MHT-CET 2019

Day 1 - Shift 1

Section : **Physics**

Q.1 Two capillary tubes of different diameters are dipped in water .The rise of water is

Ans

✗ 1. more in the tube of larger diameter

✗ 2. same in both the tubes

✓ 3. more in the tube of smaller diameter

✗ 4. zero in both the tubes

Q.2 Two small drops of mercury each of radius 'R' coalesce to form a large single drop. The ratio of the total surface energies before and after the change is

Ans

✗ 1. $\sqrt{2}:1$

✗ 2. $2:1$

✗ 3. $2^{2/3}:1$

✓ 4. $2^{1/3}:1$

Q.3

Which of the following combinations of 7 identical capacitors each of 2μF gives a resultant capacitance of $^{10}/_{11}$ μF?

Ans
1. 4 in parallel and 3 in series.
2. 2 in parallel and 5 in series.
3. 5 in parallel and 2 in series.
4. 3 in parallel and 4 in series.

Q.4 If a star emitting yellow light is accelerated towards earth, them to an observer on earth it will appear

Ans
1. shining yellow.
2. becoming orange.
3. gradually changing to blue.
4. gradually changing to red.

Q.5 The kinetic energy of a revolving satellite (mass m) at a height equal to thrice the radius of the earth (R) is

Ans
1. $\frac{mgR}{4}$
2. $\frac{mgR}{16}$
3. $\frac{mgR}{2}$
4. $\frac{mgR}{8}$

Q.6 In air, a charged soap bubble of radius 'R' breaks into 27 small soap bubbles of equal radius 'r'. Then the ratio of mechanical force acting per unit area of big soap bubble to that of a small soap bubble is

Ans

✔ 1. $\frac{9}{1}$

✘ 2. $\frac{3}{1}$

✘ 3. $\frac{1}{3}$

✘ 4. $\frac{1}{81}$

Q.7 A transverse wave is propagating on the string.The linear density of a vibrating string is 10^{-3} kg/m. The equation of the wave is Y = 0.05 sin(x+15t) where x and Y are in metre and time in second.The tension in the string is

Ans

✔ 1. 0.225 N

✘ 2. 0.2 N

✘ 3. 0.325 N

✘ 4. 0.250 N

Q.8 If $\sqrt{A^2 + B^2}$ represents the magnitude of resultant of two vectors $(\vec{A} + \vec{B})$ and $(\vec{A} - \vec{B})$, then the angle between two vectors is

Ans

✔ 1. $\cos^{-1}[-\frac{(A^2 + B^2)}{2(A^2 - B^2)}]$

✘ 2. $\cos^{-1}[-\frac{2(A^2 - B^2)}{(A^2 + B^2)}]$

3. $\cos^{-1}[-\frac{(A^2-B^2)}{A^2+B^2}]$

4. $\cos^{-1}[-\frac{A^2-B^2}{A^2B^2}]$

Q.9 The maximum velocity of the photoelectron emitted by the metal surface is ' V '. Charge and mass of the photoelectron is denoted by ' e ' and ' m ' respectively. The stopping potential in volt is

Ans

1. $\frac{V^2}{2(\frac{e}{m})}$

2. $\frac{V^2}{2(\frac{m}{e})}$

3. $\frac{V^2}{(\frac{e}{m})}$

4. $\frac{V^2}{(\frac{m}{e})}$

Q.10 The equation of simple harmonic progressive wave is given by $Y = a\sin 2\pi\ (bt - cx)$
The maximum particle velocity will be twice the wave velocity if

Ans

1. $c = \frac{1}{\pi a}$

2. $c = \frac{1}{2\pi a}$

3. $c = \pi a$

4. $c = 2\pi a$

Q.11 **A thin hollow prism of refracting angle 3^o , filled with water gives a deviation of 1^o.The refractive index of water is**

Ans

1. 1.59

2. 1.51

3. 1.46

4. 1.33

Q.12 If ' C_p' and C_v are molar specific heats of an ideal gas at constant pressure and volume respectively, If ' λ ' is ratio of two specific heats and ' R ' is universal gas constant then ' C_p' is equal to

Ans

1. $\frac{1+\gamma}{1-\gamma}$

2. $\frac{R\gamma}{\gamma-1}$

3. γR

4. $\frac{R}{\gamma-1}$

Q.1

3 Bohr model is applied to a particle of mass ' m ' and charge ' q ' moving in a plane under the influence of a transverse magnetic field ' B '. The energy of the charged particle in the n^{th} level will be (h = Planck's constant)

Ans

✗ 1. $2nhq\ B\ /\ \pi\ m$

✗ 2. $nhq\ B\ /\ 2\pi\ m$

✗ 3. $nhq\ \ B/\pi\ m$

✓ 4. $nhq\ B\ /\ 4\pi\ m$

Q.14 For transistor, the current ratio 'β_{dc}' is defined as the ratio of

Ans

✗ 1. collector current to emitter current

✓ 2. collector current to base current

✗ 3. emitter current to collector current

✗ 4. base current to collector current

Q.15 If radius of the solid sphere is doubled by keeping its mass constant, the ratio of their moment of inertia about any of its diameter is

Ans

✗ 1. $2:3$

✓ 2. $1:4$

✗ 3. $1:8$

✗ 4. $2:5$

Q.16 In biprism experiment ,the distance between source and eyepiece is 1.2 m,the distance between two virtual sources is 0.84 mm. Then the wavelength of light used if eyepiece is to be moved transversely through a distance of 2.799 cm to shift 30 fringes is

Ans

1. 6533 Å
2. 6535 Å
3. 6537 Å
4. 6351 Å

Note: For this question, discrepancy is found in question/answer. Full Marks is being awarded to all candidates.

Q.17 The quantity which ***does not*** vary periodically for a particle performing S.H.M. is

Ans

✗ 1. velocity
✗ 2. displacement
✓ 3. total energy
✗ 4. acceleration

Q.18 A sotne of mass 1kg is tied to a string 2m long and is rotated at constant speed of 40 ms^{-1} in a vertical circle . The ratio of the tension at the top and the bottom is [Take g = 10ms^{-2}]

Ans

✓ 1. $\frac{79}{81}$
✗ 2. $\frac{81}{79}$
✗ 3. $\frac{12}{19}$
✗ 4. $\frac{19}{12}$

Q.19 A layer of atmosphere that reflects medium frequency radio waves which is ineffective during night, is

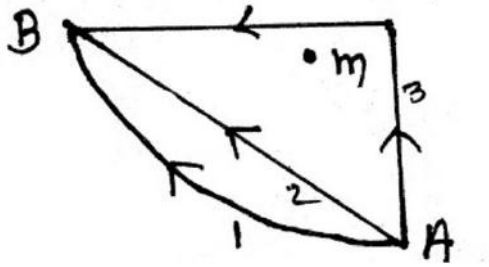
Ans
- ✗ 1. F layer
- ✗ 2. stratosphere
- ✗ 3. thermosphere
- ✓ 4. E layer

Q.20 Work done in stretching a wire through 1mm is 2J. What amount of work will be done for elongating another wire of same material, with half the length and double the radius of cross section, by 1 mm?

