**Eamcet 2004 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.

The Position of a particle at time t is given by the equation  x(t) = \cfrac{vo}{A}\ (1-e^{At})   
 vo = constant and  A > 0   
Dimension of  vo and A respectively are :

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| --- |
|  |
|  | A.  \big[M^oLT^oJ \big] and  \big[M^oL^oT^{-1} \big] |
|  | B.  \big[M^oLT^{-1} \big] and   \big[M^oLT^{-2} \big] |
|  | C.  \big[M^oLT^{-1} \big] and  \big[M^oL^oT \big] |
|  | D.  \big[M^oLT^{-1} \big] and  \big[M^oL^oT^{-1} \big] |

At a given instant of time two particles are having the position vectors  4\ \hat{i} + 4\ \hat{j} + 57\ \hat{k} meters and  2\ \hat{i} + 2\ \hat{j} + 5\ \hat{k} respectively. If the velocity of the first particles be  0.4\ \hat{i}\ ms^{-1}, the velocity of the second particles in metre per second if they collide after 10 sec is :

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|  |
|  | A.  6 \Bigg(\hat{i} - \hat{j} + \cfrac{1}{3}\ \hat{k} \Bigg) |
|  | B.  0.6 \Bigg(\hat{i} - \hat{j} + \cfrac{1}{3}\ \hat{k} \Bigg) |
|  | C.  6 \Bigg(\hat{i} + \hat{j} + \cfrac{1}{3}\ \hat{k} \Bigg) |
|  | D.  0.6 \Bigg(\hat{i} + \hat{j} - \cfrac{1}{3}\ \hat{k} \Bigg) |

The horizontal and vertical displacements x and y of a projectile at a given time t are given by  x = 6\ t metre and  y = 8\ t - 5t^2 metre. The range of the projectile in metre is :

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|  |
|  | A. 9.6 |
|  | B. 10.6 |
|  | C. 19.2 |
|  | D. 38.4 |

A 2 kg ball moving at  24\ ms^{-1} undergoes inelastic head-on collision with a 4 kg ball moving in the opposite direction at  48\ ms^{-1}. If the coefficient of restitution is 2/3 their velocities in  ms^{-1} after impact are :

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|  |
|  | A. -56, -8 |
|  | B. -28, -4 |
|  | C. -14, -2 |
|  | D. -7, -1 |

A block of mass 2 kg is initially at rest on a horizontal force  \overset{\rightarrow}{F} = (9 - x^2)\ \hat{i} newtons acts on it, when the block is at x = 0. The maximum kinetic energy of the block between x = 0 and x = 3m in joule is :

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|  |
|  | A. 24 |
|  | B. 20 |
|  | C. 18 |
|  | D. 15 |

Two particles of equal mass have velocities  \overset{\rightarrow}{V_1} = 4\ \hat{i} and  \overset{\rightarrow}{V_2} = 4\ \hat{j}\ ms^{-1}. First particle has an acceleration  \overset{\rightarrow}{a_1} = (5\hat{i} + 5\hat{j})\ ms^{-2} while the acceleration of the other particles moves in a path of :

|  |
| --- |
|  |
|  | A. Straight line |
|  | B. Parabola |
|  | C. Circle |
|  | D. Ellipse |

Consider the following statement A and B and identify the correct answer:  
  
**A :** When a person walks on a rough surface the direction of frictional force exerted by the surface on the person is opposite to the direction of his motion.  
  
**B :** When a cycle is in motion, the force of friction exerted by the ground on the front wheel is in the backward direction :

|  |
| --- |
|  |
|  | A. A and B are correct |
|  | B. A is correct, B is wrong |
|  | C. A and B are wrong |
|  | D. A is wrong, B is correct |

A thin uniform square lamina of side a is placed in the xy-plane with its sides parallel to x and y-axes and with its centre coinciding with origin. Its moment of inertia about an axis passing through a point on the y-axis at a distance at a distance y = 2a and parallel to x-axis is equal to its moment of inertia about an axis passing through a point on the x-axis at a distance x = d and perpendicular to xy-plane. Then value of d is :

|  |
| --- |
|  |
|  | A.  \cfrac{7}{3}\ a |
|  | B.  \cfrac{\sqrt{47}}{12}\ a |
|  | C.  \cfrac{9}{5}\ a |
|  | D.  \cfrac{\sqrt{51}}{12}\ a |

A particle of mass 1 kg is projected with an initial velocity  10\ ms^{-1} at an angle of projection  45^{^\circ} with the horizontal. The average torque acting on the projectile, between the time at which it is projected and the time at which it strike the ground, about the point of projection in newton-metre is:

|  |
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|  |
|  | A. 25 |
|  | B. 50 |
|  | C. 75 |
|  | D. 100 |

The escape velocity of a body on the earth’s surface is  v_{e.} A body is thrown up with a speed  \sqrt5\ v_e. Assuming that the sun and planets do not influence the motion of the body, velocity of the body at infinite distance, is :

|  |
| --- |
|  |
|  | A. 0 |
|  | B.  v_c |
|  | C.  \sqrt2\ v_e |
|  | D.  2\ v_e |

The time period of a simple pendulum is T. When the length is increased by 10 cm, its period is  T_1. When the length is decreased by 10 cm, its period is  T_2. Then, relation between  T,\ T_1\ and\ T_2 is :

|  |
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|  |
|  | A.  \cfrac{2}{T^2} = \cfrac{1}{T^2} + \cfrac{1}{T^2} |
|  | B.  \cfrac{2}{T^2} = \cfrac{1}{T^2} - \cfrac{1}{T^2} |
|  | C.  2T^2 = T^2_1 + T^2_2 |
|  | D.  2T^2 = T^2_1 - T^2_2 |

