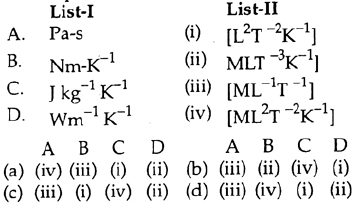
**Eamcet 2005 Solved Paper**

This practice EAMCET solved question papers is designed to prepare you for the EAMCET 2011 Exam. Find the information related to EAMCET 2011 Notification, EAMCET Key.

Names of units of some physical quantities are given in List – I and their dimensions formulae are given in List – II. Match the correct pairs in the list-II. Match the correct pairs in the lists:  
  


|  |
| --- |
|  |
|  | A. ( a) |
|  | B. ( b) |
|  | C. ( c) |
|  | D. ( d) |

At a given instant of time the position vector of a particle moving in a circle with a velocity  3\hat{i} - 4\hat{j} + 5\hat{k} is  \hat{i} + 9\hat{j} - 3\hat{k}. its angular velocity at that time is :

|  |
| --- |
|  |
|  | A.  \cfrac{13\hat{i} + 29\hat{j} - 31\hat{k}}{\sqrt{146}} |
|  | B.  \cfrac{13\hat{i} - 29\hat{j} - 31\hat{k}}{146} |
|  | C.  \cfrac{13\hat{i} + 29\hat{j} - 31\hat{k}}{\sqrt{146}} |
|  | D.  \cfrac{13\hat{i} + 29\hat{j} + 31\hat{k}}{146} |

A body projected vertically upwards crosses a point twice in its journey at a height h just after  t_1 and  t_2 seconds. Maximum height reached by the body is :

|  |
| --- |
|  |
|  | A.  \cfrac{g}{4}\big(t_1 + t_2\big)^2 |
|  | B.  g\Bigg(\cfrac{t_1 + t_2}{4}\Bigg)^2 |
|  | C.  2g\Bigg(\cfrac{t_1 + t_2}{4}\Bigg)^2 |
|  | D.  \cfrac{g}{4}\big(t_1\ t_2\big)^2 |

The equation of trajectory of a projectile is  y = 10\ x - \Bigg(\cfrac{5}{9}\Bigg)\ x^2   
  
If we assume  g = 10\ ms^{-2}, the range of projectile (in metre) is :

|  |
| --- |
|  |
|  | A. 36 |
|  | B. 24 |
|  | C. 18 |
|  | D. 9 |

The machine gun fires 240 bullet per minute. If the mass of each bullet is 10 g and the velocity of the bullets is  600\ ms^{-1}, the power (in kW) of the gun is :

|  |
| --- |
|  |
|  | A. 43200 |
|  | B. 432 |
|  | C. 72 |
|  | D. 7.2 |

The centre of mass of three particle of masses 1 kg, 2 kg and 3 kg is at (2, 2, 2). The position of the fourth mass of 4 kg to be placed in the system as that the news centre of mass is at (0, 0, 0) is :

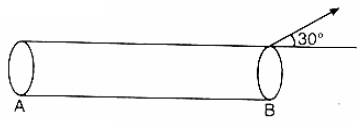
|  |
| --- |
|  |
|  | A. (-3, -3, -3) |
|  | B. (-3, 3, -3) |
|  | C. (2, 3, -3) |
|  | D. (2, -2, 3) |

Consider the following statement A and B and identify the correct answer :  
  
**(A):** In an elastic collision, if a body suffers a head on collision with another of same mass at rest, the first body comes to rest, while the others starts moving with the velocity of the first one.  
  
**(B):** Two bodies of equal masses suffering a head on the elastic collision merely exchanges their velcities :

|  |
| --- |
|  |
|  | A. both A and B are true |
|  | B. both A and B are false |
|  | C. A is true but B is false |
|  | D. A is false but B is true |

The minimum force required to move a body up an inclined plane is three times the minimum force required to prevent it from sliding down the plane. if the coefficient of friction between the body and the inclined plane is  \cfrac{1}{2\sqrt3}, the angle of inclined plane is :

|  |
| --- |
|  |
|  | A.  60^{^\circ} |
|  | B.  45^{^\circ} |
|  | C.  30^{^\circ} |
|  | D.  15^{^\circ} |

The instantaneous velocity of a point B of the given rod pf length of 0.5 m is 3 m/s in the represented direction. The angular velocity of the rod for minimum velocity of end A is :  
  


|  |
| --- |
|  |
|  | A. 1.5 rad / s |
|  | B. 5.2 rad / s |
|  | C. 2.5 rad / s |
|  | D. none of these |

Identify the increasing order of the angular velocities of the following :  
  
1. earth rotating about its own axis  
2. hour’s hand of a clock  
3. second’s hand of a clock  
4. flywheel of radius 2 m, making 300 rpm

|  |
| --- |
|  |
|  | A. 1, 2, 3, 4 |
|  | B. 2, 3, 4, 1 |
|  | C. 3, 4, 1, 2 |
|  | D, 4, 1, 2, 3 |

Degenerate electron pressure will not be sufficient to prevent core collapse of ‘white dwarf’ if its mass becomes n times of solar mass. Value of n is :

|  |
| --- |
|  |
|  | A. 0.5 |
|  | B. 0.8 |
|  | C. 1 |
|  | D. 1.4 |

A body of mass m is suspended to an ideal spring of force constant k. the expected change position of the body due to an additional force F acting vertically downwards is :

|  |
| --- |
|  |
|  | A.  \cfrac{3F}{2k} |
|  | B.  \cfrac{2F}{k} |
|  | C.  \cfrac{5F}{2k} |
|  | D.  \cfrac{4F}{k} |

The radii and Young’s moduli of two uniform wires A and B are in the ratio 2 : 1 and 1 : 2 respectively. Both wires are subjected to the same longitudinal force. If the increase in length of the wire A is one percent, the percentage increase in length of the wire B is :

|  |
| --- |
|  |
|  | A. 1.0 |
|  | B. 1.5 |
|  | C. 2.0 |
|  | D. 3.0 |

The heat evolved for the rise of water when one end of the capillary tube of radius r is immersed vertically into water is: (Assume surface tension = T and density of water to be  \rho )

|  |
| --- |
|  |
|  | A.  \cfrac{2 \pi T}{\rho g} |
|  | B.  \cfrac{\pi T^2}{\rho g} |
|  | C.  \cfrac{2 \pi T^2}{\rho g} |
|  | D. None of these |

An iron sphere of mass  20 \times 10^{-3}\ kg falls through a viscous liquid with terminal velocity  0.5\ ms^{-1}. The terminal velocity (in  ms^{-1} ) of another iron sphere of mass  54 \times 10^{-2} kg is :

|  |
| --- |
|  |
|  | A. 4.5 |
|  | B. 3.5 |
|  | C. 2.5 |
|  | D. 1.5 |

The relation between the coefficient of real expansion  (\gamma_r) and coefficient of apparent expansion  (\gamma_a) of liquid and the coefficient of linear expansion  (\alpha_g) of the material of container is :

|  |
| --- |
|  |
|  | A.  \gamma_r = \alpha_g + \gamma_a |
|  | B.  \gamma_r = \alpha_g + 3\gamma_a |
|  | C.  \gamma_r = 3\alpha_g + \gamma_a |
|  | D.  \gamma_r = 3(\alpha_g + \gamma_a) |

The differences between volume and pressure coefficient of an ideal gas is :

|  |
| --- |
|  |
|  | A.  \cfrac{1}{273} |
|  | B. 273 |
|  | C.  \cfrac{2}{273} |
|  | D. Zero |

The ratio of specific heats of a gas is  \gamma . The change in internal energy of one mole of the gas, when the volume changes from V to 2V at constant pressure P is :

|  |
| --- |
|  |
|  | A.  \cfrac{\gamma - 1}{PV} |
|  | B. PV |
|  | C.  \cfrac{PV}{\gamma - 1} |
|  | D.  \cfrac{PV}{\gamma} |