Ans
- ✗ 1. 2J
- ✓ 2. 16J
- ✗ 3. 4J
- ✗ 4. 8J

Q.21

If W_1, W_2 and W_3 represent the work done in moving a particle from A to B along three different paths1,2 and 3 (as shown in fig) in the gravitational field of the point mass 'm'. Find the correct relation between 'W_1','W_2' and 'W_3'

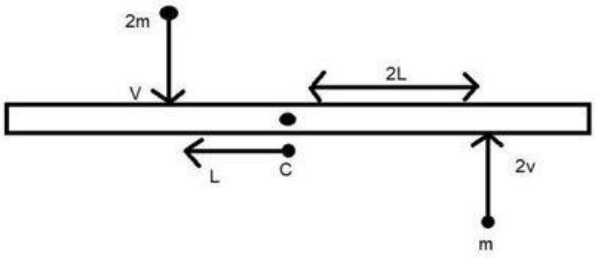


Ans
- ✗ 1. W1>W3>W2
- ✗ 2. W1<W3<W2
- ✓ 3. W1=W2=W3
- ✗ 4. W1<W2<W3

Q.2 For a metallic wire, the ratio of voltage to corresponding current is
2

Ans
- ✓ 1. increases with rise in temperature.
- ✗ 2. increases or decreases with rise in temperature depending upon the metal.
- ✗ 3. decreases with rise in temperature.
- ✗ 4. independent of temperature.

Q.2 3 A uniform rod of length '6L' and mass '8m' is pivoted at its centre 'C'. Two masses 'm' and '2m' with speed 2v, v as shown strikes the rod and stick to the rod. Initially the rod is at rest. Due to impact, if it rotates with angular velocity 'ω_1' then 'ω' will be.



Ans

1. $\frac{8\,v}{6\,L}$

2. $Zero$

3. $\frac{v}{5\,L}$

4. $\frac{11\,v}{3\,L}$

Q.24 **A particle executes the simple hormonic motion with an amplitude ' *A* '. The distance travelled by it in one periodic time is**

Ans

1. $2A$

2. $\frac{A}{2}$

3. A

4. $4A$

Q.25 The equiconvex lens has a focal length ' f '. If the lens is cut along the line perpendicular to principal axis and passing through the pole,what will be the focal length of any half part ?

Ans

1. f

2. $\frac{3f}{2}$

3. $\frac{f}{2}$

✔ 4. $2f$

Q.26 **The wave length of the first line in Balmer series in the hydrogen spectrum is 'λ'. What is the wavelength of the second line in the same series?**

Ans

✘ 1. $\frac{5}{36}\lambda$

✘ 2. $\frac{3}{16}\lambda$

✘ 3. $\frac{3}{4}\lambda$

✔ 4. $\frac{20}{27}\lambda$

Q.27 The magnitude of magnetic induction at a point on the axis at a large distance (r) from the centre of circular coil of ' n ' turns, and area ' A ' carrying current (I) is given by

Ans

✘ 1. $Baxis = \frac{\mu_0}{4\pi}.\frac{nIA}{r^3}$

✘ 2. $Baxis = \frac{\mu_0}{4\pi}.\frac{2nI}{Ar^3}$

✔ 3. $Baxis = \frac{\mu_0}{4\pi}.\frac{2nIA}{r^3}$

✘ 4. $B_{axis} = \frac{\mu_0}{4\pi}.\frac{nA}{Ir^3}$

Q.28 In fundamental mode,the time required for the sound wave to reach upto the closed end of a pipe filled with air is 't' second .The frequency of vibration of air column is

Ans

✗ 1. $4(t)^{-1}$

✗ 2. $(2t)^{-1}$

✓ 3. $(4t)^{-1}$

✗ 4. $2(t)^{-1}$

Q.29 A telescope has large diameter of the objective.Then its resolving power is

Ans

✗ 1. independent of the diameter of the objective.

✓ 2. high.

✗ 3. zero.

✗ 4. low.

Q.30 The real force ' F ' acting on a particle of mass ' m ' performing circular motion acts along the radius of circle ' r ' and is directed towards the centre of circle. The square root of magnitude of such force is (T = periodic time)

Ans

✗ 1. $\frac{Tmr}{4\pi}$

✗ 2. $\frac{T^2mr}{4\pi}$

✓ 3. $\frac{2\pi}{T}\sqrt{mr}$

✗ 4. $\frac{2\pi T}{\sqrt{mr}}$

Q.31 A metal sphere of radius 'R' and density 'ϱ_1' is dropped in a liquid of density 'σ' moves with terminal velocity 'V'. Another metal sphere of same radius and density 'ϱ_2' is dropped in the same liquid, its terminal velocity will be

Ans

✗ 1. $V[(\varrho_2+\sigma)/(\varrho_1+\sigma)]$

✓ 2. $V[(\varrho_2-\sigma)/(\varrho_1-\sigma)]$

✗ 3. $V[(\varrho_1-\sigma)/(\varrho_2-\sigma)]$

✗ 4. $V[(\varrho_1+\sigma)/(\varrho_2+\sigma)]$

Q.32 A clock pendulum having coefficient of linear expansion $\alpha = 9\times10^{-7}/°C$ has a period of 0.5 s at 20^o C. If the clock is used in a climate where the temperature is 30^o C , how much time does the clock lose in each oscillation?(g=constant)

Ans

✗ 1. 5×10^{-7}s

✓ 2. 2.25×10^{-6}s

✗ 3. 1.125×10^{-6}s

✗ 4. 2.5×10^{-7}s

Q.33 In moving coil galvanometer, strong horse shoe magnet of concave shaped pole pieces is

3 used to

Ans
- ✗ 1. reduce weight of galvanometer.
- ✓ 2. produce magnetic field which is parallel to plane of coil at any position.
- ✗ 3. increase space for roatation of coil.
- ✗ 4. make magnetic induction weak at the centre.

Q.34 A body is projected vertically from the surface of the earth of radius 'R' with velocity equal to half of the escape velocity. The maximum height reached by the body is

Ans
- ✗ 1. R/2
- ✗ 2. R/4
- ✗ 3. R/5
- ✓ 4. R/3

Q.35 The dimensions of torque are same as that of

Ans
- ✗ 1. acceleration.
- ✗ 2. impulse.
- ✓ 3. moment of force.
- ✗ 4. pressure.