A metallic ring of radius r and cross sectional area A is fitted into a wooden circular disc of radius R (R > r). If the Young’s modulus of the material of the ring is Y, the force with which the metal ring expands is :

|  |
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|  |
|  | A.  \cfrac{AYR}{r} |
|  | B.  \cfrac{AY\ (R-r)}{r} |
|  | C.  \cfrac{Y\ (R-r)}{Ar} |
|  | D.  \cfrac{YR}{AR} |

One end of a uniform glass capillary tube of radius r = 0.025 cm is immersed vertically in water to a depth h = 1 cm. The excess pressure in  N/m^2 required to blow an air bubble out of the tube :  
  
(Surface tension of water =  7 \times 10^{-2}N/m Density of water =  10^3\ kg/m^3 Acceleration due to gravity =  7 \times 10\ m/s^2 )

|  |
| --- |
|  |
|  | A.  0.0048 \times 10^5 |
|  | B.  0.0066 \times 10^5 |
|  | C.  1.0048 \times 10^5 |
|  | D.  1.0066 \times 10^5 |

Water in a river 20 m deep is flowing at a speed of  10\ ms^{-1}. The Shearing stress between the horizontal layers of water in the river in  Nm^{-2} is : (Coefficient of viscosity of water =  10^{-3} SI units )

|  |
| --- |
|  |
|  | A.  1 \times 10^{-2} |
|  | B.  0.5 \times 10^{-2} |
|  | C.  1 \times 10^{-3} |
|  | D.  0.5 \times 10^{-3} |

There are two holes one each along the opposite sides of a wide rectangular tank. The cross-section of each holes is one metre. The tank is filled with water. The net force on the tank in newton when the water flows out of the holes is :  
  
(Density of water  = 1000\ kg/m^3 )

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| --- |
|  |
|  | A. 100 |
|  | B. 200 |
|  | C. 300 |
|  | D. 400 |

A metallic solid sphere is rotating about its diameter as axis of rotation about its temperature is increased by  200^{^\circ}C, the percentage increase in its moment of inertia is : (Coefficient of linear expansion of the metal =  10^{-5/^\circ C} )

|  |
| --- |
|  |
|  | A. 0.1% |
|  | B. 0.2% |
|  | C. 0.3% |
|  | D. 0.4% |

Two identical vessels A and B with frictional pistons contain the same ideal gas at the same temperature and the same volume V. The masses of gas in A and B and  m_A and  m_B respectively. The gases are allowed to expand isothermally to the same final allowed to expand isothermally to the same final volume 2V. The change in pressure of the gas in A and B are found to be  \triangle P and  1.5\ \triangle P respectively. Then:

|  |
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|  |
|  | A.  9m_A = 4m_B |
|  | B.  3m_A = 2m_B |
|  | C.  2m_A = 3m_B |
|  | D.  4m_A = 9m_B |

The pressure and density of a given mass of a diatomic gas  \Bigg(y = \cfrac{7}{5} \Bigg) change adiabatically from (P,d). If  \cfrac{d'}{d} = 32, then  \cfrac{P'}{P} is : (Y = ratio of specific heats )

|  |
| --- |
|  |
|  | A. 1/128 |
|  | B. 1/64 |
|  | C. 64 |
|  | D. 128 |

If 4 moles of an ideal monoatomic gas at temperature 400 K is mixed with 2 moles temperature 700 K, the temperature of the mixture is :

|  |
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|  |
|  | A.  550^{^\circ}C |
|  | B.  500^{^\circ}C |
|  | C.  550\ K |
|  | D.  500\ K |

A black body of mass 34.38 g and surface area  19.2\ cm^2 is at an initial temperature of 400 K. It is allowed to cool inside an evacuated enclosure kept at constant temperature 300 K. the rate of cooling is  0.04^{^\circ}C per second. The specific heat of the body in  J\ kg^{-1}K^{-1} is:  
(Stefan’s constant  \sigma = 5.73 \times 10^{-8}\ Wm^{-2}K^{-4} )

|  |
| --- |
|  |
|  | A. 2800 |
|  | B. 2100 |
|  | C. 1400 |
|  | D. 1200 |

The wavelength of two notes in air are  \cfrac{36}{195}\ m and  \cfrac{36}{193}\ m Each note produces 10 beats per second separately with a third note of fixed frequency. The velocity of sound in air in m/s is :

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|  |
|  | A. 330 |
|  | B. 340 |
|  | C. 350 |
|  | D. 360 |

An iron load of 2 kg is suspended in air from the free end of a sonometer wire of length 1 m. A tuning fork of frequency 256 Hz, is in resonance with  \cfrac{1}{\sqrt7} times the length of the sonometer wire. If the load is immensed in water, the length of the wire in meter that will be in resonance with the same tuning fork is : (Specific gravity of iron = 8)

|  |
| --- |
|  |
|  | A.  \sqrt8 |
|  | B.  \sqrt6 |
|  | C.  \cfrac{1}{\sqrt6} |
|  | D.  \cfrac{1}{\sqrt8} |

**Assertion ( A) :** Optical fibres are widely used in communication network.  
  
**Reason ( R) :** Optical fibres are small in size, light weight, flexible and there is no scope for interference in them.