The tyre of motor car contains air at  15^{^\circ}C. If the temperature increases to  35^{^\circ}C, the approximate percentage increase in pressure is (ignore to expansion of tyre) :

|  |
| --- |
|  |
|  | A. 7 |
|  | B. 9 |
|  | C. 11 |
|  | D. 13 |

Two identical bodies have temperature  277^{^\circ}C and  67^{^\circ}C. If the surroundings temperature is  27^{^\circ}C, the ratio of loss of heats of the two bodies during the same interval of time is (approximately) :

|  |
| --- |
|  |
|  | A. 4 : 1 |
|  | B. 8 : 1 |
|  | C. 12 : 1 |
|  | D. 19 : 1 |

A vehicle sounding a whistle of frequency 256 Hz is moving on a straight road, towards a hill with a velocity of  10\ ms^{-1}. The number of beats per second observed by a person travelling in the vehicle is : (Velocity of sound =  330\ ms^{-1} )

|  |
| --- |
|  |
|  | A. Zero |
|  | B. 10 |
|  | C. 14 |
|  | D. 16 |

A transverse wave propagating on a stretched string of linear density  3 \times 10^{-4}\ kg-m^{-1} is represented by the equation  y = 0.2\ \sin (15x + 60t) where x is in metres and t is in seconds. The tension in the string (in newton) is:

|  |
| --- |
|  |
|  | A. 0.24 |
|  | B. 0.48 |
|  | C. 1.20 |
|  | D. 1.80 |

**Assertion (A) :** Propagation of light through an optical fibre is due to total internal reflection taking place at the core-clad interface.  
  
**Reason ( R) :** Refractive index of the material of the core of the optical fibre is greater than that of air.

|  |
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|  |
|  | A. Both (A) and ( R) are true and ( R) is the correct explanation of (A) |
|  | B. Both (A) and ( R) are true but ( R) is not the correct explanation of (A) |
|  | C. (A) is true but ( R) is false |
|  | D. (A) is false but ( R) is true |

The focal length of an equi-convex lens is greater than the radius of curvature of any of the surfaces. Then the refractive index of the material of the lens is :

|  |
| --- |
|  |
|  | A. Greater than zero but less than 1.5 |
|  | B. Greater than 1.5 but less than 2.0 |
|  | C. Greater than 2.0 but less than 2.5 |
|  | D. Greater than 2.5 but less than 2.0 |

Fraunhofer lines are produced by the obsorption of light in :

|  |
| --- |
|  |
|  | A. The chromosphere of the sun |
|  | B. The photosphere of the sun |
|  | C. Sodium |
|  | D. Hydrogen |

A light ray of wavelength  \lambda is passing through a pin hole of diameter D and the effect is observed on a screen placed at a distance L from the pin hole. The approximations of geometrical optics are applicable if :

|  |
| --- |
|  |
|  | A.  D \leq \lambda |
|  | B.  \cfrac{L\lambda}{D^2} = 1 |
|  | C.  \cfrac{L\lambda}{D^2} < < 1 |
|  | D.  \cfrac{L\lambda}{D^2} > > 1 |

With a standard rectangular bar magnet of length (l), breadth (b ; b < < l) and magnetic moment M, the time period of the magnetometer is 4 s. If the magnet is cut normal to its length into four equal pieces, the time period (in seconds) with one of the pieces is :

|  |
| --- |
|  |
|  | A. 16 |
|  | B. 2 |
|  | C. 1 |
|  | D. 1/4 |

If two identical bar magnets, each of length l, pole strength m and magnetic moment M are placed perpendicular to each other with their unlike poles in contact, the the magnetic moments of the combination is :

|  |
| --- |
|  |
|  | A.  \cfrac{M}{\sqrt2} |
|  | B.  lm\ (\sqrt2) |
|  | C.  2\ lm\ (\sqrt2) |
|  | D. 2M |

A 4  \mu F capacitor is charged by 200 V battery. it is then disconnected from the supply and is connected to another uncharged 2  \mu F capacitor. During the process, loss of energy (in J) is :

|  |
| --- |
|  |
|  | A.  3.43 \times 10^{-2} |
|  | B.  2.67 \times 10^{-2} |
|  | C.  2.67 \times 10^{-4} |
|  | D.  3.43 \times 10^{-4} |

Two charges 2 C and 6 C are separated by a finite distance. If a charge of -4 C is added to each of them, the initial force of  12 \times 10^3\ N will change to :

|  |
| --- |
|  |
|  | A.  4 \times 10^3\ N (repulsion) |
|  | B.  4 \times 10^2\ N (repulsion) |
|  | C.  6 \times 10^3\ N (attraction) |
|  | D.  4 \times 10^3\ N (attraction) |

A 6 V cell with 0.5  \Omega internal resistance, a 10 V cell with  1\ \Omega internal resistance and a  12\ \Omega external resistance are connected in parallel. The current (in ampere) through the 10 V cell is :

|  |
| --- |
|  |
|  | A. 0.60 |
|  | B. 2.27 |
|  | C. 2.87 |
|  | D. 5.14 |

In a meter bridge a  30\ \Omega resistance is connected in the left gap and a pair of resistances P and Q in the right gap. Measured from the left, the balance point is 37.5 cm, when P and Q are in series and 714 cm when they the parallel. the values of P and Q  (in\ \Omega) are :

|  |
| --- |
|  |
|  | A. 40 10 |
|  | B. 35 15 |
|  | C. 30 20 |
|  | D. 25 25 |

Consider the following statements A and B and identify the correct answers given below :  
  
**A :** Peltier coefficient is numerically equal to the potential differences across the junctions of the thermocouple through which current is following.  
  
**B :** According to Thomson, energy is neither absorbed nor evolved only along the lengths of both the conductors.

|  |
| --- |
|  |
|  | A. Both A and B are true |
|  | B. Both A and B are false |
|  | C. A is true but B is false |
|  | D. A is false but B is true |

An inductance 1 H is connected in series with an AC source of 220 V and 50 Hz. The inductive reactance (in ohm) is :

|  |
| --- |
|  |
|  | A.  2 \pi |
|  | B.  50 \pi |
|  | C.  100 \pi |
|  | D.  1000 \pi |

Two parallel rails of the railway track insulated from each other and with the ground are connected to a millivoltmeter. The distance between the rails is one metre. A train is travelling with a velocity of 72 km/h along the track. The reading of the milivoltmeter (in mV) is : (Vertical component of the earth’s magnetic induction is  2 \times 10^{-5}\ T )

|  |
| --- |
|  |
|  | A. 1.44 |
|  | B. 0.72 |
|  | C. 0.4 |
|  | D. 0.2 |

Magnetic field induction at the centre of a circular coil of radius 5 cm and carrying a current 0.9 A is (in SI units)  
( \varepsilon_o =  absolute permittivity of air in SI units; velocity of light  = 3 \times 10^8\ ms^{-1} )

|  |
| --- |
|  |
|  | A.  \cfrac{1}{\varepsilon_o\ 10^{16}} |
|  | B.  \cfrac{10^{16}}{\varepsilon_o} |
|  | C.  \cfrac{\varepsilon_o}{10^{16}} |
|  | D.  10^{16}\varepsilon_o |

A particle of mass  1 \times 10^{-26}\ kg and charge  1.6 \times 10^{-19}\ C  travelling with a velocity  1.28 \times 10^6\ ms^{-1} along the positive X-axis enters a region in which a uniform electric field  \overset{\rightarrow}{E} and a uniform magnetic filed of induction  \overset{\rightarrow}{B} are present. If  \overset{\rightarrow}{E} = -102.4 \times 10^3 \hat{k}\ NC^{-1} and  B = 8 \times 10^{-2} \hat {j}\ Wbm^{-2}, the direction of motion of the particles is :

|  |
| --- |
|  |
|  | A. Along the positive X-axis |
|  | B. Along the negative X-axis |
|  | C. At  45^{^\circ} to positive X-axis |
|  | D. At  135^{^\circ} to positive X-axis |

