2}{4} = 1$

70819164877. $\frac{x^2}{9} - \frac{y^2}{25} = 1$

70819164878. $x^2 - y^2 = 9$

Question Number : 72 Question Id : 70819119905 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ایک بذلولی، بیضوی $\frac{x^2}{25} + \frac{y^2}{16} = 1$ کے مرکز (foci) میں سے گزرتا ہے اور اس کے بالترتیب transverse اور ہم اصل (conjugate) محور بیضوی کے بڑے (major) اور چھوٹے (minor) محوروں پر منطبق (coincide) ہوتے ہیں۔ اگر ان کے eccentricities کا حاصل ضرب (product) ایک ہے تو بذلولی کی مساوات _____ ہے۔

Options :

70819164875. $\frac{x^2}{9} - \frac{y^2}{16} = 1$

70819164876. $\frac{x^2}{9} - \frac{y^2}{4} = 1$

70819164877. $\frac{x^2}{9} - \frac{y^2}{25} = 1$

70819164878. $x^2 - y^2 = 9$

Question Number : 73 Question Id : 70819119906 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A plane passes through the points A(1, 2, 3), B(2, 3, 1) and C(2, 4, 2). If O is the origin and P is (2, -1, 1), then the projection of \vec{OP} on this plane is of length :

Options :

70819164879. $\frac{\sqrt{2}}{\sqrt{3}}$

70819164880. $\frac{\sqrt{2}}{\sqrt{11}}$

70819164881.

$$\sqrt{\frac{2}{7}}$$

70819164882.

$$\sqrt{\frac{2}{5}}$$

Question Number : 73 Question Id : 70819119906 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

ایک مستوی نقاط $A(1, 2, 3)$ ، $B(2, 3, 1)$ اور $C(2, 4, 2)$ میں سے گزرتی ہے۔ اگر 'O' مبدا ہے اور $P(2, -1, 1)$ ہے تو اس مستوی پر \vec{OP} کے عکس (Projection of) کی لمبائی ہے۔

Options :

70819164879.

$$\sqrt{\frac{2}{3}}$$

70819164880.

$$\sqrt{\frac{2}{11}}$$

70819164881.

$$\sqrt{\frac{2}{7}}$$

70819164882.

$$\sqrt{\frac{2}{5}}$$

Question Number : 74 Question Id : 70819119907 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$\lim_{n \rightarrow \infty} \left[\frac{1}{n} + \frac{n}{(n+1)^2} + \frac{n}{(n+2)^2} + \dots + \frac{n}{(2n-1)^2} \right]$ is equal to :

Options :

70819164883. $\frac{1}{1}$

70819164884. $\frac{1}{2}$

70819164885. $\frac{1}{3}$

70819164886. $\frac{1}{4}$

Question Number : 74 Question Id : 70819119907 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$$\lim_{n \rightarrow \infty} \left[\frac{1}{n} + \frac{n}{(n+1)^2} + \frac{n}{(n+2)^2} + \dots + \frac{n}{(2n-1)^2} \right]$$

کے برابر ہے۔ _____

Options :

70819164883. $\frac{1}{1}$

70819164884. $\frac{1}{2}$

70819164885. $\frac{1}{3}$

70819164886. $\frac{1}{4}$

Question Number : 75 Question Id : 70819119908 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

In a group of 400 people, 160 are smokers and non-vegetarian; 100 are smokers and vegetarian and the remaining 140 are non-smokers and vegetarian. Their chances of getting a particular chest disorder are 35%, 20% and 10% respectively. A person is chosen from the group at random and is found to be suffering from the chest disorder. The probability that the selected person is a smoker and non-vegetarian is :

Options :

70819164887. $\frac{7}{45}$

70819164888. $\frac{8}{45}$

70819164889. $\frac{28}{45}$

70819164890. $\frac{14}{45}$

Question Number : 75 Question Id : 70819119908 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