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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 refracting angle of a prism is A and the refracting index of the material of the prism is cot (A/2). The angle of minimum deviation of the prism is :

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

The principal section of a glass prism is an isosceles triangle ABC with AB = AC. The face AC is silvered. A ray of light is incident normally on the face AB and after two reflections, it emerges from the base BC perpendicular to the base. Angle BAC of the prism is :

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|  |
|  | A.  30^{^\circ} |
|  | B.  36^{^\circ} |
|  | C.  60^{^\circ} |
|  | D.  72^{^\circ} |

Consider the following statement A and B and identify the correct answer :  
  
**A :** fresnel’s diffraction pattern occurs when the source of light or the screen on which the diffraction pattern is screen or when both are at finite distance from the aperture.  
  
**B :** Diffracted light can be used to estimate the helical structure of nucleic acids.

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

The magnetic induction and the intensity of magnetic field inside an iron core of an electromagnet are 1 Wb  m^{-2} and  150\ Am^{-1} respectively. The relative permeability of iron is: ( \mu_0 = 4\pi \times 10^{-7}  henry/m)

|  |
| --- |
|  |
|  | A.  \cfrac{10^6}{4\pi} |
|  | B.  \cfrac{10^6}{6\pi} |
|  | C.  \cfrac{10^5}{4\pi} |
|  | D.  \cfrac{10^3}{6\pi} |

The magnetic needle of a vibration magnetometer makes 12 oscillations per minute in the horizontal component of the earth’s magnetic field. When an external short bar magnet is placed at some distance along the axis of the needle in the same line, It makes 15 oscillations per minute. If the poles of the bar magnet are interchanged, the number of oscillations it makes per minute is :

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|  | A.  \sqrt{61} |
|  | B.  \sqrt{63} |
|  | C.  \sqrt{65} |
|  | D.  \sqrt{67} |

The plates of a parallel plate capacitor are charged upto 200 volts. A dielectric slab of thickness 4mm is inserted between, its plates, Then to maintain the same potential differences between the plates of the capacitor, the distance between the plates is increased by 3.2 mm. The dielectric constant of the dielectric constant of the dielectric slab is :

|  |
| --- |
|  |
|  | A. 1 |
|  | B. 4 |
|  | C. 5 |
|  | D. 6 |

Three point charges 1C, -2C and -2C are placed at the vertices of an equilateral triangle of side 1 metre. The work done by an external force to increase the separation of the charges to 2 metre in joule is:  
( \varepsilon_0 =  permittivity of air)

|  |
| --- |
|  |
|  | A.  \cfrac{1}{4\pi \varepsilon_0} |
|  | B.  \cfrac{1}{8 \pi \varepsilon_0} |
|  | C.  \cfrac{1}{16\pi \varepsilon_0} |
|  | D. Zero |

n conducting wires of same dimensions but having resistance 1, 2, 3, ...... n, are connected in series. The equivalent resistivity of the combination is:

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|  |
|  | A.  1\ \cfrac{n(n+1)}{2} |
|  | B.  \cfrac{n+1}{2} |
|  | C.  \cfrac{n+2}{2n} |
|  | D.  \cfrac{2n}{n+1} |

**Assertion ( A) :** Rapidly changing temperature can be measured by thermocouples.   
  
**Reason ( R) :** The thermal capacity of the junction of a thermocouple is very samll.

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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 |

Magnetic induction at the centre of a circular loop of area  \pi\ m^2 is 0.1 tesia. The magnetic moment of the loop is:  
( \mu_0 =  permeability of air)

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| --- |
|  |
|  | A.  \cfrac{0.1\ \pi}{\mu_0} |
|  | B.  \cfrac{0.2\ \pi}{\mu_0} |
|  | C.  \cfrac{0.3\ \pi}{\mu_0} |
|  | D.  \cfrac{0.4\ \pi}{\mu_0} |

A wire length l is bent into a circular coil of one turn of radius  R_1. Another wire of the same material and same area of cross-section and same lengths is bent into a circular coil of two turns of radius  R_2. When the same current flows, through the two coils, the ratio of magnetic induction at the centres of two coils is:

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

 \triangle \lambda is the difference between the wavelength of  k_\alpha line and the minimum wavelength of the continuous X-ray spectrum when the X-ray tube is operated at a voltage V. If the operating voltage is changed to VB, then the above difference is  \triangle \lambda. Then:

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|  |
|  | A.  \triangle \lambda = 5\ \triangle \lambda |
|  | B.  \triangle \lambda = 4\ \triangle \lambda |
|  | C.  \triangle \lambda = 3\ \triangle \lambda |
|  | D.  \triangle \lambda < 3\ \triangle \lambda |

Electrons ejected from the surface of metal, when light of certain frequency is incident on it, are stopped fully by retarding potential of 3 volts. Photoelectric effect in this metallic surface begins at a frequency  6 \times 10^{14}\ s^{-1}. The frequency of the incident light in  s^{-1} is: [Planck’s constant =  6.4 \times 10^{-34}\ Js, charge on the electron  = 1.6 \times 10^{-19}\ C ]

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|  |
|  | A.  7.5 \times 10^{13} |
|  | B.  13.5 \times 10^{13} |
|  | C.  13.5 \times 10^{14} |
|  | D.  7.5 \times 10^{15} |

Consider the following two statements A and B and identify the correct answer given below:  
  
**A :** Nuclear density is same for all nuclei  
  
**B :** Radius of the nucleus R and its mass number A are related as  \sqrt{A}\ \infty\ R^{1/6}. 

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|  |
|  | 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 |

In n-p-n transistor, in CE configuration:  
  
(1) The emitter is heavy doped than the collector.  
(2) Emitter and collector can be interchanged.  
(3) The base region is very thin but is heavily doped.  
(4) The convectional current flows from the base to emitter

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|  |
|  | A. (1) and (2) are correct |
|  | B. (1) and (3) are correct |
|  | C. (1) and (4) are correct |
|  | D. (2) and (3) are correct |