Particles and their anti-particles have:

|  |
| --- |
|  |
|  | A. The same masses but opposite spins |
|  | B. The same masses but opposite magnetic moments |
|  | C. The same masses and same magnetic moments |
|  | D. Opposite spins and some magnetic moments |

An n-p-n transistor power amplifier in C-E configuration gives:

|  |
| --- |
|  |
|  | A. voltage amplification only |
|  | B. currents amplification only |
|  | C. both current and voltage amplifications |
|  | D. only power gain of unity |

In Fischer-Ringe’s method of separation of nobles gas mixture from air, ........... is used :

|  |
| --- |
|  |
|  | A.  90\%\ CaC_2 + 10\%\ CaCl_2 |
|  | B. coconut charcoal |
|  | C. soda lime + potash solution |
|  | D.  90\%\ CaCO_3 + 10\% urea |

A complex compounds of  Co^{3+} with molecular formula  CoCl_x\ .yNH_3 gives a total of 3 ions when dissolved in water. How many  Cl^- ions satisfy both primary and secondary valencies in this complex ?

|  |
| --- |
|  |
|  | A. 3 |
|  | B. 1 |
|  | C. 4 |
|  | D. zero |

The chemicals and the reaction conditions required for the preparation of ethane are :

|  |
| --- |
|  |
|  | A.  C_2H_5l,\ Zn-Cu,\ C_2H_5OH |
|  | B.  CH_3Cl,\ Na,\ H_2O |
|  | C.  KOOC-CH = CH - COOK, electrolysis |
|  | D.  CH_3CO_2Na,\ NaOH,\ CaO,\ \triangle |

Observe the following statements regarding purification of bauxite :  
  
I. During Hall’s process, silica is removed as Si (vapour)  
II. Bauxite ore contaminated with  Fe_2O_3 is purified in Baeyer’s process.  
III. During Serpeck’s process, AlN is formed.  
  
The correct answer is

|  |
| --- |
|  |
|  | A. I, II and III are correct |
|  | B. Only I and II are correct |
|  | C. Only I and III are correct |
|  | D. Only II and III are correct |

Sodium is heated in air at  300^{^\circ}C to form X,X absorbs  CO_2 and forms  Na_2CO_3 and Y Which of the following is Y ?

|  |
| --- |
|  |
|  | A.  H_2 |
|  | B.  O_2 |
|  | C.  H_2O_2 |
|  | D.  O_3 |

Identify A and B in the following reactions :  
  
 A \overset{aq.NaOH}{\longrightarrow}\ C_2H_5OH \overset{AgOH}{\longleftarrow} B 

|  |
| --- |
|  |
|  | A.  A = C_2H_2,\ B = C_2H_6 |
|  | B.  A = C_2H_4Cl,\ B = C_2H_4 |
|  | C.  A = C_2H_4,\ B = C_2H_5Cl |
|  | D.  A = C_2H_5Cl,\ B = C_2H_5Cl |

Which one of the following reactions does not form gaseous product ?

|  |
| --- |
|  |
|  | A.  PbO_2 + H_2O_2 \rightarrow |
|  | B. Acidified  KMnO_4 + H_2O_2 \rightarrow |
|  | C.  PbS + H_2O_2 \rightarrow |
|  | D.  Cl_2 + H_2O_2 \rightarrow |

Which of the following is an example for heterogeneous catalysis reaction ?

|  |
| --- |
|  |
|  | A.  2SO_2(g) + O_2(g) \overset{NO(g)}{\longrightarrow} 2SO_3(g) |
|  | B. Hydrolysis of aqueous sucrose solution in the presence of aqueous minerals acid |
|  | C.  2H_2O_2(l) \overset{Pt(s)}{\longrightarrow} 2H_2O(l) + O_2(g) |
|  | D. Hydrolysis of liquid in the presence of aqueous minerals acid |

In which of the following reaction the product is an ether ?

|  |
| --- |
|  |
|  | A.  C_6H_6 + CH_3COCl/anhydrous\ AlCl_3 |
|  | B.  C_2H_5Cl + aq.\ KOH |
|  | C.  C_6H_6 + C_6H_5COC/anhydrous\ AlCl_3 |
|  | D.  C_2H_5Cl + C_2H_5ONa |

The atomic numbers of elements X, Y and Z are 19, 21 and 25 respectively. The number of electrons present in the M Shell of these elements follow the order :

|  |
| --- |
|  |
|  | A. Z > X > Y |
|  | B. X > Y > Z |
|  | C. Z > Y > X |
|  | D. Y > Z > X |

Which of the following, Compounds is the reactant in Rosenmund’s reduction ?

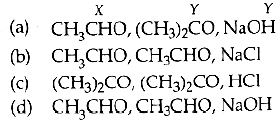
|  |
| --- |
|  |
|  | A.  CH_3CO_2H |
|  | B.  CH_3CHO |
|  | C.  CH_3CH_2Cl |
|  | D.  CH_3COCl |

An electron is moving in Bohr’s fourth orbit. Its de-Broglie wave length is  \lambda. What is the circumference of the fourth orbit ?

|  |
| --- |
|  |
|  | A.  \cfrac{2}{\lambda} |
|  | B.  2\lambda |
|  | C.  4\lambda |
|  | D.  \cfrac{4}{\lambda} |

The half-lives of two radioactive nuclides A and B are 1 and 2 min respectively. Equal weights of A and B are taken separately and allowed to disintegrate for 4 min. What will be the radio of weight of A and B disintegrated ?

|  |
| --- |
|  |
|  | A. 1 : 1 |
|  | B. 5 : 4 |
|  | C. 1 : 2 |
|  | D. 1 : 3 |

3-hydroxybutanal is formed when (X) reacts with (Y) in dilute (Z) solution. What are X,Y and Z ?  
  


|  |
| --- |
|  |
|  | A. ( a) |
|  | B. ( b) |
|  | C. ( c) |
|  | D. ( d) |

Identify the correct order in which the covalent radius of the following elements increases :  
  
(I) Ti  
(II) Ca  
(III) Sc

|  |
| --- |
|  |
|  | A. (I), (II), (III) |
|  | B. (III), (II), (I) |
|  | C. (II), (I), (III) |
|  | D. (I), (III), (II) |

Which of the following is a linear molecule ?

|  |
| --- |
|  |
|  | A.  BeCl_2 |
|  | B.  H_2O |
|  | C.  SO_2 |
|  | D.  CH_4 |

‘Natalite’ is used as :

|  |
| --- |
|  |
|  | A. Anaesthetic |
|  | B. substitute for petrol |
|  | C. insecticide |
|  | D. preservative |

Which of the following is correct ?

|  |
| --- |
|  |
|  | A. The number of electrons present in the valence shell of S in  SF_6 is 12 |
|  | B. The rates of ionic reactions are very slow |
|  | C. According to VSEPR theory,  SnCl_2 is a linear molecule |
|  | D. The correct order of ability to forms ionic compounds among  Na^+,\ Mg^{2+}. and  Al^{3+} is  Al^{3+} > Mg^{2+} > Na^+ |

x grams of calcium carbonate was completely burnt in air. The weight of the solid reside formed is 28 g. What is the value of x (in grams) ?

|  |
| --- |
|  |
|  | A. 44 |
|  | B. 200 |
|  | C. 150 |
|  | D. 50 |

In reaction.  
  