400 لوگوں کی گروپ میں 160 تمباکو نوش کرنے والے اور گوشت خور (non-vegetarian) ہیں۔ 100 تمباکو نوش کرنے والے اور سبزی خور (vegetarian) ہیں اور باقی 140 غیر تمباکو نوش کرنے والے اور سبزی خور ہیں۔ ان کے چھاتی کی خاص تکلیف کے موقعے (chances) بالترتیب 35% ، 20% اور 10% ہیں۔ بغیر سوچے سمجھے اس گروپ میں سے ایک آدمی منتخب کیا گیا اور پایا گیا کہ وہ چھاتی کی تکلیف سے گزر رہا ہے۔ منتخب کیا گیا آدمی تمباکو نوش کرنے والا اور گوشت خور ہونے کی احتمال _____ ہے۔

Options :

70819164887. $\frac{7}{45}$

70819164888. $\frac{8}{45}$

70819164889. $\frac{28}{45}$

70819164890. $\frac{14}{45}$

Question Number : 76 Question Id : 70819119909 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let A be a set of all 4-digit natural numbers whose exactly one digit is 7. Then the probability that a randomly chosen element of A leaves remainder 2 when divided by 5 is :

Options :

70819164891. $\frac{1}{5}$

70819164892. $\frac{2}{9}$

70819164893. $\frac{97}{297}$

70819164894. $\frac{122}{297}$

Question Number : 76 Question Id : 70819119909 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

کرس بیجے A ہندسی حقیقی عدد (4-digit natural numbers) کا سیٹ ہے۔ اس کا صرف ایک (exactly one) ہندسہ 7 ہے۔ سیٹ A میں سے بغیر سوچے سمجھے منتخب کئے گئے رکن (element) کا احتمال ہے۔ جس کو 5 سے تقسیم کرنے پر باقی 2 رہتا ہے۔

Options :

70819164891. $\frac{1}{5}$

70819164892. $\frac{2}{9}$

70819164893. $\frac{97}{297}$

70819164894. $\frac{122}{297}$

Question Number : 77 Question Id : 70819119910 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

If $0 < x, y < \pi$ and $\cos x + \cos y - \cos(x + y) = \frac{3}{2}$, then $\sin x + \cos y$ is equal to :

Options :

70819164895. $\frac{1}{2}$

70819164896. $\frac{\sqrt{3}}{2}$

70819164897. $\frac{1 - \sqrt{3}}{2}$

70819164898.

$$\frac{1 + \sqrt{3}}{2}$$

Question Number : 77 Question Id : 70819119910 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$$\cos x + \cos y - \cos(x + y) = \frac{3}{2} \text{ اور } 0 < x, y < \pi \text{ اگر}$$

تو $\sin x + \cos y$ کے برابر ہے۔

Options :

70819164895. $\frac{1}{2}$

70819164896. $\frac{\sqrt{3}}{2}$

70819164897. $\frac{1 - \sqrt{3}}{2}$

70819164898. $\frac{1 + \sqrt{3}}{2}$

Question Number : 78 Question Id : 70819119911 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Let x denote the total number of one-one functions from a set A with 3 elements to a set B with 5 elements and y denote the total number of one-one functions from the set A to the set $A \times B$. Then :

Options :

70819164899. $2y = 91x$

70819164900. $2y = 273x$

70819164901. $y = 91x$

70819164902. $y = 273x$

Question Number : 78 Question Id : 70819119911 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

فرض کیجئے 3 رکن والا سیٹ A سے 5 رکن والے سیٹ B کے تمام ایک-ایک تفاعل (one-one function) کی تعداد x ہے۔ اور سیٹ A سے سیٹ $A \times B$ کے تمام ایک-ایک تفاعل کی تعداد y ہے تو :

Options :

70819164899. $2y = 91x$

70819164900. $2y = 273x$

70819164901. $y = 91x$

70819164902. $y = 273x$

Question Number : 79 Question Id : 70819119912 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$\operatorname{cosec} \left[2 \cot^{-1}(5) + \cos^{-1} \left(\frac{4}{5} \right) \right]$ is equal to :

Options :