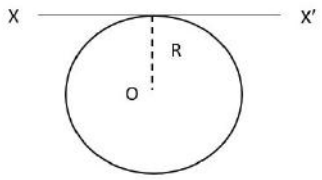
Q.36 The angle made by orbital angular momentum of electron with the direction of the orbital magnetic moment is

Ans
- ✓ 1. 180^{o}
- ✗ 2. 120^{o}
- ✗ 3. 60^{o}

✗ 4. 90^o

Q.37

A thin metal wire of length 'L' and uniform linear mass density 'ϱ' is bent into a circular coil with 'o' as centre. The moment of inertia of a coil about the axis XX' is



Ans

✓ 1. $3\varrho L^3/8\pi^2$

✗ 2. $\varrho L^3/8\pi^2$

✗ 3. $3\varrho L^2/4\pi^2$

✗ 4. $\varrho L^3/4\pi^2$

Q.38 When photons of energy $h\nu$ fall on metal plate of work function 'W_o', photoelectrons of maximum kinetic enrgy 'K' are ejected. If the frequency of the radiation is doubled, the maximum kinetic energy of the ejected photoelectrons will be

Ans

✗ 1. $2K$

✓ 2. $K+h\nu$

✗ 3. $K + W_0$

✗ 4. K

Q.39 Two parallel conductors carrying unequal currents in the same direction _____

Ans
- ✔ 1. attract each other.
- ✘ 2. repel each other.
- ✘ 3. will have rotational motion.
- ✘ 4. neither attract nor repel each other.

Q.40 A galvanometer has resistance of 100Ω and a current of 10mA produces full scale deflection in it. The resistance to be connected to it in series, to get a voltmeter of range 50 volt is

Ans
- ✘ 1. 3900Ω
- ✘ 2. 4600Ω
- ✔ 3. 4900Ω
- ✘ 4. 4000Ω

Q.41 Two identical wires of substances 'P' and 'Q' are subjected to equal stretching force along the length. If the elongation of 'Q' is more than that of 'P', then

Ans
- ✘ 1. Q is more elastic than P.
- ✘ 2. P is plastic and Q is elastic.
- ✘ 3. both P and Q are equally elastic.
- ✔ 4. P is more elastic than Q.

Q.42 Dimensions of Gyromagnetic ratio are

Ans
✗ 1. $[L^1M^0T^1I^1]$

✗ 2. $[L^{-1}M^0T^1I^1]$

✗ 3. $[L^1M^0T^0I^{-1}]$

✓ 4. $[L^0M^{-1}T^1I^1]$

Q.43 **The radius of the earth and the radius of orbit around the sun are 6371 km and 149×10^6 km respectively.The order of magnitude of the diameter of the orbit is greater than that of earth by**

Ans
✗ 1. 10^3

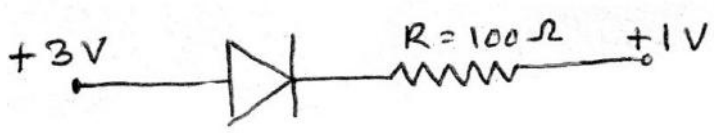
✓ 2. 10^4

✗ 3. 10^5

✗ 4. 10^2

Q.44

Assuming that the junction diode is ideal, the current in the arrangement shown in figure is



Ans
✗ 1. 40mA

✓ 2. 20mA

✗ 3. 30mA

✗ 4. 10 mA

Q.45 **If ∝ is the coefficient of performance of a refrigerator and 'Q_1' is heat released to the hot reservoir, then the heat extracted from the cold reservoir 'Q_2' is**

Ans

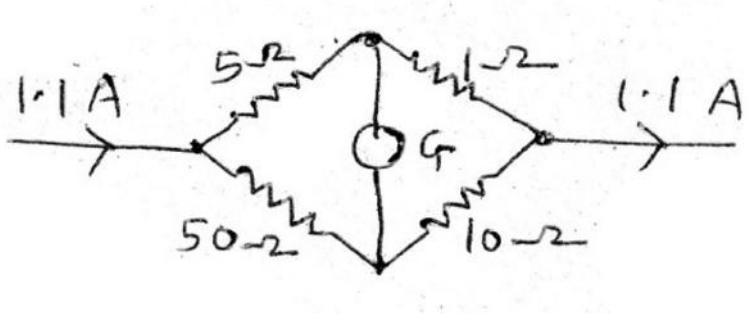
✗ 1. $\frac{1+\alpha}{\alpha}Q_1$

✗ 2. $\frac{\alpha Q_1}{\alpha - 1}$

✗ 3. $\frac{\alpha - 1}{\alpha}Q_1$

✓ 4. $\frac{\alpha Q_1}{1+\alpha}$

Q.46 The current in 1Ω resistor in the following circuit is



Ans

✗ 1. 0.5A

✗ 2. 0.8A

✓ 3. 1A

✗ 4. 1.1A

Q.47 Two coils have a mutual inductance of 0.01 H. The current in the first coil changes according to equation I = 5 sin 200πt. The maximum value of e.m.f induced in the second coil is

Ans

1. $0.01\ \pi$ volt
2. $10\ \pi$ volt
3. $0.1\ \pi$ volt
4. π volt

Q.48 In a series LCR circuit R=300Ω ,L=0.9H,C=2μF , ω =1000rad/s. The impedance of the circuit is

Ans

1. 500Ω
2. 1300Ω
3. 400Ω
4. 900Ω

Q.49 The resultant $\vec{R}$ of $\vec{P}$ and $\vec{Q}$ is perpendicular to $\vec{P}$. Also $|\vec{P}| = |\vec{R}|$. The angle between $\bar{P}$ and $\bar{Q}$ is $[\tan 45^o = 1]$

Ans

1. $\frac{3\pi}{4}$
2. $\frac{5\pi}{4}$
3. $\frac{7\pi}{4}$
4. $\frac{\pi}{4}$

Q.50 Two open pipes of different lengths and of same diameter in which the air column vibrates with fundamental frequencies 'n_1', and 'n_2' respectively. When both pipes are joined to form a single pipe, its fundamental frequency will be