 \underset{(Vapour)}{C_2H_5OH} \overset{Cu}{\underset{300^{^\circ}C}{\longrightarrow}} X   
  
The molecular formula of X is :

|  |
| --- |
|  |
|  | A.  C_4H_6O |
|  | B.  C_4H_{10}O |
|  | C.  C_2H_4O |
|  | D.  C_2H_6 |

A and B are ideal gases. The molecular weights of A and B are in the ratio of 1 : 4. The pressure of a gas mixture containing equal weight of a gas mixture containing equal weight of A and B is P atm. What is the partial pressure (in atm) of B in the mixture ?

|  |
| --- |
|  |
|  | A.  \cfrac{P}{5} |
|  | B.  \cfrac{P}{2} |
|  | C.  \cfrac{P}{2.5} |
|  | D.  \cfrac{3P}{4} |

The vapour pressure of water at  23^{^\circ}C is 19.8 mm. 0.1 mole of glucose is dissolved in 178.2 g of water. What is the vapour pressure (in mm) of the resultant solution?

|  |
| --- |
|  |
|  | A. 19.0 |
|  | B. 19.602 |
|  | C. 19.402 |
|  | D. 19.202 |

Which of the following is not correct ?

|  |
| --- |
|  |
|  | A. Chlorophyll is responsible for all the synthesis of carbohydrates in plants |
|  | B. The compounds formed in the addition of oxygen to hemoglobin is called oxyhaemoglobin |
|  | C. Acetyl salicylic acid is known as aspirin |
|  | D. The metal ion present in vitamin  B_{12} is  Mg^{2+} |

**Assertion (A) :** The pH of a buffer solution containing equal moles of acetic acid and sodium acetate is 4.8 ( pK_a  of acetic acid is 4.8).  
  
**Reason ( R) :** the ionic product of water at  25^{^\circ}C is  10^{-14}\ mol^2.\ L^{-2}.   
  
The correct answer is :

|  |
| --- |
|  |
|  | A. Both (A) and ( R) are true and ( R) is the correct explanation of (A) |
|  | B. Both (A) and ( R) are true and ( R) is not the correct explanation of (A) |
|  | C. (A) is true but ( R) is not true |
|  | D. (A) is not true but ( R) is true |

What is the quantity of electricity (in Coulombs) required to deposit all the silver from 250 mL of 1 M  AgNO_3 solution ?

|  |
| --- |
|  |
|  | A. 2412.5 |
|  | B. 24125 |
|  | C. 4825.0 |
|  | D. 48250 |

Which of the following is not an air pollutant ?

|  |
| --- |
|  |
|  | A.  N_2 |
|  | B.  N_2O |
|  | C.  NO |
|  | D.  CO |

Which of the following is not correct ?

|  |
| --- |
|  |
|  | A. Aqueous solution of  NaCl is an electrolyte |
|  | B. The units of electrochemical equivalent are g- Coulomb |
|  | C. In the Nernst equation, represent the number of electrons transferred in the electrode reaction |
|  | D. Standard reduction potential of hydrogen electrode is zero volt |

Observe the following reaction :  2A + B \longrightarrow C   
  
The rate of information of C is  2.2 \times 10^{-3}\ mol\ L^{-1}\ min^{-1}. What is the value of  -\cfrac{d[A]}{dt} (in  mol\ L^{-1}\ min^{-1} ) ?

|  |
| --- |
|  |
|  | A.  2.2 \times 10^{-3} |
|  | B.  1.1 \times 10^{-3} |
|  | C.  4.4 \times 10^{-3} |
|  | D.  5.5 \times 10^{-3} |

Which of the following compounds is soluble in benzene but almost insoluble in water?

|  |
| --- |
|  |
|  | A.  C_2H_5OH |
|  | B.  CH_3CO_2H |
|  | C.  CH_3CHO |
|  | D.  C_6H_5NO_2 |

At 550 K, the  K_c for the following reaction is  10^4\ mol^{-1}\ L   
  
 X(g) + Y(g) \rightleftharpoons Z(g) At equilibrium, it was observed that :  [X] = \cfrac{1}{2} [Y] = \cfrac{1}{2} [Z].   
  
What is the value of [Z] (in mol  L^{-1} ) at equilibrium ?

|  |
| --- |
|  |
|  | A.  2 \times 10^{-4} |
|  | B.  10^{-4} |
|  | C.  2 \times 10^{4} |
|  | D.  10^{4} |

Which of the following is not correct ?

|  |
| --- |
|  |
|  | A. Dissolution of  NH_4Cl in excess of water is an endothermic process |
|  | B. Nautralisation process is always exothermic |
|  | C. The absolute value of enthalpy (H) can be determined experimentally |
|  | D. The heat of reaction at constant volume is denoted by  \triangle E |

Which of the following is a pair of functional isomers ?

|  |
| --- |
|  |
|  | A.  CH_3COCH_3,\ CH_3CHO |
|  | B.  C_2H_5CO_2H,\ CH_3CO_2CH_3 |
|  | C.  C_2H_5CO_2H,\ CHCO_2C_2H_5 |
|  | D.  CH_3CO_2H,\ CH_3CHO |

The pH of a solution of  H_2O_2 is 6.0. Some chlorine gas is bubbled into this solution. Which of the following is correct ?

|  |
| --- |
|  |
|  | A. The pH of resultant solution becomes 8.0 |
|  | B. Hydrogen gas is liberated from the resultant solution |
|  | C. The pH of resultant solution becomes less than 6.0 and oxygen gas is liberated |
|  | D.  Cl_2O is formed in the resultant solution |

In which of the following reactions, MgO is not formed ?

|  |
| --- |
|  |
|  | A.  Mg + CO_2 \longrightarrow |
|  | B.  Mg + dil.HNO_3 \longrightarrow |
|  | C.  Mg + NO \overset{\triangle}{\longrightarrow} |
|  | D.  Mg + B_2O_3 \longrightarrow |

The compound prepared by a substitutions reaction of benzene is :

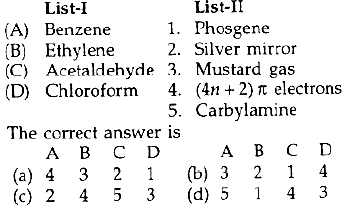
|  |
| --- |
|  |
|  | A. acetophenone |
|  | B. glyoxal |
|  | C. cyclohexane |
|  | D. hexabromo cyclohexane |

Which of the following is not correct ?

|  |
| --- |
|  |
|  | A.  SiO_2 is used as acid flux |
|  | B. The distance between the layers in graphite is  3.35 \times 10^{-3}\ cm |
|  | C.  SiO_2 reacts with  Na_2CO_3 and liberates CO. |
|  | D. The hybridisation of C in graphic is  sp^2 |

Which of the following is not correct ?

|  |
| --- |
|  |
|  | A. Ammonia is used as refrigerant |
|  | B. A mixture of  Ca(CN)_2 and C is known as nitrolim |
|  | C. A mixture of  Ca(H_2PO_4)_2 and  CaSO_4. 2H_2O is known as super phosphate of lime |
|  | D. Hydrolysis of  NCl_3 gives  NH_3 and  HOCl |

Match the following lists :  
  


|  |
| --- |
|  |
|  | A. ( a) |
|  | B. ( b) |
|  | C. ( c) |
|  | D. ( d) |

Which of the following is not correct ?

|  |
| --- |
|  |
|  | A. Iodine oxidises sodium thiosulphate to sodium tetrathionate |
|  | B. Sodium thiousulphate is soluble in water |
|  | C. Ozone is used to identify the presence of unsaturation in alkenes |
|  | D. Sodium thiosulphate reacts with iodine to form sodium sulpahte |

Which one of the following pairs of reactants does not form oxygen when they react with each other ?

|  |
| --- |
|  |
|  | A.  F_2.\ NaOH solution (hot, conc.) |
|  | B.  F_2,\ H_2O |
|  | C.  Cl_2,\ NaOH solution (cold, dilute) |
|  | D.  CaOCl_2,\ H_2SO_4 (dilute, small, amount) |