Two cells A and B are connected in the secondary circuit of a potentiometer one at a time and the balancing length are respectively 400 cm and 440 cm. The emf of the cell A is 1.08 volt. The emf of the second cell B in volts is:

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|  |
|  | A. 1.08 |
|  | B. 1.188 |
|  | C. 11.88 |
|  | D. 12.8 |

Match the pairs in two list given below:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sl.No** | | **List-I** | | **Sl.No** | **List-II** |
| (1) | | Spectra produced by light from incandescent solid | | (d) | Photon |
| (2) | | Elementry particles with zero mass and with a spin of unity | | (e) | Continuous spectra |
| (3) | | Photocell in which current changes intensity of light after time gap. | | (f) | Photo emissive cell |
| - | | - | | (g) | Photoconducting cell |
| - | | - | | (h) | Neutrino |
| - | | - | | (i) | Band spectra |
|  |
|  | A. a-e, b-h, c-g | |
|  | B. a-i, b-h, c-f | |
|  | C. a-e, b-h, c-f, | |
|  | D. a-i, b-d, c-g | |

 {}_6C^{12} and  {}_1T^3 are formed in nature due to the nuclear reaction of neutron with :

|  |
| --- |
|  |
|  | A.  {}_7N^{14} |
|  | B.  {}_6C^{13} |
|  | C.  {}_2He^4 |
|  | D.  {}_3Li^6 |

Exhausted permutit does not contain …........ ion:

|  |
| --- |
|  |
|  | A.  Na^+ |
|  | B.  Mg^{2+} |
|  | C.  Al^{3+} |
|  | D.  Si^{4+} |

Which one of the following is a secondary alcohol?

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|  |
|  | A. 2-methyl-1-propanol |
|  | B. 2-methyl-2-propanol |
|  | C. 2-butanol |
|  | D. 1-butanol |

In which of the following reactions, the concentration of product is higher than the concentration of reactant at equilibrium ?  
(K = equilibrium constant)

|  |
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|  |
|  | A.  A \rightleftharpoons B; K = 0.001 |
|  | B.  M \rightleftharpoons N; K = 10 |
|  | C.  X \rightleftharpoons Y; K = 0.005 |
|  | D.  R \rightleftharpoons P; K = 0.01 |

The electrochemical equivalent of a metal is ‘x’ g.  coulomb^{-1}. The equivalent weight of metal is:

|  |
| --- |
|  |
|  | A. x |
|  | B.  x \times\ 96500 |
|  | C.  \cfrac{x}{96500} |
|  | D.  1.6 \times 10^{-19} \times x |

The correct structure of 4-bromo-3-methyl-but-1-ene:

|  |
| --- |
|  |
|  | A.  Br-CH = C(CH_3)_2 |
|  | B.  CH_2 = CH - CH(CH_3) - CH_2Br |
|  | C.  CH_2 = C(CH_3)CH_2CH_2Br |
|  | D.  CH_3 - C(CH_3) = CHCH_2 - Br |

In the hardening stage of plaster of paris, the compound formed is:

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|  |
|  | A.  CaSO_4 |
|  | B. orthorhombic  CaSO_4\ .\ 2H_2O |
|  | C.  CaSO_4\ .\ H_2O |
|  | D. monoclinic  CaSO_4\ .\ 2H_2O |

The IUPAC name of an unsymmetrical ether with the molecule formula  C_4H_{10}O: 

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|  |
|  | A. ethoxy propane |
|  | B. methoxy ethane |
|  | C. ethoxy ethane |
|  | D. methoxy propane |

Which of the following pairs of ions are colourless ?

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| --- |
|  |
|  | A.  Ti^{3+},\ Cu^{2+} |
|  | B.  Sc^{3+},\ Zn^{2+} |
|  | C.  Co^{2+},\ Fe^{3+} |
|  | D.  Ni^{2+},\ V^{3+} |

Which of the following is a lyophobic colloidal soultion ?

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|  |
|  | A. Aqueous starch solution |
|  | B. Aqueous protein solution |
|  | C. Gold sol |
|  | D. Polymer solution in some organic solvents |

The following reaction is an example of …..... reaction.  
  
 C_2H_4Br_2 \overset{alc.KOH}{\longrightarrow} C_2H_2 

|  |
| --- |
|  |
|  | A. Addition |
|  | B. Dehydrobromination |
|  | C. Substitution |
|  | D. Debromination |

The molecular formula of potash alum is:

|  |
| --- |
|  |
|  | A.  KAl_2S_4H_{48}O_{40} |
|  | B.  K_2Al_2S_4H_{48}O_{39} |
|  | C.  K_2Al_2S_4H_{48}O_{40} |
|  | D. None of these |

Which of the following is not correct regarding the properties of ionic compounds ?

