JEE Main 2019

Question Paper with Answer



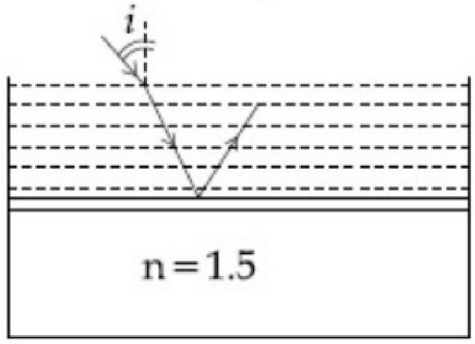
aglasem.com

aglasem.com

JEE Main 2019 Question Paper with Answers
09 Jan 2019 : Shift 1 : Paper 1

Physics

1. Consider a tank made of glass(refractive index 1.5) with a thick bottom. It is filled with a liquid of refractive index u. A student finds that, irrespective of what the incident angle i (see figure) is for a beam of light entering the liquid, the light reflected from the liquid glass interface is never completely polarized. For this to happen, the minimum value of u is :



1. $\sqrt{\frac{5}{3}}$
2. $\frac{4}{3}$
3. $\frac{3}{\sqrt{5}}$
4. $\frac{5}{\sqrt{3}}$

Correct: 3

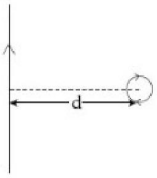
2. A conducting circular loop made of a thin wire, has area 3.5 x $10^{-3}$$m^{2}$´and resistance 10 Ω. It is placed perpendicular to a time dependent magnetic field B(t)=(0.4T)sin(50πt). The field is uniform in space. Then the net charge flowing through the loop during t=0 s and t=10 ms is close to :

1. 21 mC
2. 7 mC
3. 6 mC
4. 14 mC

Correct: 4

3. An infinitely long current carrying wire and a small current carrying loop are in the plane of the paper as shown. The radius of the loop is a and distance of its centre from the wire is d (d>>a). If the loop applies a force F on the wire then:

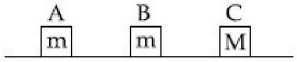
AglaSem Admission



1. F=0
2. $F \propto \left(\frac{a}{d}\right)$
3. $F \propto \left(\frac{a^2}{d^3}\right)$
4. $F \propto \left(\frac{a}{d}\right)^2$

Correct: 4

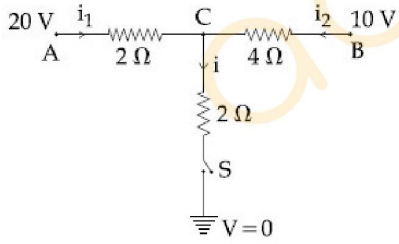
4. Three blocks A, B and C are lying on a smooth horizontal surface, as shown in the figure. A and B have equal masses, m while C has mass M. Block A is given an initial speed v towards B due to which it collides with B perfectly inelastically. The combined mass collides with C, also perfectly inelastically ⅚ th of the initial kinetic energy is lost in whole process. What is value of M/m?



1. 5
2. 2
3. 3
4. 4

Correct: 4

5. When the switch S, in the circuit shown, is closed, then the value of current i will be:



1. 5 A
2. 3 A
3. 2 A
4. 4 A

Correct: 1

6. A sample of radioactive material A, that has an activity of 10 mCi (1 Ci=3.7 x 10^{10} decays/s), has twice the number of nuclei as another sample of a different radioactive material B which has an activity of 20 mCi. The correct choices for half-lives of A and
B would then be respectively :

1. 20 days and 5 days
2. 10 days and 40 days

AglaSem Admission

3. 20 days and 10 days
4. 5 days and 10 days

Correct: 1

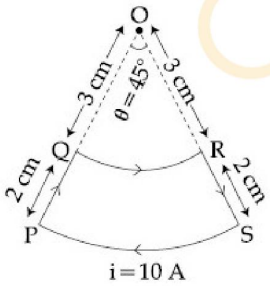
7. If the angular momentum of a planet of mass m, moving around the Sun in a circular orbit is L, about the center of the Sun, its areal velocity is :
1. 4L/m
2. L/2m
3. 2L/m
4. L/m

Correct: 2

8. A plane electromagnetic wave of frequency 50 MHz travels in free space along the positive x-direction. At a particular point in space and time, $\vec{E}$ = 6.3 $\hat{j}$| V/m. The corresponding magnetic field $\vec{B}$, at that point will be:
1. $6.3 \times 10^{-8}\hat{k}T$
2. $18.9 \times 10^{8}\hat{k}T$
3. $18.9 \times 10^{-8}\hat{k}T$
4. $2.1 \times 10^{-8}\hat{k}T$