70819164903. $\frac{56}{33}$

70819164904. $\frac{65}{33}$

70819164905. $\frac{65}{56}$

70819164906. $\frac{75}{56}$

Question Number : 79 Question Id : 70819119912 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

$$\operatorname{cosec} \left[2 \cot^{-1}(5) + \cos^{-1} \left(\frac{4}{5} \right) \right]$$

کے برابر ہے۔ _____

Options :

70819164903. $\frac{56}{33}$

70819164904. $\frac{65}{33}$

70819164905. $\frac{65}{56}$

70819164906. $\frac{75}{56}$

Question Number : 80 Question Id : 70819119913 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The contrapositive of the statement "If you will work, you will earn money" is :

Options :

70819164907. To earn money, you need to work

70819164908. You will earn money, if you will not work

70819164909. If you will not earn money, you will not work

70819164910. If you will earn money, you will work

Question Number : 80 Question Id : 70819119913 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

”اگر تم کام کرو گے، تم روپیہ کماؤ گے۔“

اس بیان کا مخالف مثبت (contrapositive) ہے _____ :

Options :

70819164907. روپیہ کمانے کے لئے، تم کو کام کرنا چاہئے۔

70819164908. تم روپیہ کماؤ گے، اگر تم کام نہیں کرو گے۔

70819164909. اگر تم روپیہ نہیں کماؤ گے، تم کام نہیں کرو گے۔

70819164910. اگر تم روپیہ کماؤ گے، تم کام کرو گے۔

Mathematics Section B

| | |
|---------------------------------------|------------|
| Section Id : | 708191867 |
| 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 : | 7081911147 |
| Question Shuffling Allowed : | Yes |

Question Number : 81 Question Id : 70819119914 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

A function f is defined on $[-3, 3]$ as

$$f(x) = \begin{cases} \min\{|x|, 2 - x^2\}, & -2 \leq x \leq 2 \\ [x] & , 2 < |x| \leq 3 \end{cases}$$

where $[x]$ denotes the greatest integer $\leq x$. The number of points, where f is not differentiable in $(-3, 3)$ 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 : 81 Question Id : 70819119914 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

اگر وقفہ $[-3, 3]$ میں تفاعل f اس طرح بیان کیا گیا کہ

$$f(x) = \begin{cases} \min\{|x|, 2 - x^2\}, & -2 \leq x \leq 2 \\ [|x|] & , 2 < |x| \leq 3 \end{cases}$$

یہاں پر $[x]$ سب سے بڑا صحیح عدد ہے جو $x \leq$ کو ظاہر کرتا ہے۔ تمام نقاط کی تعداد _____ ہیں جہاں پر تفاعل 'f' وقفہ $(-3, 3)$ میں غیر تفریقی (not differentiable) 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 : 70819119915 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If the curve, $y = y(x)$ represented by the solution of the differential equation $(2xy^2 - y)dx + xdy = 0$, passes through the intersection of the lines, $2x - 3y = 1$ and $3x + 2y = 8$, then $|y(1)|$ is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 82 Question Id : 70819119915 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

اگر کسی $y=y(x)$ تفریقی مساوات (differential equation) $(2xy^2 - y)dx + xdy = 0$ کے حل کو نپا ہر کرتا ہے،

خطوط $2x - 3y = 1$ اور $3x + 2y = 8$ کے انقطاع (intersection) میں سے گزرتی ہے تو $|y(1)|$ _____ 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 : 83 **Question Id :** 70819119916 **Question Type :** SA

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

The total number of two digit numbers 'n', such that $3^n + 7^n$ is a multiple of 10, 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 : 83 **Question Id :** 70819119916 **Question Type :** SA

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

دو ہندی اعداد (two digit numbers) 'n' کی کل تعداد _____ ہے جبکہ $3^n + 7^n$ 10 کا مضروب 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 : 70819119917 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If $\lim_{x \rightarrow 0} \frac{ax - (e^{4x} - 1)}{ax(e^{4x} - 1)}$ exists and is equal to b, then the value of $a - 2b$ 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 : 84 Question Id : 70819119917 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