Ans

✗ 1. $\frac{n_1 + n_2}{n_1 n_2}$

✗ 2. $\frac{n_1 n_2}{2n_2 + n_1}$

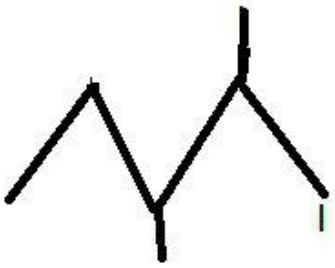
✗ 3. $\frac{2n_2 + n_1}{n_1 n_2}$

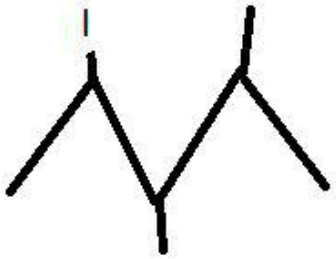
✓ 4. $\frac{n_1 n_2}{n_1 + n_2}$

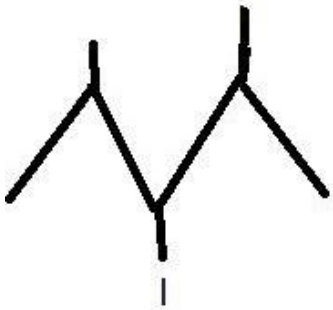
Section : **Chemistry**

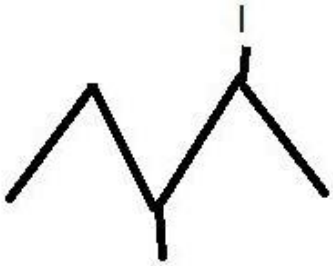
Q.1 The bond line formula of 1-iodo -2,3-dimethyl pentane is

Ans

✓ 1. 

2. 

3. 

4. 

Q.2 Which among the following compounds is used to decaffeinate coffee?

Ans

1. Methylene dichloride
2. Chloroform
3. Iodoform
4. Carbon tetrachloride

Q.3

In the reaction , $MnO_4^{-1}{}_{(aq.)} + Br^{-1}{}_{(aq.)} \rightarrow MnO_{2(s)} + BrO_{3(aq)}^{-1}$,the correct change in oxidation number of the species involved is

Ans
- ✗ 1. Mn^{+7} to Mn^{+2}
- ✓ 2. Br^{-1} to Br^{+5}
- ✗ 3. Br^{+5} to Br^{-1}
- ✗ 4. Mn^{+7} to Mn^{+3}

Q.4 Mandelonitrile is obatined by the reaction between hydrogen cyanide and

Ans
- ✗ 1. Acetaldehyde
- ✓ 2. Benzaldehyde
- ✗ 3. Acetone
- ✗ 4. Propionaldehyde

Q.5 Which among the following pairs of compounds is *NOT* isomorphous?

Ans
- ✓ 1. NaCl and KCl
- ✗ 2. K_2SO_4 and K_2SeO_4
- ✗ 3. NaF and MgO
- ✗ 4. $NaNO_3$ and $CaCO_3$

Q.6 Calculate Vant Hoff factor for 0.2 m aqueous solution of KCl which freezes at -0.680^{0}C. (K_f=1.86 K kg mol^{-1})

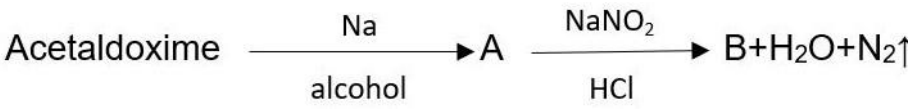
Ans
- ✓ 1. 1.83
- ✗ 2. 6.8

3. 3.72

4. 1.86

Q.7

Identify B in the following reaction,



Ans

1. $CH_3CH_2CH_2OH$

2. C_2H_5OH

3. C_2H_5Cl

4. $C_2H_5NH_2$

Q.8 When $CuSO_4$ solution in water is treated with concentrated HCl it turns

Ans

1. Yellow

2. Purple

3. Green

4. Violet

Q.9 Which among the following solids shows Frenkel defect ?

Ans

1. NaCl

2. KCl

3. C_sCl

4. AgCl

Q.10 **Action of hydrogen iodide on anisole gives,**

Ans

1. phenol and methanol
2. iodobenzene and methanol
3. iodobenzene and iodomethane
4. phenol and iodomethane

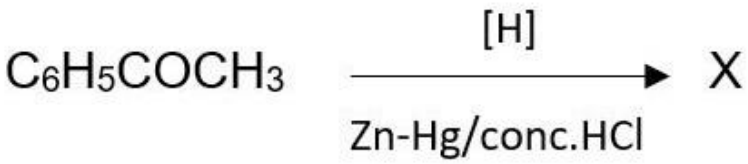
Q.11 **The conductivity of an electrolytic solution decreases on dilution due to**

Ans

1. increase in percentage ionisation
2. decrease in number of ions per unit volume
3. increase in ionic mobility of ions
4. increase in number of ions per unit volume

Q.12

In the reaction,



X is

Ans
- ✔ 1. ethylbenzene
- ✘ 2. methylbenzene
- ✘ 3. benzylalcohol
- ✘ 4. toluene

Q.13 For a process, entropy change of a system is expressed as

Ans
- ✘ 1. $\frac{T}{q_{rev}}$
- ✔ 2. $\frac{q_{rev}}{T}$
- ✘ 3. H-TS
- ✘ 4. $q_{rev} \times T$

Q.14 For the elementary reaction $2SO_{2(g)} + O_{2(g)} \rightarrow 2SO_{3(g)}$, identify the correct among the following relations

Ans

1. $\frac{+d[SO_{3(g)}]}{dt} = \frac{-2d[O_{2(g)}]}{dt}$

2. $\frac{-d[SO_{2(g)}]}{dt} = \frac{-d[O_{2(g)}]}{dt}$

3. $\frac{+1}{2}\frac{d[SO_{3(g)}]}{dt} = \frac{d[SO_{2(g)}]}{dt}$

4. $\frac{+d[SO_{2(g)}]}{dt} = \frac{-d[O_{2(g)}]}{dt}$

Q.15 **Which among the following compounds is used as selective weed killer?**

Ans

1. 2,4-dichlorophenoxy acetic acid
2. 2,4,6- trichlorophenoxy acetic acid
3. Salol
4. Picric acid

Q.16 **A cold drink bottle contains 200 mL liquid in which CO_2 is 0.1 molar . Considering CO_2 as an ideal gas the volume of the dissolved CO_2 at S.T.P is**

Ans

1. 0.448 L
2. 0.224 L
3. 2.24 L
4. 22.4 L

Q.17 Which of the following is NOT an antiseptic compound?

Ans

✗ 1. Hydrogen peroxide

✗ 2. Iodoform

✓ 3. Potassium sulphite

✗ 4. Boric acid

Q.18 Which of the following sets of components form homogeneous mixture?

Ans

✗ 1. Silver chloride + Water

✗ 2. Ethyl alcohol + Water

✓ 3. Phenol + Water

✗ 4. Sugar + Benzene

Q.19 Which among the following sets of compounds is used as raw material for the preparation of sodium carbonate by solvay process?