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| --- |
|  |
|  | A. Ionic compounds have height melting and boiling points |
|  | B. Their reaction velocity in aqueous medium is very high |
|  | C. Ionic compounds in their molten and aqueous solutions do not conduct electricity |
|  | D. They are highly soluble in polar solvents |

x grams of water is mixed in 69 g of ethanol. Mole fraction of ethanol in the resultant solution is 0.6. What is the value of x in grams ?

|  |
| --- |
|  |
|  | A. 54 |
|  | B. 36 |
|  | C. 180 |
|  | D. 18 |

Match the following lists

|  |  |  |  |
| --- | --- | --- | --- |
| **Sl.No** | **List-I** | **Sl.No** | **List-II** |
| A. | Ethane | 1. | 2 sp carbons |
| B. | Ethylene | 2. | 6\ sp^2 carbons |
| C. | Acetylene | 3. | 2\ sp^3 carbons |
| D. | Benzene | 4. | 2\ sp^2 carbons |
| - | - | 5. | 1 sp and  1\ sp^2 carbons |

**The Correct answer is**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| - | **A** | | **B** | **C** | **D** | |
| ( a) | 3 | | 4 | 1 | 2 | |
| ( b) | 4 | | 5 | 3 | 2 | |
| ( c) | 3 | | 1 | 2 | 5 | |
| ( d) | 2 | | 3 | 4 | 5 | |
|  | |
|  | | A. ( a) | | | |
|  | | B. ( b) | | | |
|  | | C. ( c) | | | |
|  | | D. ( d) | | | |

The number of oxygen atoms bonded to to one phosphorous atoms in  P_4O_6 is:

|  |
| --- |
|  |
|  | A. 4 |
|  | B. 3 |
|  | C. 6 |
|  | D. 5 |

Which of the following has S—S bonds ?

|  |
| --- |
|  |
|  | A.  H_2S_2O_6 |
|  | B.  H_2S_2O_7 |
|  | C.  H_2S_2O_8 |
|  | D. Mustard gas |

In the Dewar’s method of separation of noble gases, the mixture of noble gases is kept in contact with coconut charcoal at 173K. Which one of the following gaseous mixtures is not observed on the charcoal ?

|  |
| --- |
|  |
|  | A. Ar, Kr |
|  | B. Xe, Ar |
|  | C. He, Ne |
|  | D. Xe, Kr |

Identify ‘acetaldoxime’

|  |
| --- |
|  |
|  | A.  CH_3CH = N-NH_2 |
|  | B.  CH_3CH = N-OH |
|  | C.  (CH_3)_2C = N-OH |
|  | D.  CH_2 = N-OH |

An organic compound containing C and H has 92.3% of carbon, its empirical formula is:

|  |
| --- |
|  |
|  | A. CH |
|  | B.  CH_3 |
|  | C.  CH_2 |
|  | D.  CH_4 |

Identify A and B in the following reaction  
  
 C_2H_5Cl \overset{A}{\longrightarrow} C_2H_5OH \overset{B}{\longleftarrow} C_2H_5Cl 

|  |
| --- |
|  |
|  | A. A = aqueous KOH; B = AgOH |
|  | B. A = aqueous  KOH/ \triangle ; B = aqueous NaOH |
|  | C. A = aqueous NaOH; B =  AgNO_2 |
|  | D. A =  AgNO_2; B = KNO_2 |

.......... of a reaction cannot be determined experimentally :

|  |
| --- |
|  |
|  | A. order |
|  | B. rate |
|  | C. rate constant |
|  | D. molecularity |

In the extraction of sodium by Down’s process, cathode and anode are respectively:

|  |
| --- |
|  |
|  | A. copper and nickel |
|  | B. copper and chromium |
|  | C. nickel and chromium |
|  | D. iron and graphite |

Which of the following functional groups undergoes hydrolysis with alkali to yield and acid group?

|  |
| --- |
|  |
|  | A.  -CN |
|  | B.  -CHO |
|  | C.  -COCH_3 |
|  | D.  -Br |

Which one of the following is used as an acid flux in metallurgy?

|  |
| --- |
|  |
|  | A.  CaO |
|  | B.  SiO_2 |
|  | C.  Na_2CO_3 |
|  | D.  SO_2 |

Which of the following pair of ions have same paramagnetic moments?

|  |
| --- |
|  |
|  | A.  Cu^{2+},\ Ti^{3+} |
|  | B.  Mn^{2+},\ Cu^{2+} |
|  | C.  Ti^{4+},\ Cu^{2+} |
|  | D.  Ti^{3+},\ Ni^{2+} |

Which of the following elements has least number of electrons in its M shell?

|  |
| --- |
|  |
|  | A. K |
|  | B. Mn |
|  | C. Ni |
|  | D. Sc |

Which one of the following compounds forms a quaternary salt on reacting with excess methyl iodide?

|  |
| --- |
|  |
|  | A.  C_2H_5OCH_3 |
|  | B.  (CH_3)_2CHOC_2H_5 |
|  | C.  C_6H_5NH_2 |
|  | D.  C_6H_5NO_2 |

The chemical formula of ‘tear gas is:

|  |
| --- |
|  |
|  | A.  COCl_2 |
|  | B.  CO_2 |
|  | C.  Cl_2 |
|  | D.  CCl_3NO_2 |

Which of the following is a favourable factor for cation formation?

|  |
| --- |
|  |
|  | A. High electronegativity |
|  | B. High electron affinity |
|  | C. Low ionisation potential |
|  | D. Smaller atomic size |

Which of the following reagents can form a hydrazone with alkanone?

|  |
| --- |
|  |
|  | A.  NH_3OHCl |
|  | B.  PhNHNH_2 |
|  | C.  NH_2NHCONH_2 |
|  | D.  HCN |

Average  C-H bond energy is  416\ kJ.\ mol^{-1}. Which of the following is correct?

|  |
| --- |
|  |
|  | A.  CH_4(g) + 416kJ \rightarrow C(g) + 4H(g) |
|  | B.  CH_4(g) \rightarrow C(g) + 4H(g) + 416kJ |
|  | C.  CH_4(g) + 1664\ kJ \rightarrow C(g) + 4H(g) |
|  | D.  CH_4(g) \rightarrow C(g) + 4H(g) + 1664\ kJ |

What is the molecular formula of the product formed when benzene is reacted with ethyl chloride in presence of anhydrous aluminium chloride?