 \big\{x\ \in\ R : [x - |x| ] = 5\big\} is equal to :

|  |
| --- |
|  |
|  | A. R, the set of all real numbers |
|  | B.  \phi, the empty set |
|  | C.  \big\{x \in\ R : x < 0 \big\} |
|  | D.  \big\{x \in\ R : x \geq 0 \big\} |

The function  f : C \longrightarrow C defined by  f(x) = \cfrac{ax + b}{cx + d} for  x \in\ C where  bd \neq 0 reduces to a constant functions, if :

|  |
| --- |
|  |
|  | A. a = c |
|  | B. b = d |
|  | C. ad = bc |
|  | D. ab = cd |

If n denotes the set of all positives integers and if  f : N \longrightarrow N is defined by f(n) = the sum of positive divisors of n then,  f(2^k. 3), where k is a positives integers, is :

|  |
| --- |
|  |
|  | A.  2^{k + 1} - 1 |
|  | B.  2 (2^{k + 1} - 1) |
|  | C.  3 (2^{k + 1} - 1) |
|  | D.  4 (2^{k + 1} - 1) |

 x = \cfrac{1}{2} \Bigg(\sqrt3 + \cfrac{1}{\sqrt3} \Bigg) then  \cfrac{\sqrt{x^2 - 1}}{x - \sqrt{x^2 - 1}} is equal to :

|  |
| --- |
|  |
|  | A. 1 |
|  | B. 2 |
|  | C. 3 |
|  | D.  \cfrac{1}{2} |

If  a, b, c \neq 0 and belong to the set  \big\{0, 1, 2, 3 ......., 9\big\}, then  
  
 \log_{10} \Bigg(\cfrac{a + 10b + 10^2{}_{c}}{10^{-4}\ a + 10^{-3}\ b + 10^{-2}\ c} \Bigg) is equal to :

|  |
| --- |
|  |
|  | A. 1 |
|  | B. 2 |
|  | C. 3 |
|  | D. 4 |

 \big\{n\ (n+1) (2n+1) : n\ \in\ Z/c 

|  |
| --- |
|  |
|  | A.  \big\{ 6k : k\ \in\ Z\big\} |
|  | B.  \big\{12k : k\ \in\ Z\big\} |
|  | C.  \big\{18k : k\ \in\ Z\big\} |
|  | D.  \big\{24k : k\ \in\ Z\big\} |

A three digit number n is such that the last two digits of it are equal and differ from the first. the number of such n’s is :

|  |
| --- |
|  |
|  | A. 64 |
|  | B. 72 |
|  | C. 81 |
|  | D. 900 |

If  (1 + x)^{15} = a_0 + a_1x + ... + a_{15}x^{15}, then  \overset{15}{\underset{r = 1}{\sum}}\ r\cfrac{a_r}{a_r-1} is equal to :

|  |
| --- |
|  |
|  | A. 110 |
|  | B. 115 |
|  | C. 120 |
|  | D. 135 |

The coefficient of  x^3y^4z^5 in the expansion of  (xy + yz + xz)^6 is :

|  |
| --- |
|  |
|  | A. 70 |
|  | B. 60 |
|  | C. 50 |
|  | D. None of these |

If  |x| < \cfrac{1}{2}, then the coefficient of  x^r in the expansion of  \cfrac{1+2x}{(1-2x)^2} is :

|  |
| --- |
|  |
|  | A.  r2^r |
|  | B.  (2r-1)2^r |
|  | C.  r2^{2r+1} |
|  | D.  (2r+1)2^r |

If  \cfrac{x^3}{(2x-1)(x+2)(x-3)} =  A + \cfrac{B}{2x-1} + \cfrac{C}{x+2} + \cfrac{D}{x-3} then A is equal to :

|  |
| --- |
|  |
|  | A.  \cfrac{1}{2} |
|  | B.  -\cfrac{1}{50} |
|  | C.  -\cfrac{8}{25} |
|  | D.  \cfrac{27}{25} |

 \overset{\infty}{\underset{n=1}{\sum}}\ \cfrac{2n^2 + n + 1}{n!} is equal to :

|  |
| --- |
|  |
|  | A. 2e – 1 |
|  | B. 2e + 1 |
|  | C. 6e – 1 |
|  | D. 6e + 1 |

If  |a| < 1,\ b = \overset{\infty}{\underset{k=1}{\sum}}\ \cfrac{a^k}{k} then a is equal to :

|  |
| --- |
|  |
|  | A.  \overset{\infty}{\underset{k=1}{\sum}}\ \cfrac{(-1)^k\ b^k}{k} |
|  | B.  \overset{\infty}{\underset{k=1}{\sum}}\ \cfrac{(-1)^{k-1}\ b^k}{k!} |
|  | C.  \overset{\infty}{\underset{k=1}{\sum}}\ \cfrac{(-1)^k\ b^k}{(k-1)!} |
|  | D.  \overset{\infty}{\underset{k=1}{\sum}}\ \cfrac{(-1)^{k-1}\ b^k}{(k+1)!} |

If x is real, then the minimum value of  \cfrac{x^2-x+1}{x^2+x+1}, is :

|  |
| --- |
|  |
|  | A.  \cfrac{1}{3} |
|  | B. 3 |
|  | C.  \cfrac{1}{2} |
|  | D. 1 |

 E_1 : a+b+c = 0, if is a root of  ax^2 + bx + c = 0   
  
 E_2 : b^2 - a^2 = 2ac, if  \sin \theta, \cos \theta are the roots of  ax^2 + bx + c = 0   
  
Which of the following is true ?

|  |
| --- |
|  |
|  | A.  E_1 is true,  E_2 is true |
|  | B.  E_1 is true,  E_2 is false |
|  | C.  E_1 is false,  E_2 is true |
|  | D.  E_1 is false,  E_2 is false |

The roots of the equation  x^3 - 3x - 2 = 0 are :

|  |
| --- |
|  |
|  | A. -1, -1, 2 |
|  | B. -1, 1, -2 |
|  | C. -1, 2, -3 |
|  | D. -1, -1, -2 |

If  \alpha, \beta, \gamma are the roots of  x^3 + 2x^2 - 3x - 1 = 0, then  \alpha^{-2} + \beta^{-2} + \gamma^{-2} = 

|  |
| --- |
|  |
|  | A. 12 |
|  | B. 13 |
|  | C. 14 |
|  | D. 15 |

If  m[-3\ \ 4] + n[4\ \ -3] = [10\ \ -11] then 3m + 7n is equal to :

|  |
| --- |
|  |
|  | A. 3 |
|  | B. 5 |
|  | C. 10 |
|  | D. 1 |

 adj \Bigg[\overset{1}{\underset{0}{-1}}\ \overset{0}{\underset{1}{2}}\ \overset{2}{\underset{1}{-2}} \Bigg] =  \Bigg[\overset{5}{\underset{-2}{1}}\ \overset{a}{\underset{-2}{1}}\ \overset{-2}{\underset{b}{0}} \Bigg] then  [a\ \ b] is equal to :

|  |
| --- |
|  |
|  | A.  \big[-4\ \ 1\big] |
|  | B.  \big[-4\ \ -1\big] |
|  | C.  \big[4\ \ 1\big] |
|  | D.  \big[4\ \ -1\big] |

If  A = \big[{}^{-1}_0\ {}^0_2 \big] then  A^3 - A^2 is equal to :

|  |
| --- |
|  |
|  | A. 2A |
|  | B. 2i |
|  | C. A |
|  | D. i |

If  \alpha_1, \alpha_2, \alpha_3 respectively denote the moduli of the complex number  -i, \cfrac{1}{3}(1 + i) and  -1 + i, then their increasing order is :

|  |
| --- |
|  |
|  | A.  \alpha_1, \alpha_2, \alpha_3 |
|  | B.  \alpha_3, \alpha_2, \alpha_1 |
|  | C.  \alpha_2, \alpha_1, \alpha_3 |
|  | D.  \alpha_3, \alpha_1, \alpha_2 |