Correct: 4

9. A current loop, having two circular arcs joined by two radial lines is shown in the figure. It carries a current of 10 A. The magnetic field at point O will be close to :



1. 1.0×10^{-5} T
2. 1.5×10^{-5} T
3. 1.0×10^{-7} T
4. 1.5×10^{-7} T

Correct: 1

10. Surface of certain metal is first illuminated with light of wavelength λ_1 = 350 nm and then, by light of wavelength λ_2 = 540 nm. It is found that the maximum speed of the photo electrons in the two cases differ by a factor of 2. The work function of the metal (in eV) is close to :
(Energy of photon = $\frac{1240}{\lambda(\text{ in nm})}$eV)

aglasem.com

AglaSem Admission

1. 5.6
2. 2.5
3. 1.4
4. 1.8

Correct: 4

11. A convex lens is put 10 cm from a light source and it makes a sharp image on a screen, kept 10 cm from the lens. Now a glass block (refractive index 1.5) of 1.5 cm thickness is placed in contact with the light source. To get the sharp image again, the screen is shifted by a distance d. Then d is :
1. 0.55 cm towards the lens
2. 0
3. 1.1 cm away from the lens
4. 0.55 cm away from the lens

Correct: 4

12. Drift speed of electrons, when 1.5 A of current flows in a copper wire of cross section 5 mm^2, is v. If the electron density in copper is 9 x 10^{28} /m^3 the value of v in mm/s is close to (Take charge of electron to be = 1.6 x 10^{-19} C)
1. 3
2. 0.2
3. 2
4. 0.02

Correct: 4

13. A copper wire is stretched to make it 0.5% longer. The percentage change in its electrical resistance if its volume remains unchanged is :
1. 2.0 %
2. 1.0 %
3. 0.5 %
4. 2.5 %

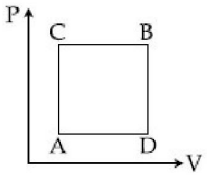
Correct: 2

14. A heavy ball of mass M is suspended from the ceiling of a car by a light string of mass m (m<
1. 35 °C
2. 45 °C
3. 60°C
4. 75 °C

Correct: 2

AglaSem Admission

16. A gas can be taken from A to B via two different processes ACB and ADB.



When path ACB is used 60 J of heat flows into the system and 30 J of work is done by the system. If path ADB is used work done by the system is 10 J. The heat Flow into the system in path ADB is :

1. 100J
2. 80 J
3. 40 J
4. 20 J

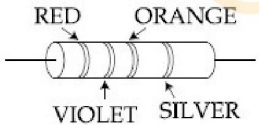
Correct: 3

17. A mixture of 2 moles of helium gas (atomic mass=4u), and 1 mole of argon gas (atomic mass= 40u) is kept at 300 K in a container. The ratio of their rms speeds [$\frac{V_{\text{rms}}(\text{helium})}{V_{\text{rms}}(\text{argon})}$], is close to:

1. 2.24
2. 0.32
3. 0.45
4. 3.16

Correct: 4

18. A resistance is shown in the figure. Its value and tolerance are given respectively by :



1. 27 kΩ, 20%
2. 270 Ω, 10%
3. 270 Ω,5%
4. 27 kΩ, 10%

Correct: 4

19. A particle is moving with a velocity $\vec{v} = \mathrm{K}(y\hat{i} + x\hat{j})$,where K is a constant. The general equation for its path is :

1. $y^2 = x^2$ + constant
2. $y = x^2$ + constant
3. $y^2 = x$ + constant
4. xy = constant

AglaSem Admission

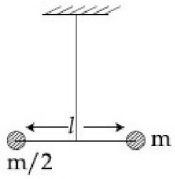
Correct: 1

20. For a uniformly charged ring of radius R, the electric field on its axis has the largest magnitude at a distance h from its centre. Then value of h is :

1. $\frac{R}{\sqrt{5}}$
2. $\frac{R}{\sqrt{2}}$
3. R
4. R $\mathrm{R}\sqrt{2}$

Correct: 2

21. Two masses m and m/2 are connected at the two ends of a massless rigid rod of length l. The rod is suspended by a thin wire of torsional constant k at the centre of mass of the rod-mass system(see figure). Because of torsional constant k, the restoring torque is $\tau = k\theta$ for angular displacement θ. If the rod is rotated by θ_o, and released, the tension in it when it passes through its mean position will be:



1. $K\theta_o^2 / 2l$
2. $3K\theta_o^2 / l$
3. $K\theta_o^2 / l$
4. $2K\theta_o^2 / l$

Correct: 3

22. A bar magnet is demagnetized by inserting it inside a solenoid of length 0.2 m, 100 turns, and carrying a current of 5.2 A. The coercivity of the bar magnet is

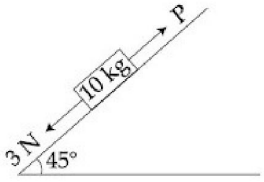
1. 520 A/m
2. 1200 A/m
3. 2600 A/m
4. 285 A/m

Correct: 3

23. A block of mass 10 kg is kept on a rough inclined plane as shown in the figure. A force of 3 N is applied on the block. The coefficient of static friction between the plane and the block is 0.6. What should be the minimum value of force P, such that the block does not move downward ? (take g = 10 ms^{-2})

aglasem.com

AglaSem Admission



1. 25 N
2. 23 N
3. 18 N
4. 32 N

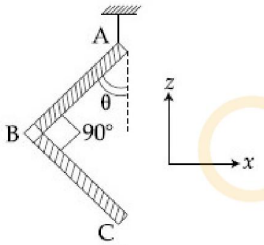
Correct: 4

24. Mobility of electrons in a semiconductor is defined as the ratio of their drift velocity to the applied electric field. If, for an n-type semiconductor, the density of electrons is 10^{19} m^{-3} and their mobility is 1.6 m^2 / (V.s) then the resistivity of the semiconductor (since it is an n-type semiconductor contribution of holes is ignored) is close to:

1. 0.2 Ωm
2. 4 Ωm
3. 2 Ωm
4. 0.4 Ωm

Correct: 4

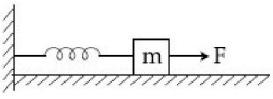
25. An L-shaped object, made of thin rods of uniform mass density, is suspended with a string as shown in figure. If AB = BC, and the angle made by AB with downward vertical is θ, then:



1. $\tan\theta = \frac{2}{\sqrt{3}}$
2. $\tan\theta = \frac{1}{2}$
3. $\tan\theta = \frac{1}{2\sqrt{3}}$
4. $\tan\theta = \frac{1}{3}$

Corect: 4

26. A block of mass m, lying on a smooth horizontal surface, is attached to a spring (of negligible mass) of spring constant k. The other end of the spring is fixed, as shown in the figure. The block is initially at rest in its equilibrium position. If now the block is pulled with a constant force F, the maximum speed of the block is :



AglaSem Admission

1. $\frac{F}{\sqrt{mk}}$
2. $\frac{F}{\pi\sqrt{mk}}$
3. $\frac{\pi F}{\sqrt{mk}}$
4. $\frac{2f}{\sqrt{mk}}$

Correct: 1

27. A parallel plate capacitor is made of two square plates of side 'a', separated by a distance d (d<
1. $\frac{1}{2}\frac{K\epsilon_0 a^2}{d}$
2. $\frac{K\epsilon_0 a^2}{d(K-1)}\ln K$
3. $\frac{K\epsilon_0 a^2}{2d(K+1)}$
4. $\frac{K\epsilon_0 a^2}{d}\ln K$

Correct: 2

28. A rod, of length L at room temperature and uniform area of cross section A, is made of a metal having coefficient of linear expansion $\propto$/°C. It is observed that an external compressive force F, is applied on each of its ends, prevents any change in the length of the rod, when its temperature rises by ΔTK. Young's modulus, Y, for this metal is :
1. $\frac{2F}{A\alpha\Delta T}$
2. $\frac{F}{A\alpha\Delta T}$
3. $\frac{F}{2A\alpha\Delta T}$
4. $\frac{F}{A\alpha(\Delta T-273)}$

Correct: 2

29. Three charges +Q, q, +Q are placed respectively, at distance, 0, d/2 and d from the origin, on the x-axis. If the net force experienced by +Q placed at x=0, is zero, then value of q is:
1. +Q/4
2. -Q/2
3. +Q/2
4. -Q/4