Ans

✗ 1. NH_4Cl , H_2O , NaCl

✗ 2. NaOH , HCl , CO_2

✓ 3. NaCl , NH_3 ,$Ca(OH)_2$

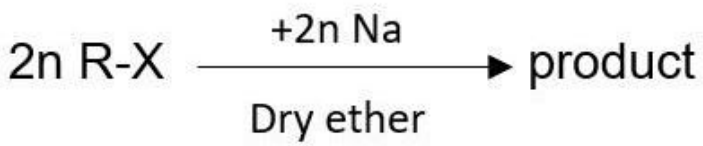
✗ 4. NaCl , $CaCO_3$, H_2SO_4

Q.2 0 Which of following bonds has maximum bond length ?

Ans
- ✔ 1. C - H
- ✘ 2. C - O
- ✘ 3. C - N
- ✘ 4. C - C

Q.2 1

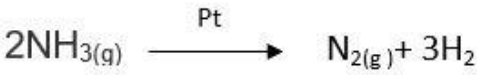
In the reaction,



The product obtained is

Ans
- ✔ 1. n Alkane
- ✘ 2. n Alchol
- ✘ 3. 2n Alkene
- ✘ 4. n Sodium halide

Q.2 2 Which among the following reaction is an example of a zero order reaction?

Ans
- ✔ 1. 

- ✘ 2. $2H_2O_{2(l)} \rightarrow 2H_2O_{(l)} + O_{2(g)}$
- ✘ 3. $C_{12}H_{22}O_{11(aq.)} + H_2O_{(l)} \rightarrow C_6H_{12}O_{6(aq.)} + C_6H_{12}O_{6(aq.)}$

4. $H_{2(g)} + I_{2(g)} \rightarrow 2HI_{(g)}$

Q.23 Which among the following compounds in crystalline form is used for making Nicol's prism?

Ans

1. $CaCO_3$
2. Na_2AlF_6
3. $CaSO_4$
4. Al_2O_3

Q.24 Three moles of an ideal gas are expanded isothermally from a volume of 300 cm^3 to 2.5 L at 300 K against a pressure of 1.9 atm. The work done in joules is

Ans

1. +423.56 J
2. +4.8 J
3. -4.18 J
4. -423.56 J

Q.25 What happens when ionic hydrides of S-block elements in molten state are electrolysed?

Ans

1. Hydride ion migrates at cathode
2. Dihydrogen is liberated at anode
3. Dihydrogen is liberated at cathode
4. Hydride ion reforms metal hydride

Q.2 6 β-pleated sheets of polypeptide chains are present in

Ans
- ✗ 1. quaternary structure
- ✗ 2. Primary structure
- ✗ 3. Tertiary structure
- ✓ 4. Secondary structure

Q.2 7 How many isoprene units are present in abscisic acid ?

Ans
- ✗ 1. Five
- ✗ 2. Two
- ✗ 3. Four
- ✓ 4. Three

Q.2 8 When propene reacts with HCl in presence of peroxide, the product is

Ans
- ✗ 1. 1,2-dichloro propane
- ✗ 2. 1,1-dichloro propane
- ✓ 3. 2-chloro propane
- ✗ 4. 1-chloro propane

Q.29 Which among the following is NOT a semi-synthetic polymer.

Ans
- ✔ 1. Terylene
- ✘ 2. Viscose-Rayon
- ✘ 3. Cupra-ammonium silk
- ✘ 4. Acetate Rayon

Q.30 If the Vant Hoff factor for 0.1 M $Ba(NO_3)_2$ solution is 2.74, the degree of dissociaion is

Ans
- ✘ 1. 0.91
- ✔ 2. 0.87
- ✘ 3. 0.74
- ✘ 4. 87

Q.31 What is the percentage of carbon in urea ? (At mass C=12, H=1, N=14,O=16)

Ans
- ✘ 1. 26.6%
- ✘ 2. 6.67%
- ✘ 3. 46.0%
- ✔ 4. 20%

Q.32 Calculate the difference between heat of combustion of carbon monoxide gas at constant pressure and at constant volume at 27°C? (R = 2Cal K^{-1} mol^{-1})

Ans
- ✘ 1. -600 cal
- ✘ 2. 27 cal

3. -300 cal

4. 54 cal

Q.33 **For the conversion of oxygen to ozone in the atmosphere, nitric oxide in gaseous phase acts as**

Ans

1. Inhibitor

2. homogeneous catalyst

3. heterogeneous catalyst

4. enzyme catalyst

Q.34 **Which hydride among the following is strongest reducing agent ?**

Ans

1. AsH_3

2. PH_3

3. BiH_3

4. SbH_3

Q.35 **The ionic charges on chromate ion and dichromate ion respectively is**

Ans

1. -3,-2

2. -4,-2

3. -2,-2

4. -2,-4

Q.36 The resistance of $\frac{1}{10}$ M solution is 2.5×10^3 ohm. What is the molar conductivity of solution? (cell constant=1.25 cm^{-1})

Ans

✗ 1. 3.5 $ohm^{-1}cm^2mol^{-1}$

✓ 2. 5.0 $ohm^{-1}cm^2mol^{-1}$

✗ 3. 2.5 $ohm^{-1}cm^2mol^{-1}$

✗ 4. 2.0 $ohm^{-1}cm^2mol^{-1}$

Q.37 **Which among the following is used in the treatment of cancer?**

Ans

✗ 1. trans-$[Pt(en)_2Cl_2]$

✗ 2. trans-$[Pt(NH_3)_2Cl_2]$

✗ 3. cis-$[Pt(en)_2Cl_2]$

✓ 4. cis-$[PtCl_2(NH_3)_2]$

Q.38 **What is the H-S-H bond angle in H_2S?**

Ans

✓ 1. 92.1^0

✗ 2. 90^0

✗ 3. 104.5^0

✗ 4. 91^0

Q.39 Nitroalkanes are obtained in laboratory from primary or secondary alkyl halides by the action of

Ans
- ✗ 1. $NaNO_3$
- ✓ 2. $AgNO_2$
- ✗ 3. HNO_3
- ✗ 4. $AgNO_3$

Q.40 Which among the following oxides of nitrogen is called nitrogen sesquioxide?

Ans
- ✓ 1. N_2O_3
- ✗ 2. N_2O_5
- ✗ 3. N_2O_4
- ✗ 4. NO_2

Q.41 ' K ' is Henry's constant and has the unit

Ans
- ✗ 1. atm mol dm^{-3}
- ✗ 2. $mol^{-1}dm^3atm^{-1}$
- ✓ 3. mol $dm^{-3}atm^{-1}$
- ✗ 4. atm $mol^{-1}dm^3$

Q.42 Which of following is NOT a property of red phosphorus ?