اگر $\lim_{x \rightarrow 0} \frac{ax - (e^{4x} - 1)}{ax(e^{4x} - 1)}$ موجود (exists) ہے اور یہ b کے برابر ہے تو $a - 2b$ کی قیمت _____ 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 : 70819119918 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If the curves $x = y^4$ and $xy = k$ cut at right angles, then $(4k)^6$ is equal to _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 85 Question Id : 70819119918 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

اگر منحنی (curves) $x = y^4$ اور $xy = k$ زاویہ قائمہ پر قطع (cut) کرتے ہیں تو $(4k)^6$ 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 : 70819119919 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The value of $\int_{-2}^2 |3x^2 - 3x - 6| dx$ 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 : 86 Question Id : 70819119919 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

ہے _____ کی قیمت $\int_{-2}^2 |3x^2 - 3x - 6| dx$

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

Question Number : 87 Question Id : 70819119920 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If the remainder when x is divided by 4 is 3, then the remainder when $(2020 + x)^{2022}$ is divided by 8 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 : 70819119920 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

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 :** 70819119921 **Question Type :** SA

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

A line ' l ' passing through origin is perpendicular to the lines

$$l_1 : \vec{r} = (3 + t)\hat{i} + (-1 + 2t)\hat{j} + (4 + 2t)\hat{k}$$

$$l_2 : \vec{r} = (3 + 2s)\hat{i} + (3 + 2s)\hat{j} + (2 + s)\hat{k}$$

If the co-ordinates of the point in the first octant on ' l_2 ' at a distance of $\sqrt{17}$ from the point of intersection of ' l ' and ' l_1 ' are (a, b, c), then $18(a + b + c)$ 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 : 88 **Question Id :** 70819119921 **Question Type :** SA

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

ایک خط 'l' مبدا میں سے گذرتی ہے اور خطوط

$$l_1 : \vec{r} = (3 + t)\hat{i} + (-1 + 2t)\hat{j} + (4 + 2t)\hat{k}$$

$$l_2 : \vec{r} = (3 + 2s)\hat{i} + (3 + 2s)\hat{j} + (2 + s)\hat{k}$$

پر عمود ہے۔ اگر 'l' اور 'l₁' کے انقطاعی نقطہ (point of intersection) سے $\sqrt{17}$ کے فاصلے پر خط 'l₂' کے پہلے

octant پر واقع نقطہ کے محدد (a, b, c) (co-ordinates) ہیں تو $18(a + b + c)$ 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 : 89 **Question Id :** 70819119922 **Question Type :** SA

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

A line is a common tangent to the circle $(x - 3)^2 + y^2 = 9$ and the parabola $y^2 = 4x$. If the two points of contact (a, b) and (c, d) are distinct and lie in the first quadrant, then $2(a + c)$ 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 :** 70819119922 **Question Type :** SA

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

ایک خط، دائرہ $(x-3)^2 + y^2 = 9$ اور شاخ $y^2 = 4x$ کا مشترک مماس (common tangent) ہے۔ اگر دو چھونے والے

نقاط (two points of contact) (a, b) اور (c, d) جو مختلف (distinct) ہیں اور پہلے ربع میں شامل ہیں تو $2(a+c)$

_____ 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 :** 70819119923 **Question Type :** SA

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

Let $\vec{a} = \hat{i} + \alpha\hat{j} + 3\hat{k}$ and $\vec{b} = 3\hat{i} - \alpha\hat{j} + \hat{k}$. If the area of the parallelogram whose adjacent sides are represented by the vectors \vec{a} and \vec{b} is $8\sqrt{3}$ square units, then $\vec{a} \cdot \vec{b}$ 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 : 90 **Question Id :** 70819119923 **Question Type :** SA

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

فرض کیجئے $\vec{a} = \hat{i} + \alpha\hat{j} + 3\hat{k}$ اور $\vec{b} = 3\hat{i} - \alpha\hat{j} + \hat{k}$ اگر متوازی الاضلاع (parallelogram) جس کے متضلعے \vec{a} اور \vec{b} ہیں، اس کا رقبہ $8\sqrt{3}$ مربع اکائی ہے تو $\vec{a} \cdot \vec{b}$ 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