Correct: 4

30. Two coherent sources produce waves of different intensities which interfere. After interference, the ratio of the maximum intensity to the minimum intensity is 16. The intensity of the waves are in the ratio :
1. 16:9
2. 5:3
3. 25:9

aglasem.com

AglaSem Admission

4. 4:1

Correct: 3

Chemistry

1. Aluminium is usually found in +3 oxidation state. In contrast, thallium exists in +1 and +3 oxidation states. This is due to:
1. lattice effect
2. lanthanoid contraction
3. inert pair effect
4. diagonal relationship

Correct: 3

2. For emission line of atomic hydrogen from $n_i = 8$ to $n_f = n$, the plot of wave number $(\overline{v})$ against $\left(\frac{1}{n^2}\right)$ will be (The Rydberg constant, R_H is in wave number unit)
1. Linear with intercept - R_H
2. Non linear
3. Linear with slope R_H
4. Linear with slope - R_H

Correct: 4

3. 20 mL of 0.1 M H_2SO_4 solution is added to 30 mL of 0.2 M NH_4OH solution. The pH of the resultant mixture is : [pk_b of NH_4OH=4.7].
1. 9.4
2. 9.0
3. 5.0
4. 5.2

Correct: 2

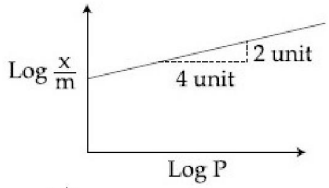
4. The anodic half-cell of lead-acid battery is recharged using electricity of 0.05 Faraday. The amount of $PbSO_4$ electrolyzed in g during the process is : (Molar mass of $PbSO_4$ =303 g mol^{-1})
1. 15.2
2. 11.4
3. 7.6
4. 22.8

aglasem.com

AglaSem Admission

Correct: 3

5. Adsorption of a gas follows Freundlich adsorption isotherm. In the given plot, x is the mass of the gas adsorbed on mass m of the adsorbent at pressure p. x/m is proportional to:



1. $p^{1/2}$
2. p^{2}
3. $p^{1/4}$
4. p

Correct: 1

6. The correct match between Item-I and Item-II is :

	Item-I (drug)		Item-II (test)
A	Chloroxylenol	P	Carbylamine test
B	Norethindrone	Q	Sodium hydrogen-carbonate test
C	Sulphapyridine	R	Ferric chloride test
D	Penicillin	S	Bayer's test

1. A→Q; B→P; C→S; D→R
2. A→R; B→S; C→P; D→Q
3. A→R; B→P; C→S; D→Q
4. A→Q; B→S; C→P; D→R

Correct: 2

7. The following results were obtained during kinetic studies of the reaction ;
2A+B Products

Experiment	[A] (in mol L^{-1})	[B] (in mol L^{-1})	Initial Rate of reaction (in mol L^{-1} min^{-1})
I	0.10	0.20	6.93×10^{-3}
II	0.10	0.25	6.93×10^{-3}
III	0.20	0.30	1.386×10^{-2}

The time (in minutes) required to consume half of A is:

1. 5
2. 1
3. 10
4. 100

aglasem.com

AglaSem Admission

Correct: 1

8. The isotopes of hydrogen are :
1. Protium, deuterium and tritium
2. Protium and deuterium only
3. Deuterium and tritium only
4. Tritium and protium only

Correct: 1

9. A water sample has ppm level concentration of the following metals : Fe=0.2; Mn=5.0; Cu=3.0; Zn=5.0. The metal that makes the water sample unsuitable for drinking is :
1. Mn
2. Zn
3. Cu
4. Fe

Correct: 1

10. The major product of following reaction is :

$$R-C\equiv N \xrightarrow[(2)\ H_2O]{(1)\ AlH(i\text{-}Bu)_2} ?$$

1. RCOOH
2. RCHO
3. $RCONH_2$
4. RCH_2NH_2

Correct: 2

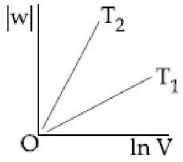
11. According to molecular orbital theory, which of the following is true with respect to Li^+ and Li^-?
1. Both are stable
2. Both are unstable
3. Li_2^+ is unstable and Li_2^- is stable
4. Li_2^+ is stable and Li_2^- is unstable

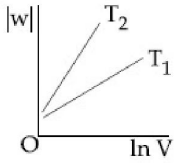
Correct: 1

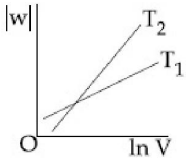
12. The increasing order of pKa of the following amino acids in aqueous solution is :
1. Arg < Lys

aglasem.com

AglaSem Admission

2. 

3. 

4. 