|  |
| --- |
|  |
|  | A.  C_8H_{10} |
|  | B.  C_6H_6 |
|  | C.  C_8H_8 |
|  | D.  C_6H_5Cl |

At  27^{^\circ}C,\ 500\ mL of helium diffuses in 30 minutes. What is the time (in hours) taken for 1000 mL of  SO_2 to diffuse under same experimental conditions ?

|  |
| --- |
|  |
|  | A. 240 |
|  | B. 3 |
|  | C. 2 |
|  | D. 4 |

The metal used for the de-bromination reaction of 1, 2-dibromoethane:

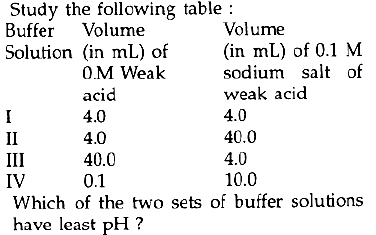
|  |
| --- |
|  |
|  | A. Na |
|  | B. Zn |
|  | C. Mg |

**Assertion (A):** At 300 K, kinetic energy of 16 g of methane is equal to the kinetic energy of 32 g of oxygen.  
  
**Reason ( R):** At constant temperature, kinetic energy of one mole of all gases is equal  
  
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 but ( 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 |

Identify the correct decreasing order of the following with respect to attitude from atmosphere:  
  
**I.** Troposphere  
**II.** Mesosphere  
**III.** Thermosphere

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



|  |
| --- |
|  |
|  | A. I and II |
|  | B. I and III |
|  | C. II and III |
|  | D. II and IV |

Which of the following is an endothermic reaction?

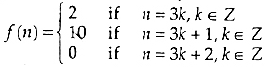
|  |
| --- |
|  |
|  | A.  N_2(g) + 3H_2(g) - 92kJ \rightarrow 2NH_3(g) |
|  | B.  N_2(g) + O_2(g) + 180.8\ kJ \rightarrow 2NO(g) |
|  | C.  H_2(g) + Cl_2(g) \rightarrow 2HCl(g) + 184.6\ kJ |
|  | D.  C (graphite) + 2H_2(g) \rightarrow CH_2(g) + 74.8\ kJ |

Which of the following is correct?

|  |
| --- |
|  |
|  | A.  {}_1H^1 and  {}_2He^3 are isotopes |
|  | B.  {}_6C^{14} and  {}_7N^{14} are isotopes |
|  | C.  {}_{19}K^{39} and  {}_{20}Ca^{40} are isotones |
|  | D.  {}_9F^{19} and  {}_{11}Na^{24} are isodiaphers |

For any integers  n \geq 1, the number of positive divisor of n is denoted by d (n). Then for a prime  P, d(d(d(P^7))) = 

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

If  f:N \rightarrow Z is defined by  
  
then  \Big\{n\ \in\ N : f(n) > 2\Big\} = 

|  |
| --- |
|  |
|  | A.  \Big\{3, 6, 4\Big\} |
|  | B.  \Big\{1, 4, 7\Big\} |
|  | C.  \Big\{4, 7\Big\} |
|  | D. \Big\{7\Big\} |

The function  f : R \rightarrow R is defined by  f(x) = 3^{-x}. Observe the following statements of it:  
  
I. f is one-one  
II. f is onto  
III. f is a decreasing function  
  
Out of these, true statement are:

|  |
| --- |
|  |
|  | A. only I, II |
|  | B. only II, III |
|  | C. only I, III |
|  | D. I, II, III |

 \overset{5}{\underset{k=1}{\sum}}\ \cfrac{1^3 + 2^3 + .... + k^3}{1+3+5+....+ (2k-1)} = 

|  |
| --- |
|  |
|  | A. 22.5 |
|  | B. 24.5 |
|  | C. 28.5 |
|  | D. 32.5 |

The value of  \sqrt{42 + \sqrt{42 + \sqrt{42 + ...}}} is equal to:

|  |
| --- |
|  |
|  | A. 7 |
|  | B. -6 |
|  | C. 5 |
|  | D. 4 |

If  \log_{27}(\log_3\ x) = \cfrac{1}{3}, then the value of x is:

|  |
| --- |
|  |
|  | A. 3 |
|  | B. 6 |
|  | C. 9 |
|  | D. 27 |

 S_1, S_2, ......... , S_{10} are the speakers in a conference. If  S_1 addresses only after  S_2, then the number of ways the speakers address is:

|  |
| --- |
|  |
|  | A. 10! |
|  | B. 9! |
|  | C.  10 \times 8! |
|  | D.  \cfrac{(10!)}{2} |

The number of positive odd divisor of 216 is:

|  |
| --- |
|  |
|  | A. 4 |
|  | B. 6 |
|  | C. 8 |
|  | D. 12 |

The binomial coefficient which are in decreasing order are:

|  |
| --- |
|  |
|  | A.  {}^{15}C_5, {}^{15}C_6, {}^{15}C_7 |
|  | B.  {}^{15}C_{10}, {}^{15}C_9, {}^{15}C_8 |
|  | C.  {}^{15}C_6, {}^{15}C_7, {}^{15}C_8 |
|  | D.  {}^{15}C_7, {}^{15}C_6, {}^{15}C_5 |

If  \cfrac{x-4}{x^2-5x+6} can be expanded in the ascending powers of x, then the coefficient of  x^3 is:

|  |
| --- |
|  |
|  | A.  \cfrac{-73}{648} |
|  | B.  \cfrac{73}{648} |
|  | C.  \cfrac{71}{648} |
|  | D.  \cfrac{-71}{648} |