Ans
1. It is non-poisonous
2. It does not show chemiluminescence by action of air
3. It forms phosphine when treated with hot sodium hydroxide solution
4. Insoluble in carbon disulphide

Q.4 3 **Bassemerization is used in the extraction of**

Ans
1. Zinc
2. Copper
3. Aluminium
4. Iron

Q.4 4 **Which of following methods is used to separate wolframite and stannic oxide present in cassiterite?**

Ans
1. Froth flotation
2. Hydraulic washing using Wilfley table
3. Magnetic separation
4. Hydraulic classifier

Q.4 5 **Which of the following polymer is used in paints ?**

Ans
1. Gutta percha
2. Melamine
3. Buna-S
4. Novolac

Q.46 Which among the following group 15 elements does not exhibit allotropy ?

Ans
- ✗ 1. N
- ✗ 2. As
- ✗ 3. Sb
- ✓ 4. Bi

Q.47 Two electrolytic cells are connected in series containing $CuSO_4$ solution and molten $AlCl_3$. If in electrolysis 0.4 moles of 'Cu' are deposited on cathode of first cell. The number of moles of 'Al ' deposited on cathode of the second cell is

Ans
- ✓ 1. 0.4 moles
- ✗ 2. 0.18 moles
- ✗ 3. 0.27 moles
- ✗ 4. 0.6 moles

Q.48 The bacteriostatic antibiotic from the following is

Ans
- ✗ 1. Aminoglycosides
- ✓ 2. Tetracycline
- ✗ 3. Penicillin
- ✗ 4. Ofloxacin

Q.49 ∝ - butylene when subjected to hydroboration oxidation reaction, yields

Ans
- ✗ 1. iso-butyl alcohol
- ✗ 2. tert-butyl alcohol
- ✓ 3. n-butyl alcohol
- ✗ 4. sec-butyl alcohol

Q.50 Which complex among the following gives a white precipitate on treatment with an aqueous solution of barium chloride?

Ans
- ✗ 1. $[Pt(NH_3)_4Br_2]Cl_2$
- ✓ 2. $[Co(NH_3)_5NO_2]SO_4$
- ✗ 3. $[Pt(NH_3)_4Cl_2]\ Br_2$
- ✗ 4. $[Co(NH_3)_5SO_4]NO_2$

Section : **Mathematics**

Q.1 If $f(x) = 3x - 2\ and\ g(x) = x^2$, then $fog(x) = ...$

Ans
- ✗ 1. $3x - 2$
- ✗ 2. $3x^2 + 2$

✔ 3. $3x^2 - 2$

✘ 4. $2 - 3x^2$

Q.2 The number of solutions of $sin^2\theta = \frac{1}{2}$ in [0, π] is ……

Ans
✘ 1. three

✔ 2. two

✘ 3. four

✘ 4. one

Q.3 If $\bar{a} + \bar{b}$, $\bar{b} + \bar{c}$ and $\bar{c} + \bar{a}$ are coterminous edges of a parallelepiped then its volume is……..

Ans
✘ 1. 0

✘ 2. $3[\bar{a}\ \bar{c}\ \bar{b}]$

✔ 3. $2[\bar{a}\ \bar{b}\ \bar{c}]$

✘ 4. $4[\bar{b}\ \bar{a}\ \bar{c}]$

Q.4 $\int \frac{\sqrt{x^2-a^2}}{x} dx = \ldots\ldots$

Ans ✔ 1. $\sqrt{x^2-a^2} - a\cos^{-1}\left(\frac{a}{x}\right) + c$

✘ 2. $\sqrt{x^2-a^2} + \frac{1}{x}\sec^{-1}(x) + c$

✘ 3. $\sqrt{x^2-a^2} + a\sec^{-1}\left(\frac{x}{a}\right) + c$

✘ 4. $x\sqrt{x^2-a^2} - \frac{1}{a}\tan^{-1}\left(\frac{x}{a}\right) + c$

Q.5 The minimum value of $z = 10x + 25y$ subject to $0 \le x \le 3, 0 \le y \le 3, x + y \ge 5$ is ...

Ans ✘ 1. 105

✔ 2. 80

✘ 3. 30

✘ 4. 95

Q.6 If $f(x) = 3x^3 - 9x^2 - 27x + 15$, then the maximum value of $f(x)$ is ……..

Ans
- ✔ 1. 30
- ✘ 2. -66
- ✘ 3. 66
- ✘ 4. -30

Q.7 The general solution of $x\frac{dy}{dx} = y - xtan\left(\frac{y}{x}\right)$ is ……

Ans
- ✔ 1. $x \sin\left(\frac{y}{x}\right) = c$
- ✘ 2. $x^2 \sin\left(\frac{x}{y}\right) = c$
- ✘ 3. $x \sin\left(\frac{x}{y}\right) = c$
- ✘ 4. $x^2 \sin\left(\frac{y}{x}\right) = c$

Q.8 Which of the following is NOT equivalent to $p \longrightarrow q$.

Ans

✗ 1. p is sufficient for q

✓ 2. q only if p

✗ 3. p only if q

✗ 4. q is necessary for p

Q.9 If the function $f(x) = \frac{\log(1+ax)-\log(1-bx)}{x}$, $x \neq 0$ is continuous at $x = 0$ then, $f(0) = \ldots$

Ans

✓ 1. $a + b$

✗ 2. $loga + logb$

✗ 3. loga-logb

✗ 4. $a - b$

Q.10 For a G.P, if $(m+n)^{th}$ term is p and $(m-n)^{th}$ term is q , then m^{th} term is .....

Ans

1. $\frac{p}{q}$

2. $\sqrt{pq}$

3. pq

4. $\frac{q}{p}$

Q.11 The value of $\int_{-3}^{3}(ax^5 + bx^3 + cx + k)dx$, where a, b, c, k are constants, depends only on .....

Ans

1. $a, b \text{ and } c$

2. a and b

3. k

4. a and k

Q.12 Which of the following equation has no solution ?

Ans

1. $cos\theta = \sqrt{2}$

2. $sin\theta = -\frac{1}{5}$

3. $sec\theta = 23$

4. $tan\theta = 2019$

Q.13 The angle between lines $\frac{x-2}{2} = \frac{y-3}{-2} = \frac{z-5}{1}$ and $\frac{x-2}{1} = \frac{y-3}{2} = \frac{z-5}{2}$ is .....

Ans

1. $30°$

2. $60°$

3. $90°$

4. $45°$

Q.14 If A is non-singular matrix such that $(A-2I)(A-4I) = 0$ then $A+8A^{-1}$ = ...