Correct: 1

17. Two complexes $[Cr(H_2O)_6]Cl_3$(A) and $[Cr(NH_3)_6]Cl_3$ (B) are violet and yellow coloured, respectively. The incorrect statement regarding them is :
1. Δ_o value for (A) is less than that of (B).
2. Δ_o values of (A) and (B) are calculated from the energies of violet and yellow light, respectively.
3. both absorb energies corresponding to their complementary colors.
4. both are paramagnetic with three unpaired electrons.

Correct: 2

18. Correct statements among a tod regarding silicones are :
(a) They are polymers with hydrophobic character.
(b) They are biocompatible.
(c) In general, they have high thermal stability and low dielectric strength.
(d) Usually, they are resistant to oxidation and used as greases.
1. (a), (b), (c) and (d)
2. (a) and (b) only
3. (a), (b) and (c) only
4. (a), (b) and (d) only

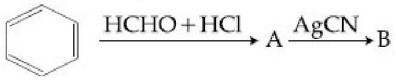
Correct: 4

19. The correct decreasing order for acid strength is :
1. $FCH_2COOH > NCCH_2COOH > NO_2CH_2COOH > ClCH_2COOH$
2. $CNCH_2COOH > O_2NCH_2COOH > FCH_2COOH > ClCH_2COOH$
3. $NO_2CH_2COOH > NCCH_2COOH > FCH_2COOH > ClCH_2COOH$
4. $NO_2CH_2COOH > FCH_2COOH > CNCH_2COOH > ClCH_2COOH$

Correct: 3

AglaSem Admission

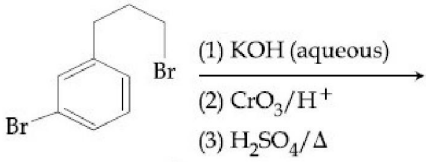
20.The compounds A and B in the following reaction are, respectively :

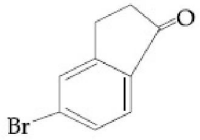


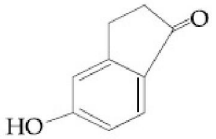
1. A=Benzyl chloride, B=Benzyl isocyanide
2. A= Benzyl alcohol, B=Benzyl isocyanide
3. A=Benzyl alcohol, B=Benzyl cyanide
4. A= Benzyl chloride, B=Benzyl cyanide

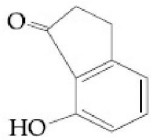
Correct: 1

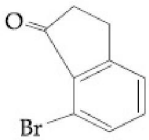
21. The major product of the following reaction is :



1. 

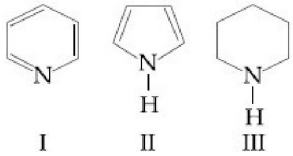
2. 

3. 

4. 

Correct: 1

22. Arrange the following amines in the decreasing order of basicity :



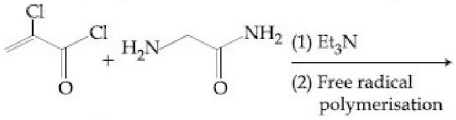
1. 1 > III > II
2. III > II > I
3. III > I > II
4. I > II > III

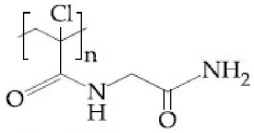
Correct: 3

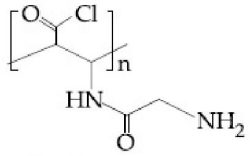
aglasem.com

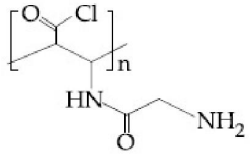
AglaSem Admission

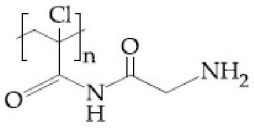
23. Major product of the following reaction is:



1. 

2. 

3. 

4. 

Correct: 1

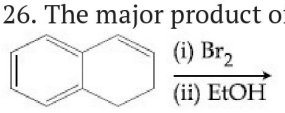
24. Which one of the following statements regarding Henry's law is not correct?
1. Different gases have different K_H (Henry's law constant) values at the same temperature.
2. The value of K_H increases with increase of temperature and K_H is function of the nature of the gas
3. The partial pressure of the gas in vapour phase is proportional to the mole fraction of the gas in the solution.
4. Higher the value of K_H at a given pressure, higher is the solubility of the gas in the liquids.