If  \alpha is non-real roots of  x^6 = 1, then  \cfrac{\alpha^5 + \alpha^3 + \alpha + 1}{\alpha^2 + 1} is equal to :

|  |
| --- |
|  |
|  | A.  \alpha^2 |
|  | B. 0 |
|  | C.  -\alpha^2 |
|  | D.  \alpha |

If  \cos \theta - 4 \sin \theta = 1 then  \sin \theta + 4 \cos \theta is equal to :

|  |
| --- |
|  |
|  | A.  \pm 1 |
|  | B. 0 |
|  | C.  \pm 2 |
|  | D.  \pm 4 |

The extreme values of  4\cos (x^2) \cos \Bigg(\cfrac{x}{3} + x^2 \Bigg) \cos \Bigg(\cfrac{\pi}{3} - x^2 \Bigg) over R, are :

|  |
| --- |
|  |
|  | A. -1, 1 |
|  | B. -2, 2 |
|  | C. -3, 3 |
|  | D. -4, 4 |

If  \cfrac{\tan\ 3A}{\tan A} = a then  \cfrac{\sin\ 3A}{\sin A} is equal to :

|  |
| --- |
|  |
|  | A.  \cfrac{2a}{a+1} |
|  | B.  \cfrac{2a}{a-1} |
|  | C.  \cfrac{a}{a+1} |
|  | D.  \cfrac{a}{a-1} |

If A + C = 2B then  \cfrac{\cos C - \cos A}{\sin A-\sin C} is equal to :

|  |
| --- |
|  |
|  | A. cot B |
|  | B. cot 2B |
|  | C. tan 2B |
|  | D. tan B |

 A + B = C \Longrightarrow \cos^2 A + \cos^2 B + \cos^2 C - 2 \cos A\ \cos B\ \cos C is equal to :

|  |
| --- |
|  |
|  | A. 1 |
|  | B. 2 |
|  | C. 0 |
|  | D. 3 |

If  \cos 2x = (\sqrt2 + 1) \Bigg(\cos x - \cfrac{1}{\sqrt2} \Bigg), \cos x \neq \cfrac{1}{2} then  x\ \in : 

|  |
| --- |
|  |
|  | A.  \Bigg\{2n\pi \pm \cfrac{\pi}{3} : n \in Z \Bigg\} |
|  | B.  \Bigg\{2n\pi \pm \cfrac{\pi}{6} : n \in Z \Bigg\} |
|  | C.  \Bigg\{2n\pi \pm \cfrac{\pi}{2} : n \in Z \Bigg\} |
|  | D.  \Bigg\{2n\pi \pm \cfrac{\pi}{4} : n \in Z \Bigg\} |

 \sin^{-1} \cfrac{4}{5} + 2 \tan^{-1} \cfrac{1}{3} is equal to :

|  |
| --- |
|  |
|  | A.  \cfrac{\pi}{3} |
|  | B.  \cfrac{\pi}{4} |
|  | C.  \cfrac{\pi}{2} |
|  | D. 0 |

 2 \tan h^{-1} \cfrac{1}{2} is equal to :

|  |
| --- |
|  |
|  | A. 0 |
|  | B.  \log 2 |
|  | C.  \log 3 |
|  | D.  \log 4 |

In a  \triangle ABC, a (\cos^2 B + \cos^2 C) + \cos A\ (c \cos C + b \cos B) is equal to :

|  |
| --- |
|  |
|  | A. a |
|  | B. b |
|  | C. c |
|  | D. a+b+c |

In a  \triangle ABC, \sum (b+c) \tan \cfrac{A}{2} \tan \Bigg(\cfrac{B-C}{2} \Bigg) is equal to :

|  |
| --- |
|  |
|  | A. a |
|  | B. b |
|  | C. c |
|  | D. 0 |

Two side of a triangle are given by the equation  x^2 - 5x + 6 = 0 and the angle between the sides is  \cfrac{\pi}{3}. Then the perimeter of the triangle is :

|  |
| --- |
|  |
|  | A.  5 + \sqrt2 |
|  | B.  5 + \sqrt3 |
|  | C.  5 + \sqrt5 |
|  | D.  5 + \sqrt7 |

A tower, of x metres high, has a flagstaff at its top. The tower and the flagstaff subtend equal angles at a point distant y metres from the foot of the tower. Then the length of the flagstaff (in metres), is :

|  |
| --- |
|  |
|  | A.  \cfrac{y(x^2-y^2)}{(x^2+y^2)} |
|  | B.  \cfrac{x(y^2+x^2)}{(y^2-x^2)} |
|  | C.  \cfrac{x(x^2+y^2)}{(x^2-y^2)} |
|  | D.  \cfrac{x(x^2-y^2)}{(x^2+y^2)} |

If the vector  \overset{\rightarrow}{a} = 2\hat{i} + 3\hat{j} + 6\hat{k} and  \overset{\rightarrow}{b} are collinear and  |\overset{\rightarrow}{b}| = 21, then  \overset{\rightarrow}{b} is equal to :

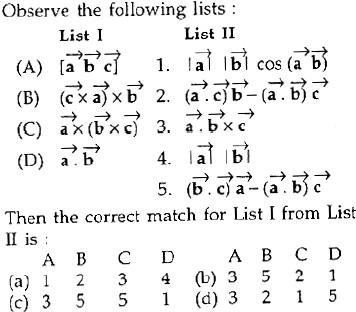
|  |
| --- |
|  |
|  | A.  \pm\ ( 2\hat{i} + 3\hat{j} + 6\hat{k} ) |
|  | B.  \pm\ 3\ (2\hat{i} + 3\hat{j} + 6\hat{k}) |
|  | C.  (\hat{i} + \hat{j} + \hat{k}) |
|  | D.  \pm\ 21\ (2\ \hat{i} + 3\ \hat{j} + 6\ \hat{k}) |

If  \overset{\rightarrow}{a} and  \overset{\rightarrow}{b} are unit vectors, then the victors  (\overset{\rightarrow}{a} + \overset{\rightarrow}{b}) \times (\overset{\rightarrow}{a} \times \overset{\rightarrow}{b}) is parallel to the vector:

|  |
| --- |
|  |
|  | A.  \overset{\rightarrow}{a} - \overset{\rightarrow}{b} |
|  | B.  \overset{\rightarrow}{a} + \overset{\rightarrow}{b} |
|  | C.  \overset{\rightarrow}{2a} - \overset{\rightarrow}{b} |
|  | D.  \overset{\rightarrow}{2a} + \overset{\rightarrow}{b} |

**I :** Two non-zero, non-collinear vectors are linearly independent.  
  
**II :** Any three coplanar vectors are linearly dependent.  
  
Which of the above statement is/are true ?

|  |
| --- |
|  |
|  | A. Only I |
|  | B. Only II |
|  | C. Both I and II |
|  | D, Neither I nor II |



|  |
| --- |
|  |
|  | A. ( a) |
|  | B. ( b) |
|  | C. ( c) |
|  | D. ( d) |

Observe the following statements :  
  
**A :** Three vectors are coplanar if one of them is expressible as a linear combination of the other two.  
  
**R :** Any three coplanar vectors are linearly dependent.   
  
Then which of the following is true ?

|  |
| --- |
|  |
|  | A. Both A and R are true and R is correct explanation of A |
|  | B. Both A and R are true but R is not correct explanation of A |
|  | C. A is true, but R is false |
|  | D. A is false, but R is true |

A coin and six faced die, both unbiassed, are thrown simultaneously. The probability of getting a head on the coin and the odd number on the die, is :

|  |
| --- |
|  |
|  | A.  \cfrac{1}{2} |
|  | B.  \cfrac{3}{4} |
|  | C.  \cfrac{1}{4} |
|  | D.  \cfrac{2}{3} |