Ans

✗ 1. I

✗ 2. 0

✓ 3. 6I

✗ 4. 3I

Q.15 It is observed that 25 % of the cases related to child labour reported to the police station are solved. If 6 new cases are reported, then the probability that atleast 5 of them will be solved is .....

Ans

✗ 1. $\left(\frac{1}{4}\right)^6$

✗ 2. $\frac{19}{2048}$

✗ 3. $\frac{19}{1024}$

✓ 4. $\frac{19}{4096}$

Q.16

If $\theta = \frac{17\pi}{3}$ then $tan\theta - cot\theta = \ldots\ldots\ldots$

Ans

✔ 1. $-\frac{2}{\sqrt{3}}$

✘ 2. $\frac{2}{\sqrt{3}}$

✘ 3. $\frac{-1}{2\sqrt{3}}$

✘ 4. $\frac{1}{2\sqrt{3}}$

Q.17 The values of x in $(0, \frac{\pi}{2})$ satisfying the equation $sinxcosx = \frac{1}{4}$ are .....

Ans

✔ 1. $\frac{\pi}{12}, \frac{5\pi}{12}$

✘ 2. $\frac{\pi}{8}, \frac{3\pi}{8}$

3. $\frac{\pi}{8}, \frac{\pi}{4}$

4. $\frac{\pi}{6}, \frac{\pi}{12}$

Q.18 If P(x_1, y_1) is a point on the hyperbola $x^2 - y^2 = a^2$, then SP.S'P = ...

Ans

1. $\frac{x_1^2 + y_1^2}{a^2}$

2. $x_1^2 - y_1^2$

3. $x_1^2 + y_1^2$

4. $\frac{x_1^2 - y_1^2}{a^2}$

Q.19 If the lengths of the transverse axis and the latus rectum of a hyperbola are 6 and $\frac{8}{3}$ respectively, then the equation of the hyperbola is .....

Ans

1. $4x^2 - 9y^2 = 72$

2. $4x^2 - 9y^2 = 36$

3. $9x^2 - 4y^2 = 36$

4. $9x^2 - 4y^2 = 72$

Q.2 0 **If G (3 , -5 , r) is centroid of triangle ABC where A (7,-8,1) , B (p , q , 5) and C (q+1 , 5p , 0) are vertices of a triangle then values of p , q , r are respectively …….**

Ans

1. -3 , 4 , 3
2. -4 , 5 ,4
3. -2 , 3 , 2
4. 6 , 5 , 4

Q.2 1 **A bag contain 6 white and 4 black balls. Two balls are drawn at random. The probability that they are of the same colour is …..**

Ans

1. $\frac{1}{15}$

✗ 2. $\frac{5}{7}$

✗ 3. $\frac{1}{7}$

✓ 4. $\frac{7}{15}$

Q.2 2 The order of the differential equation of all circles whose radius is 4 , is .....

Ans

✓ 1. 2

✗ 2. 3

✗ 3. 4

✗ 4. 1

Q.2 3 If $A = \begin{bmatrix} x & 1 \\ 1 & 0 \end{bmatrix}$ and $A=A^{-1}$, then $x =$ .....

Ans

✗ 1. 1

✓ 2. 0

✗ 3. 4

✗ 4. 2

Q.24 If $f(x) = \cos^{-1}\left[\frac{1-(logx)^2}{1+(logx)^2}\right]$, then $f'(e) =$.....

Ans

✔ 1. $\frac{1}{e}$

✘ 2. 1

✘ 3. $\frac{2}{e^2}$

✘ 4. $\frac{2}{e}$

Q.25 If $x = \sqrt{a^{\sin^{-1}t}}$, $y = \sqrt{a^{\cos^{-1}t}}$, then $\frac{dy}{dx} =$ .....

Ans

✘ 1. $\frac{-x}{y}$

✔ 2. $\frac{-y}{x}$

✘ 3. $\frac{y}{x}$

✘ 4. $\frac{x}{y}$

Q.26 The area of the region bounded by the curve $y = 2x - x^2$ and the line $y = x$ is ……. square units.

Ans

✘ 1. $\frac{1}{3}$

✘ 2. $\frac{1}{2}$

✘ 3. $\frac{7}{6}$

✔ 4. $\frac{1}{6}$

Q.27 The equivalent form of the statement $\sim(p \longrightarrow \sim q)$ is .....

Ans

✔ 1. $p \wedge q$

✘ 2. $p \wedge \sim q$

✘ 3. $\sim p \vee q$

✘ 4. $p \vee \sim q$

Q.28 The general solution of the differential equation of all circles having centre at A (-1 , 2) is .....

Ans

✘ 1. $x^2 + y^2 - x + 2y + c = 0$

✘ 2. $x^2 + y^2 - 2x + 4y + c = 0$

✔ 3. $x^2 + y^2 + 2x - 4y + c = 0$

✗ 4.

$$x^2 + y^2 + x - 2y + c = 0$$

Q.29 The equation of normal to the curve $y = log_e^x$ at the point P (1,0) is .....

Ans

✗ 1. $2x + y = 2$

✗ 2. $x - 2y = 1$

✓ 3. $x + y = 1$

✗ 4. $x - y = 1$

Q.30 The value of $tan^{-1}\frac{1}{3} + tan^{-1}\frac{1}{5} + tan^{-1}\frac{1}{7} + tan^{-1}\frac{1}{8}$ is .....

Ans

✗ 1. π

✗ 2. $\frac{3\pi}{4}$

3. $\frac{\pi}{4}$

4. $\frac{11\pi}{5}$

Q.3 1 **The equation of the plane passing through the point (-1 , 2 , 1) and perpendicular to the line joining the points (-3 , 1 ,2) and (2 , 3 , 4) is …..**

Ans

1. $\bar{r}.\left(5\hat{\imath}+2\hat{\jmath}+2\hat{k}\right)$ = -1

2. $\bar{r}.\left(5\hat{\imath}-2\hat{\jmath}+2\hat{k}\right)$ = -5

3. $\bar{r}.\left(5\hat{\imath}+2\hat{\jmath}+2\hat{k}\right)$ = 1

4. $\bar{r}.\left(5\hat{\imath}-2\hat{\jmath}-2\hat{k}\right)$ = 1

Q.3 2 The coordinates of the foot of perpendicular drawn from origin to the plane $2x - y + 5z - 3 = 0$ are ……

Ans

✗ 1. $\left(\frac{2}{\sqrt{30}}, \frac{-1}{\sqrt{30}}, \frac{5}{\sqrt{30}}\right)$

✗ 2. $\left(\frac{2}{3}, \frac{-1}{3}, \frac{5}{3}\right)$

✗ 3. (2 , -1 , 5)

✓ 4. $\left(\frac{1}{5}, \frac{-1}{10}, \frac{1}{2}\right)$

Q.33 $\int_0^4 \frac{1}{1+\sqrt{x}} dx = \cdots$

Ans

✗ 1. $log\left(\frac{e^4}{3}\right)$

✓ 2. $log\left(\frac{e^4}{9}\right)$

✗ 3. $log\left(\frac{e^3}{4}\right)$

✗ 4. $log\left(\frac{e^4}{6}\right)$

Q.34 If the line passes through the points P(6,-1,2), Q(8,-7,2λ) and R(5,2,4) then value of λ *is* .....