Correct: 4

25. 0.5 moles of gas A and x moles of gas B exert a pressure of 200 Pa in a container of volume 10 m^3 at 1000K. Given R is the gas constant in JK^{-1} mol^{-1}, x is:
1. $\frac{2R}{4+R}$
2. $\frac{2R}{4-R}$
3. $\frac{4-R}{2R}$
4. $\frac{4+R}{2R}$

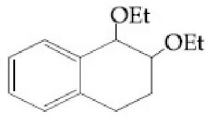
Correct: 4

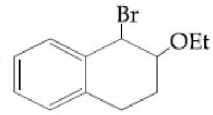
26. The major product of the following reaction is :

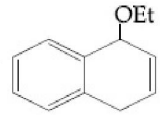


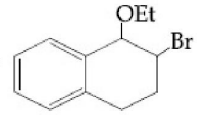
aglasem.com

AglaSem Admission

1. 

2. 

3. 

4. 

Correct: 4

27. The alkaline earth metal nitrate that does not crystallise with water molecules, is :
1. $Ba(NO_3)_2$
2. $Ca(NO_3)_2$
3. $Sr(NO_3)_2$
4. $Mg(NO_3)_2$

Correct: 1

28. Which amongst the following is the strongest acid ?
1. CHI_3
2. $CHBr_3$
3. $CH(CN)_3$
4. $CHCl_3$

Correct: 3

29. In general, the properties that decrease and increase down a group in the periodic table, respectively, are :
1. atomic radius and electronegativity.
2. electronegativity and electron gain enthalpy.
3. electronegativity and atomic radius.
4. electron gain enthalpy and electronegativity.

Correct: 3

30. A solution of sodium sulfate contains 92 g of Na^+ ions per kilogram of water. The molality of Na^+ ions in that solution in mol kg^{-1} is:
1. 8
2. 4

aglosem.com

AglaSem Admission

3. 12
4. 16

Correct: 2

Mathematics

1. For $x^2 \neq n\pi + 1, n \in \mathbf{N}$ (the set of natural numbers), the integral $\int x\sqrt{\frac{2\sin(x^2-1)-\sin 2(x^2-1)}{2\sin(x^2-1)+\sin 2(x^2-1)}}dx$ is equal to:
(where c is a constant of integration)
1. $\frac{1}{2}\log_e\left|\sec^2\left(\frac{x^2-1}{2}\right)\right| + c$
2. $\log_e\left|\frac{1}{2}\sec^2\left(x^2-1\right)\right| + c$
3. $\frac{1}{2}\log_e\left|\sec\left(x^2-1\right)\right| + c$
4. $\log_e\left[\sec\left(\frac{x^2-1}{2}\right) + c\right.$

Correct: 4

2. If the fractional part of the number $\frac{2^{403}}{15}$ is k/15, then k is equal to :
1. 6
2. 8
3. 14
4. 4

Correct: 2

3. Let f: R → R be a function defined as

$$f(x) = \begin{cases} 5, & \text{if} \quad x \leq 1 \\ a + bx, & \text{if} \quad 1 < x < 3 \\ b + 5x, & \text{if} \quad 3 \leq x < 5 \\ 30, & \text{if} \quad x \geqslant 5 \end{cases}$$

1. continuous if a = -5 and b = 10
2. continuous if a = 5 and b = 5
3. continuous if a = 0 and b = 5
4. not continuous for any values of a and b

Correct: 4

aglosem.com

AglaSem Admission

4. The value of $\int_0^{\pi} |\cos x|^3 dx$

1. 4/3
2. -4/3
3. 0
4. ⅔

Correct: 1

5. Axis of a parabola lies along x-axis. If its vertex and focus are at distances 2 and 4 respectively from the origin, on the positive x-axis then which of the following points
does not lie on it?

1. $(6, 4\sqrt{2})$
2. (4, - 4)
3. $(5, 2\sqrt{6})$
4. (8,6)

Correct: 4

6. The system of linear equations
x+y+z=2
2x+3y + 2z=5
2x+3y + (a^2 – 1)z=a +1

1. has a unique solution for $|a| = \sqrt{3}$
2. is inconsistent when $|a| = \sqrt{3}$
3. has infinitely many solutions for a=4
4. is inconsistent when a=4

Correct: 2

7. Consider the set of all lines px+qy+r=0 such that 3p+ 2q +4r=0. Which one of the following statements is true ?

1. Each line passes through the origin.
2. The lines are all parallel.
3. The lines are not concurrent.
4. The lines are concurrent at the point $\left(\frac{3}{4}, \frac{1}{2}\right)$