A number n is chosen at random from  
  
 S = \big\{1, 2, 3, ...., 50\big\}. Let  
  
 A = \bigg\{n \in S : n + \cfrac{50}{n} > 27 \bigg\},\ B = \big\{n \in S : n\ is\ a\ prime \big\} and  C = \big\{n \in S : n\ is\ a\ square \big\}. Then correct order of their probabilities is :

|  |
| --- |
|  |
|  | A. P (A) < P (B) < P ( C) |
|  | B. P (A) > P (B) > P ( C) |
|  | C. P (B) < P (A) < P ( C) |
|  | D. P (A) > P ( C) > P (B) |

Box A contains 2 black and 3 red balls, while Box B contains 3 black and 4 red balls. Out of these two boxes one is selected at random ; and the probability of choosing Box A is double that of Box B. If a red ball is drawn from the selected box, then the probability that it has come from Box B, is

|  |
| --- |
|  |
|  | A.  \cfrac{21}{41} |
|  | B.  \cfrac{10}{31} |
|  | C.  \cfrac{12}{31} |
|  | D.  \cfrac{13}{41} |

If the range of a random variable X is  \big\{0, 1, 2, 3, 4, ........ \big\} with  P (X = k) = \cfrac{(k+1)a}{3^k} for  k \geq 0, then a is equal to :

|  |
| --- |
|  |
|  | A.  \cfrac{2}{3} |
|  | B.  \cfrac{4}{9} |
|  | C.  \cfrac{8}{27} |
|  | D.  \cfrac{16}{81} |

For a binomial variate X with n = 6, if P(X = 2) = 9 P(X = 4), then its variance is :

|  |
| --- |
|  |
|  | A.  \cfrac{8}{9} |
|  | B.  \cfrac{1}{4} |
|  | C.  \cfrac{9}{8} |
|  | D. 4 |

If the point P moves such that its distances from the point A (1, 1) and the line x + y + 2 = 0 are equal, then the locus of P is :

|  |
| --- |
|  |
|  | A. a straight line |
|  | B. a pair of straight lines |
|  | C. a parabola |
|  | D. an ellipse |

The area (in square units) of the triangle formed by the lines x = 0, y = 0 and 3x + 4y = 12, is :

|  |
| --- |
|  |
|  | A. 3 |
|  | B. 4 |
|  | C. 6 |
|  | D. 12 |

If PM is the perpendicular from P (2, 3) onto the line x + y = 3, then the co-coordinates of M are :

|  |
| --- |
|  |
|  | A. (2, 1) |
|  | B. (-1, 4) |
|  | C. (1, 2) |
|  | D. (4, -1) |

The equation of the straight line perpendicular to  5x - 2y = 7 and passing through the point of intersection of the lines  2x + 3y = 1 and  3x + 4y = 6, is :

|  |
| --- |
|  |
|  | A.  2x + 5y + 17 = 0 |
|  | B.  2x + 5y - 17 = 0 |
|  | C.  2x - 5y + 17 = 0 |
|  | D.  2x - 5y = 17 |

The area of the triangle formed by the pair of straight lines  
  
 (ax + by)^2 - 3 (bx - ay)^2 = 0 and  ax + by + c = 0, is :

|  |
| --- |
|  |
|  | A.  \cfrac{c^2}{a^2+b^2} |
|  | B.  \cfrac{c^2}{2(a^2+b^2)} |
|  | C.  \cfrac{c^2}{\sqrt2(a^2+b^2)} |
|  | D.  \cfrac{c^2}{\sqrt3(a^2+b^2)} |

The product of the perpendicular distances from the origin on the pair of straight lines  12x^2 + 25xy + 12y^2 + 10x + 11y + 2 = 0, is :

|  |
| --- |
|  |
|  | A.  \cfrac{1}{25} |
|  | B.  \cfrac{2}{25} |
|  | C.  \cfrac{3}{25} |
|  | D.  \cfrac{4}{25} |

The direction cosines of the line passing through P (2, 3, -1) and the origin are :

|  |
| --- |
|  |
|  | A.  \cfrac{2}{\sqrt{14}}, \cfrac{3}{\sqrt{14}}, \cfrac{1}{\sqrt{14}} |
|  | B.  \cfrac{2}{\sqrt{14}}, \cfrac{-3}{\sqrt{14}}, \cfrac{1}{\sqrt{14}} |
|  | C.  \cfrac{-2}{\sqrt{14}}, \cfrac{-3}{\sqrt{14}}, \cfrac{1}{\sqrt{14}} |
|  | D.  \cfrac{2}{\sqrt{14}}, \cfrac{-3}{\sqrt{14}}, \cfrac{-1}{\sqrt{14}} |

The point collinear with (1, -2, -3) and (2, 0, 0) among the following is :

|  |
| --- |
|  |
|  | A. (0, 4, 6) |
|  | B. (0, -4, -5) |
|  | C. (0, -4, -6) |
|  | D. (0, -4, 6) |

The equation of the circle whose diameter is the common chord of the circles  
  
 x^2 + y^2 + 2x + 3y + 2 = 0 and  x^2 + y^2 + 2x - 3y - 4 = 0 is :

|  |
| --- |
|  |
|  | A.  x^2 + y^2 + 2x + 2y + 2 = 0 |
|  | B.  x^2 + y^2 + 2x + 2y - 1 = 0 |
|  | C.  x^2 + y^2 + 2x + 2y + 1 = 0 |
|  | D.  x^2 + y^2 + 2x + 2y + 3 = 0 |

If  x - y + 1 = 0 meets the circle  x^2 + y^2 + y - 1 = 0 at A and B, then the equation of the circle with AB as diameter is :

|  |
| --- |
|  |
|  | A.  2(x^2 + y^2) + 3x - y + 1 = 0 |
|  | B.  2(x^2 + y^2) + 3x - y + 2 = 0 |
|  | C.  2(x^2 + y^2) + 3x - y + 3 = 0 |
|  | D.  x^2 + y^2 + 3x - y + 1 = 0 |

If y = 3x is a tangent to a circle with centre (1, 1), then the other tangent drawn through (0, 0) to the circle is :

|  |
| --- |
|  |
|  | A. 3y = x |
|  | B. y = -3x |
|  | C. y = 2x |
|  | D. y = -2x |

The parabola with directrix  x + 2y - 1 = 0 and focus (1, 0) is :

|  |
| --- |
|  |
|  | A.  4x^2 - 4xy + y^2 - 8x + 4y + 4 = 0 |
|  | B.  4x^2 + 4xy + y^2 - 8x + 4y + 4 = 0 |
|  | C.  4x^2 + 5xy + y^2 + 8x - 4y + 4 = 0 |
|  | D.  4x^2 - 4xy + y^2 - 8x - 4y + 4 = 0 |

The line among the following which touches the parabola  y^2 = 4ax, is :

|  |
| --- |
|  |
|  | A.  x + my + am^3 = 0 |
|  | B.  x - my + am^2 = 0 |
|  | C.  x + my - am^2 = 0 |
|  | D.  y + mx + am^2 = 0 |

The cartesian form of the polar equation  \theta = \tan^{-1} 2 is :

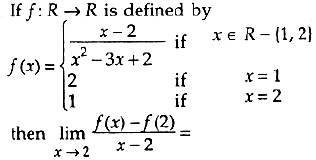
|  |
| --- |
|  |
|  | A. x = 2y |
|  | B. y = 2x |
|  | C. x = 4y |
|  | D. y = 4x |

Which of the following equations gives a circle ?