Ans

✗ 1. -3

✓ 2. -1

✗ 3. 0

✗ 4. 2

Q.35 The statement pattern $(p \wedge q) \wedge [\sim r \vee (p \wedge q)] \vee (\sim p \wedge q)$ is equivalent to .....

Ans

✗ 1. r

✗ 2. p

✓ 3. q

✗ 4. $p \wedge q$

Q.36 The joint equation of pair of straight lines passing through origin and having slopes $(1+\sqrt{2})$ and $\left(\frac{1}{1+\sqrt{2}}\right)$ is .....

Ans

✗ 1. $x^2 - 2\sqrt{2}xy - y^2 = 0$

✗ 2. $x^2 + 2xy - y^2 = 0$

✓ 3. $x^2 - 2\sqrt{2}xy + y^2 = 0$

✗ 4. $x^2 + 2xy + y^2 = 0$

Q.37 The joint equation of the lines passing through the origin and trisecting the first quadrant is .....

Ans

✗ 1. $x^2 + \sqrt{3}xy - y^2 = 0$

✓ 2. $\sqrt{3}x^2 - 4xy + \sqrt{3}y^2 = 0$

✗ 3. $x^2 - \sqrt{3}xy - y^2 = 0$

✗ 4. $3x^2 - y^2 = 0$

Q.38 **Which of the following function is not continuous at x = 0 ?**

Ans ✗ 1.

$$f(x) = (1+2x)^{1/x} \quad , x \neq 0$$

$$= e^2 \quad , x = 0$$

✓ 2.

$$f(x) = \frac{e^{1/x} - 1}{e^{1/x} + 1} \quad , x \neq 0$$

$$= -1 \quad , x = 0$$

✗ 3.

$$f(x) = sinx - cosx \quad , \quad x \neq 0$$

$$= -1 \quad , \quad x = 0$$

✗ 4.

$$f(x) = \frac{e^{5x} - e^{2x}}{sin3x} \quad , x \neq 0$$

$$= 1 \quad , x = 0$$

Q.39 If the c.d.f (cumulative distribution function) is given by $F(x) = \frac{x-25}{10}$, then P $(27 \leq x \leq 33) =$ .....

Ans

1. $\frac{3}{10}$

2. $\frac{3}{5}$

3. $\frac{1}{10}$

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

Q.40 Derivative of $log_{e^2}(logx)$ with respect to x is .....

Ans

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

2. $\frac{1}{x\log x^2}$

3. $\frac{2}{x\log x}$

4. $\frac{1}{x\log x}$

Q.41 A random variable X has following probability distribution

X=x	1	2	3	4	5	6
P(X=x)	K	3K	5K	7K	8K	K

Then $P(2 \leq X < 5)$ =.....

Ans

1. $\frac{24}{25}$

2. $\frac{23}{25}$

3. $\frac{7}{25}$

✔ 4. $\frac{3}{5}$

Q.42 For a G.P. , if $S_n = \frac{4^n - 3^n}{3^n}$, then t_2 =.....

Ans

✘ 1. $\frac{7}{9}$

✘ 2. $\frac{2}{9}$

✔ 3. $\frac{4}{9}$

✘ 4. $\frac{1}{9}$

Q.4 A stone is dropped into a pond. Waves in the form of circles are generated and radius of

3 outermost ripple increases at the rate of 5 cm/sec. Then area increased after 2 seconds is .....

Ans
- ✗ 1. 50cm^2/sec
- ✓ 2. 100 Π cm^2/sec
- ✗ 3. 25cm^2/sec
- ✗ 4. 40cm^2/sec

Q.44 In ΔABC ; with usual notations, if $cosA = \frac{SinB}{SinC}$, then the triangle is .....

Ans
- ✗ 1. Acute angled triangle
- ✗ 2. Obtuse angled triangle
- ✗ 3. Equilateral triangle
- ✓ 4. Right angled triangle

Q.45 $$\int \frac{cosx + xsinx}{x^2 + xcosx} dx = \cdots$$

Ans
- ✗ 1. $log\left|\frac{xsinx}{x + cosx}\right| + c$
- ✗ 2. $log|x^2 + xcosx| + c$
- ✗ 3. $log|cosx + xsinx| + c$

✔ 4. $log\left|\frac{x}{x+cosx}\right|+c$

Q.46 If $\bar{p}, \bar{q}\ and\ \bar{r}$ are nonzero, noncoplanar vectors then $[\bar{p}+\bar{q}-\bar{r} \quad \bar{p}-\bar{q} \quad \bar{q}-\bar{r}] = \ldots$

Ans

✔ 1. $[\bar{p}\ \ \bar{q}\ \ \bar{r}]$

✘ 2. $2[\bar{p}\ \ \bar{q}\ \ \bar{r}]$

✘ 3. 0

✘ 4. $3[\bar{p}\ \ \bar{q}\ \ \bar{r}]$

Q.47 $\int \frac{1}{(x^2+1)^2}dx = \ldots\ldots\ldots$

Ans

✔ 1. $\frac{1}{2}\tan^{-1}x+\frac{x}{2(x^2+1)}+c$

2. $tan^{-1}x - \frac{1}{2x(x^2+1)} + c$

3. $tan^{-1}x + \frac{1}{2(x^2+1)} + c$

4. $tan^{-1}x + \frac{1}{x^2+1} + c$

Q.48 The maximum value of $z = 9x + 11y$ subject to $3x + 2y \leq 12, 2x + 3y \leq 12$, $x \geq 0, y \geq 0$ is _ _ _ _ _ _ .

Ans

1. 48
2. 54
3. 44
4. 36

Q.49 If P(2,2) , Q(-2,4) and R(3,4) are the vertices of ΔPQR then the equation of the median through vertex R is .....

Ans

1. $x + 3y - 9 = 0$

2. $x - 3y + 9 = 0$

3. $x - 3y - 9 = 0$

4. $x + 3y + 9 = 0$

Q.50 If A = $\{ x \in R : x^2 - 5|x| + 6 = 0 \}$, then $n(A)$ = ...

Ans
1. 2
2. 1
3. 4
4. 0