Correct: 4

8. If A = $\begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}$ then the matrix A^{-50} when $\theta = \frac{\pi}{12}$, is equal to :

1. $\begin{bmatrix} \frac{\sqrt{3}}{2} & -\frac{1}{2} \\ \frac{1}{2} & \frac{\sqrt{3}}{2} \end{bmatrix}$

aglasem.com

AglaSem Admission

2. $\begin{bmatrix} \frac{\sqrt{3}}{2} & \frac{1}{2} \\ -\frac{1}{2} & \frac{\sqrt{3}}{2} \end{bmatrix}$

8. $\begin{bmatrix} \frac{\sqrt{3}}{2} & \frac{1}{2} \\ -\frac{1}{2} & \frac{\sqrt{3}}{2} \end{bmatrix}$

4. $\begin{bmatrix} \frac{1}{2} & \frac{\sqrt{3}}{2} \\ -\frac{\sqrt{3}}{2} & \frac{1}{2} \end{bmatrix}$

Correct: 3

9. $\lim_{y\to 0} \frac{\sqrt{1+\sqrt{1+y^4}}-\sqrt{2}}{y^4}$

1. exists and equals $\frac{1}{2\sqrt{2}(\sqrt{2}+1)}$
2. exists and equals $\frac{1}{2\sqrt{2}}$
3. does not exist
4. exists and equals $\frac{1}{4\sqrt{2}}$

Correct: 4

10.If θ denotes the acute angle between the curves, $y=10 - x^2$ and $y=2+x^2$ at a point of their intersection, then $|\tan \theta|$ is equal to:

1. 8/15
2. 8/17
3. 4/9
4. 7/17

Correct: 1

Q.11 Let $\vec{a} = \hat{i} - \hat{j}, \vec{b} = \hat{i} + \hat{j} + \hat{k}$and $\vec{c}$ be a vector that $\vec{a} \times \vec{c} + \vec{b} = \vec{0}$ and $\vec{a} \cdot \vec{c} = 4$, then $|\vec{c}|^2$ is equal to:

1. 8
2. 19/2
3. 9
4. 17/2

Correct: 2

12. 5 students of a class have an average height 150 cm and variance 18 cm^2. A new student, whose height is 156 cm, joined them. The variance (in cm^2) of the height of these six students is :

1. 22
2. 18
3. 20

aglasem.com

AglaSem Admission

4. 16

Correct: 3

13. Two cards are drawn successively with replacement from a well-shuffled deck of 52 cards. Let X denote the random variable of number of aces obtained in the two drawn cards. Then P(X=1) + P(X= 2) equals :
1. 49/169
2. 24/169
3. 52/169
4. 25/169

Correct: 4

14 Let α and ß be two roots of the equation $x^2+2x+2=0$, then $\alpha^{15} + ß^{15}$ is equal to :
1. - 512
2. - 256
3. 256
4. 512

Correct: 2

15. Let $a_1, a_2.....a_{30}$ be an A.P., $S = \sum_{i=1}^{30} a_i$ and $T = \sum_{i=1}^{15} a_{(2i-1)}$. If $a_5 = 27$ and S-2T = 75, then a_{10} is equal to:
1. 47
2. 52
3. 42
4. 57

Correct: 2

16. Let A = $\{ \theta \in \left(-\frac{\pi}{2}, \pi\right) : \frac{3+2i\sin\theta}{1-2i\sin\theta}$ is purely imaginary $\}$ .Then the sum of the elements in A is:
1. 3π/4
2. 2π/3
3. π
4. 5π/6

Correct: 2

17. Three circles of radii a, b, c (a < b < c) touch each other externally. If they have x-axis as a common tangent, then:
1. $\frac{1}{\sqrt{a}} = \frac{1}{\sqrt{b}} + \frac{1}{\sqrt{c}}$

aglasem.com

AglaSem Admission

2. A,b,c are in A.P
3. $\frac{1}{\sqrt{b}} = \frac{1}{\sqrt{a}} + \frac{1}{\sqrt{c}}$
4. $\sqrt{a}, \sqrt{b}, \sqrt{c}$ are in A.P

Correct: 1

18. Equation of a common tangent to the circle, $x^2 + y^2 - 6x = 0$ and the parabola, $y^2 = 4x$, is :
1. $\sqrt{3}y = 3x + 1$
2. $2\sqrt{3}y = -x - 12$
3. $2\sqrt{3}y = 12x + 1$
4. $\sqrt{3}y\ x + 3$