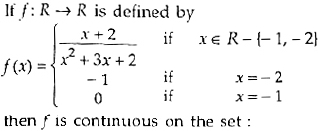
|  |
| --- |
|  |
|  | A.  r = 2 \sin \theta |
|  | B.  r^2 \cos 2\theta = 1 |
|  | C.  r (4 \cos \theta + 5 \sin \theta) = 3 |
|  | D.  5 = r (1 + \sqrt2 \cos \theta) |

 \underset{x \rightarrow 0}{\lim}\ x^2 \sin \cfrac{\pi}{x} is equal to :

|  |
| --- |
|  |
|  | A. 1 |
|  | B. 0 |
|  | C. does not exist |
|  | D.  \infty |



|  |
| --- |
|  |
|  | A. 0 |
|  | B. -1 |
|  | C. 1 |
|  | D.  -\cfrac{1}{2} |



|  |
| --- |
|  |
|  | A. R |
|  | B. R – [-2] |
|  | C. R – [-1] |
|  | D. R – [-1, -2] |

If  f : R \rightarrow R is an even function which is twice differentiable on R and  f'' (\pi) = 1, then  f'' (-\pi) is equal to :

|  |
| --- |
|  |
|  | A. -1 |
|  | B. 0 |
|  | C. 1 |
|  | D. 2 |

Observe the following statements :  
  
**I.**  f (x) = ax^{41} + bx^{-40} \Rightarrow \cfrac{f''(x)}{f (x)} = 1640 x^{-2}   
  
**II.**  \cfrac{d}{dx} \tan^{-1} \Bigg(\cfrac{2x}{1-x^2} \Bigg) = \cfrac{1}{1+x^2}   
  
Which of the following is correct ?

|  |
| --- |
|  |
|  | A. I is true, but II is false |
|  | B. Both I and II are true |
|  | C. Neither I nor II is true |
|  | D. I is false, but II is true |

If  f (x) = 10 \cos x + (13 + 2x) \sin x then  f'' (x) + f(x) is equal to :

|  |
| --- |
|  |
|  | A.  \cos x |
|  | B.  4\cos x |
|  | C.  \sin x |
|  | D.  4\sin x |

If  x \sqrt{1+y} + y \sqrt{1+x} = 0 then  \cfrac{dy}{dx} is equal to :

|  |
| --- |
|  |
|  | A.  \cfrac{1}{(1+x)^2} |
|  | B.  -\cfrac{1}{(1+x)^2} |
|  | C.  \cfrac{1}{1+x^2} |
|  | D.  -\cfrac{1}{1+x^2} |

A stone thrown upwards, has its equations of motion  s = 490t - 4.9t^2 Then the maximum height reached by it, is :

|  |
| --- |
|  |
|  | A. 24500 |
|  | B. 12500 |
|  | C. 12250 |
|  | D. 25400 |

The radius of a circular plate is increasing at the rate of 0.01 cm/sec when the radius is 12 cm. Then at the rate at which the area increase, is :

|  |
| --- |
|  |
|  | A.  0.24\ \pi\ sq.\ cm/sec |
|  | B.  60\ \pi\ sq.\ cm/sec |
|  | C.  24\ \pi\ sq.\ cm/sec |
|  | D.  1.2\ \pi\ sq.\ cm/sec |

Observe the following statements :  
  
 A : f(x) = 2x^3 - 9x^2 + 12x - 3 is increasing outside the interval (1, 2)  
  
 R : f' (x) < 0 for  x \in (1,\ 2).   
  
Then which of the following is true ?

|  |
| --- |
|  |
|  | A. Both A and R are true, and R is not the correct reason for A |
|  | B. Both A and R are true, and R is the correct reason for A |
|  | C. A is true, but R is false |
|  | D. A is false, but R is true |

If  u = \sin^{-1}\Bigg(\cfrac{x}{y}\Bigg) + \tan^{-1}\Bigg(\cfrac{y}{x}\Bigg), then the value of  x\cfrac{\delta u}{\delta x} + y\cfrac{\delta u}{\delta y} is :

|  |
| --- |
|  |
|  | A. 0 |
|  | B. 1 |
|  | C. 2 |
|  | D. None of these |

If  \int \cfrac{\sin x}{\cos x (1 + \cos x)}\ dx = f(x) + c then f (x)is equal to :

|  |
| --- |
|  |
|  | A.  \log \Bigg|\ \cfrac{1+\cos x}{\cos x}\ \Bigg| |
|  | B.  \log \Bigg|\ \cfrac{\cos x}{1+\cos x}\ \Bigg| |
|  | C.  \log \Bigg|\ \cfrac{\sin x}{1+\sin x}\ \Bigg| |
|  | D.  \log \Bigg|\ \cfrac{1+\sin x}{\sin x}\ \Bigg| |

 \int \cfrac{x^{49}\ \tan^{-1}\ (x^{50})}{(1 + x^{100})}\ d\ x = k (\tan^{-1} (x^{50}))^2 + c then k is equal to :

|  |
| --- |
|  |
|  | A.  \cfrac{1}{50} |
|  | B.  -\cfrac{1}{50} |
|  | C.  \cfrac{1}{100} |
|  | D.  -\cfrac{1}{100} |

 \overset{\pi/2}{\underset{0}{\int}}\ \cfrac{200\ \sin x + 100 \cos x}{\sin x + \cos x}\ dx is equal to :

|  |
| --- |
|  |
|  | A.  50\ \pi |
|  | B.  25\ \pi |
|  | C.  75\ \pi |
|  | D.  150\ \pi |

 \overset{\pi}{\underset{0}{\int}}\ \cfrac{\theta \sin \theta}{1 + \cos^2 \theta}\ d\ \theta is equal to :

|  |
| --- |
|  |
|  | A.  \cfrac{\pi^2}{2} |
|  | B.  \cfrac{\pi^3}{3} |
|  | C.  \pi^2 |
|  | D.  \cfrac{\pi^2}{4} |

If  \int \sin^{-1} \Bigg(\cfrac{2x}{1+x^2} \Bigg) d\ x = f (x) - \log (1+x^2) + c then f(x) is equal to :

|  |
| --- |
|  |
|  | A.  2x \tan^{-1}\ x |
|  | B.  -2x \tan^{-1}\ x |
|  | C.  x \tan^{-1}\ x |
|  | D.  -x \tan^{-1}\ x |

The area (in square units) bounded by the curves  y^2 = 4x and  x^2 = 4y in the plane is :

|  |
| --- |
|  |
|  | A.  \cfrac{8}{3} |
|  | B.  \cfrac{16}{3} |
|  | C.  \cfrac{32}{3} |
|  | D.  \cfrac{64}{3} |

If  dx + dy = (x+y)(dx-dy) then  \log(x+y) is equal to :

|  |
| --- |
|  |
|  | A.  x + y + c |
|  | B.  x + 2y + c |
|  | C.  x - y + c |
|  | D.  2x + y + c |

If  x^2y - x^3 \cfrac{dy}{dx} = y^4\ \cos x then  x^3\ y is equal to :

|  |
| --- |
|  |
|  | A.  \sin x |
|  | B.  2\ \sin\ x + c |
|  | C.  -3\ \sin\ x + c |
|  | D.  3\ \cos\ x + c |

Observe the following statements :  
  
**I.** If  dy + 2xy\ dx = 2e^{-x^{2}}\ dx then  ye^{x^2} = 2x + c   
  
**II.** If  ye^{-x^2}\ -2x = c then  dx = (2e^{-x^2}\ -2xy)dy   
  
Which of the following is a correct statement ?

|  |
| --- |
|  |
|  | A. Both I and II are true |
|  | B. Neither I nor II is true |
|  | C. I is true, II is false |
|  | D. I is false, II is true |

 \cfrac{dy}{dx} = \cfrac{y + x \tan\ \cfrac{y}{x}}{x} then  \sin\ \cfrac{y}{x} is equal to :

|  |
| --- |
|  |
|  | A.  cx^2 |
|  | B.  cx |
|  | C.  cx^3 |
|  | D.  cx^4 |