Correct: 4

19. The plane through the intersection of the planes x+y+z=1 and 2x + 3y - z+4=0 and parallel to y -axis also passes through the point:
1. (-3,0, -1)
2. (3,2,1)
3. (-3,1,1)
4. (3,3, -1)

Correct: 2

20. For any $\theta \in \left(\frac{\pi}{4}, \frac{\pi}{2}\right)$, the expression $3(\sin\theta - \cos\theta)^4 + 6(\sin\theta + \cos\theta)^2 + 4\sin^6\theta$ equals:
1. $13 - 4\cos^2\theta + 6\sin^2\theta\cos^2\theta$
2. $13 - 4\cos^6\theta$
3. $13 - 4\cos^4\theta + 2\sin^2\theta\cos^2\theta$
4. $13 - 4\cos^2\theta + 6\cos^4\theta$

Correct: 2

21. The equation of the line passing through (-4, 3, 1), parallel to the plane x+2y-z-5=0 and intersecting the line $\frac{x+1}{-3} = \frac{y-3}{2} = \frac{z-2}{-1}$ is
1. $\frac{x+4}{-1} = \frac{y-3}{1} = \frac{z-1}{1}$
2. $\frac{x+4}{3} = \frac{y-3}{-1} = \frac{z-1}{1}$
3. $\frac{x+4}{3} = \frac{y-3}{-1} = \frac{z-1}{1}$
4. $\frac{x+4}{1} = \frac{y-3}{1} = \frac{z-1}{3}$

Correct: 2

aglasem.com

AglaSem Admission

22. Let 0 < θ < π/2 If the eccentricity of the hyperbola $\frac{x^2}{\cos^2\theta} - \frac{y^2}{\sin^2\theta} = 1$ is greater than 2, then the length of its latus rectum lies in the interval :

1. (3/2,2]
2. (2,3]
3. (3,∞)
4. (1,3/2]

Correct: 3

23. Consider a class of 5 girls and 7 boys. The number of different teams consisting of 2 girls and 3 boys that can be formed from this class, if there are two specific boys A and B, who refuse to be the members of the same team, is:

1. 350
2. 300
3. 200
4. 500

Correct: 2

24. The maximum volume (in cu.m) of the right circular cone having slant height 3 m is :

1. $2\sqrt{3}\pi$
2. $3\sqrt{3}\pi$
3. 6 π
4. $\frac{4}{3}\pi$

Correct: 1

25. If $\cos^{-1}\left(\frac{2}{3x}\right) + \cos^{-1}\left(\frac{3}{4x}\right) = \frac{\pi}{2}\left(x > \frac{3}{4}\right)$, then x is equal to:

1. $\frac{\sqrt{145}}{12}$
2. $\frac{\sqrt{145}}{11}$
3. $\frac{\sqrt{145}}{10}$
4. $\frac{\sqrt{146}}{12}$

Correct: 1

26 The area (in sq. units) bounded by the parabola $y= x^2 - 1$, the tangent at the point (2, 3) to it and the y-axis is :

1. 56/3
2. 8/3
3. 32/3
4. 14/3

aglasem.com

AglaSem Admission

Correct: 2

27. If a, b and c be three distinct real numbers in G.P.and a+b+c=xb, then x cannot be:
1. 4
2. -3
3. - 2
4. 2

Correct: 4

28. If y=y(x) is the solution of the differential equation, $x\frac{dy}{dx} + 2y = x^2$ satisfying y(1)=1, then y (½) is equal to :
1. 7/64
2. 49/16
3. ¼
3. 13/16

Correct: 2

29. If the Boolean expression $(p \oplus q) \wedge (\sim p \odot q)$ is equivalent to $p \wedge q$, where $\oplus, \odot \in \{\wedge, \vee\}$, then the ordered pair $(\oplus, \odot)$ is:
1. (V , V)
2. (V , Λ)
3. (Λ , Λ)
4. (Λ , V)

Correct: 4

30. For x ∈ R - {0,1}, let $f_1(x) = \frac{1}{x}$, $f_2(x) = 1-x$ and $f_3(x) = \frac{1}{1-x}$ be three given functions. If a function, J(x) satisfies $(f_2 \circ J \circ f_1)(x) = f_3(x)$ then J(x) is equal to:
1. $f_2(x)$
2. $\frac{1}{x}f_3(x)$
3. $f_3(x)$
4. $f_1(x)$

Correct: 3

aglasem.com

AglaSem Admission

More JEE Main 2019

Question Paper & Answers

Click Here

aglasem.com