If  \cfrac{(x+1)}{(2x-1)(3x+1)} = \cfrac{A}{(2x-1)} + \cfrac{B}{(3x+1)}, then 16A + 9B is equal to:

|  |
| --- |
|  |
|  | A. 4 |
|  | B. 5 |
|  | C. 6 |
|  | D. 8 |

The value of the series  x \log_e a + \cfrac{x^3}{3!}(\log_e a)^3 + \cfrac{x^5}{5!}(\log_e a)^5 + .... is:

|  |
| --- |
|  |
|  | A.  \cos h (x \log_e a) |
|  | B.  \cot h (x \log_e a) |
|  | C.  \sin h (x \log_e a) |
|  | D.  \tan h (x \log_e a) |

Coefficient of  x^{10} in the expansion of  (2+3x) e^{-x} is :

|  |
| --- |
|  |
|  | A.  \cfrac{-26}{(10)!} |
|  | B.  \cfrac{-28}{(10)!} |
|  | C.  \cfrac{-30}{(10)!} |
|  | D.  \cfrac{-32}{(10)!} |

The set of all solutions of the in equation  x^2 - 2x + 5 \leq 0 in R is:

|  |
| --- |
|  |
|  | A.  R - (- \infty, -5) |
|  | B.  R - (5, \infty) |
|  | C.  \phi |
|  | D.  R - (- \infty, -4) |

If (x – 2) is a common factor of the expression  x^2 + ax + b and  x^2 + cx + d, then  \cfrac{b-d}{c-a} is equal to:

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

If the roots of the equations  4x^3 - 12x^2 + 11x + k = 0 are in arithmetic progression then k is equal to:

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

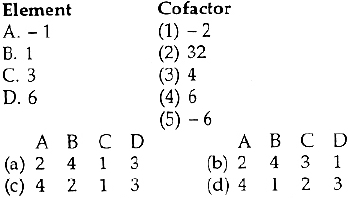
 \alpha, \beta, \gamma are the roots of the equation  x^3 - 10x^2 + 7x + 8 = 0. Match the following and choose the correct answer.

|  |  |  |  |
| --- | --- | --- | --- |
| A. | \alpha + \beta + \gamma | (1) | -\cfrac{43}{4} |
| B. | \alpha^2 + \beta^2 + \gamma^2 | (2) | -\cfrac{7}{8} |
| C. | \cfrac{1}{\alpha} + \cfrac{1}{\beta} + \cfrac{1}{\gamma} | (3) | 86 |
| D. | \cfrac{\alpha}{\beta\gamma} + \cfrac{\beta}{\gamma\alpha} + \cfrac{\gamma}{\alpha\beta} | (4) | 0 |
| - | - | (5) | 10 |

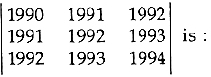
|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| - | **A** | | **B** | **C** | **D** | |
| ( a) | 5 | | 3 | 1 | 2 | |
| ( b) | 4 | | 3 | 1 | 2 | |
| ( c) | 5 | | 3 | 2 | 1 | |
| ( d) | 5 | | 2 | 3 | 1 | |
|  | |
|  | | A. ( a) | | | |
|  | | B. ( b) | | | |
|  | | C. ( c) | | | |
|  | | D. ( d) | | | |

If f(x) is a polynomial of degree n with rational coefficients and  1 + 2i,\ 2 - \sqrt3 and 5 are three roots of f(x) = 0, then the least value of n is:

|  |
| --- |
|  |
|  | A. 5 |
|  | B. 4 |
|  | C. 3 |
|  | D. 6 |

Match the following element of  
  
 \Bigg[\overset{1}{\underset{3}{0}}\ \overset{-1}{\underset{-4}{4}}\ \overset{0}{\underset{6}{2}} \Bigg] with their co factors and choose the correct answer is:  
  


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

The Value of 

|  |
| --- |
|  |
|  | A. 1992 |
|  | B. 1993 |
|  | C. 1994 |
|  | D. 0 |

The rank of  \Bigg[\overset{1}{\underset{-1}{1}}\ \overset{-1}{\underset{1}{1}}\ \overset{1}{\underset{1}{-1}} \Bigg] is:

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

If  z_1, z_2 are two complex number satisfying  \Bigg|\cfrac{z_1-3z_2}{3-z_1\bar{z_2}} \Bigg| = 1, |z_1| \neq 3, then  |z_2| is equal to:

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

The value of  \overset{\infty}{\underset{n=0}{\sum}}\ \Bigg(\cfrac{2i}{3} \Bigg)^n is:

|  |
| --- |
|  |
|  | A.  \cfrac{9+6i}{13} |
|  | B.  \cfrac{9-6i}{13} |
|  | C. 9 + 6i |
|  | D. 9 – 6i |

If  x_n = \cos \cfrac{\pi}{2^n} + i \sin \cfrac{\pi}{2^n}, then  \overset{\infty}{\underset{n=1}{\sqcap}}\ x_n is equal to:

|  |
| --- |
|  |
|  | A. -1 |
|  | B. 1 |
|  | C.  \cfrac{1}{\sqrt2} |
|  | D.  \cfrac{i}{\sqrt2} |

If  n\ \in\ N, and the period of  \cfrac{\cos\ nx}{\sin \Bigg(\cfrac{x}{n}\Bigg)} is  4\ \pi Then n is equal to:

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

The expression  \tan 9^{^\circ} - \tan 27^{^\circ} - \tan 63^{^\circ} + \tan 81^{^\circ} is equal to:

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

In a  \triangle ABC, \cos \Bigg(\cfrac{B + 2C + 3A}{2} \Bigg) + \cos \Bigg(\cfrac{A-B}{2} \Bigg) is equal to:

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

The value of series  \cos 12^{^\circ} + \cos 84^{^\circ} + \cos 132^{^\circ} + \cos 156^{^\circ} is:

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

For  x\ \in\ IR,\ 3\cos(4x - 5) + 4 lies in the interval:

|  |
| --- |
|  |
|  | A.  \Big[1,\ 7\Big] |
|  | B.  \Big[4,\ 7\Big] |
|  | C.  \Big[0,\ 7\Big] |
|  | D.  \Big[2,\ 7\Big] |

If  \sin^{-1} x + \sin^{-1}(1 - x) = \cos^{-1}x, then  x \in to:

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

f  x = \log \Bigg[\cot \Bigg(\cfrac{\pi}{4} + \theta \Bigg)\Bigg], the value of  \sin 4\ x is:

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

If, in a  \triangle ABC,\ r^3 = r^1 + r^2 + r, then  \angle A + \angle B is equal to:

|  |
| --- |
|  |
|  | A.  120^{^\circ} |
|  | B.  100^{^\circ} |
|  | C.  90^{^\circ} |
|  | D.  80^{^\circ} |

In a  \triangle ABC, (a-b)^2\ \cos^2\ \cfrac{C}{2} + (a+b)^2\ \sin^2\ \cfrac{C}{2} is equal to:

|  |
| --- |
|  |
|  | A.  a^2 |
|  | B.  c^2 |
|  | C.  b^2 |
|  | D.  a^2+b^2 |

In a  \triangle ABC, the correct formulae among the following are:  
  
**I.**  r = 4R\ \sin\ \cfrac{A}{2}\ \sin\ \cfrac{B}{2}\ \sin\ \cfrac{C}{2}   
  
**II.**  r_1 = (s-a)\ \tan\ \cfrac{A}{2}   
  
**III.**  r_3 = \cfrac{\triangle}{s-c} 

|  |
| --- |
|  |
|  | A. only I, II |
|  | B. only II, III |
|  | C. only I, III |
|  | D. I, II, III |

An aeroplane flying with uniform speed horizontal one kilometer above the ground is observed at an elevation of  60^{^\circ}. After 10 seconds if the elevation is observed to be  30^{^\circ}, then the speed of the plane (in km/hr) is:

|  |
| --- |
|  |
|  | A.  \cfrac{240}{\sqrt3} |
|  | B.  200 \sqrt3 |
|  | C.  240 \sqrt3 |
|  | D.  \cfrac{120}{\sqrt3} |

If  \hat{i} + 2\hat{j} + 3\hat{k},\ 3\hat{i} + 2\hat{j} + \hat{k} are sides of a parallelogram, then a unit vector is parallel to one of the diagonals of the parallelogram is:

|  |
| --- |
|  |
|  | A.  \cfrac{\hat{i}+\hat{j}+\hat{k}}{\sqrt3} |
|  | B.  \cfrac{\hat{i}-\hat{j}+\hat{k}}{\sqrt3} |
|  | C.  \cfrac{\hat{i}+\hat{j}-\hat{k}}{\sqrt3} |
|  | D.  \cfrac{-\hat{i}+\hat{j}+\hat{k}}{\sqrt3} |

If G is the centroid of the  \triangle ABC, then  \overset{\longrightarrow}{GA} + \overset{\longrightarrow}{BG} + \overset{\longrightarrow}{GC} is equal to:

|  |
| --- |
|  |
|  | A.  2\ \overset{\longrightarrow}{GB} |
|  | B.  2\ \overset{\longrightarrow}{GA} |
|  | C.  2\ \overset{\rightarrow}{0} |
|  | D.  2\ \overset{\longrightarrow}{BG} |

If the vector  \hat{i} + 3\hat{j} + 4\hat{k},\ \lambda\hat{i} - 4\hat{j} + \hat{k} are orthogonal to each other, then  \lambda is equal to:

|  |
| --- |
|  |
|  | A. 5 |
|  | B. -5 |
|  | C. 8 |
|  | D. -8 |

The vector  \overset{\rightarrow}{c}. (\overset{\rightarrow}{b} + \overset{\rightarrow}{c}) \times  (\overset{\rightarrow}{a} + \overset{\rightarrow}{b} + \overset{\rightarrow}{c}) is equal to:

|  |
| --- |
|  |
|  | A.  \overset{\rightarrow}{c}. \overset{\rightarrow}{b} \times \overset{\rightarrow}{a} |
|  | B.  \overset{\rightarrow}{0} |
|  | C.  \overset{\rightarrow}{c}. \overset{\rightarrow}{a} \times \overset{\rightarrow}{b} |
|  | D.  \overset{\rightarrow}{a}. \overset{\rightarrow}{c} \times \overset{\rightarrow}{b} |

If  3\hat{i} + 3\hat{j} + \sqrt3\ \hat{k},\ \hat{i} + \hat{k},\ \sqrt3\ \hat{i} + \sqrt3\ \hat{j} + \lambda\ \hat{k} are coplanar, then  \lambda is equal to:

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

An unbiased coin is tossed to get 2 points for turning up a head and one points for the tail. If three unbiased coins are tossed simultaneously, then the probability of getting a total of odd number of points is:

|  |
| --- |
|  |
|  | A.  \cfrac{1}{2} |
|  | B.  \cfrac{1}{4} |
|  | C.  \cfrac{1}{8} |
|  | D.  \cfrac{3}{8} |

Suppose E and F are two events of a random experiment. If the probability of occurrence of E is 1/5 and the probability of occurrence of F given E is 1/10, then the probability of non-occurrence of at least one of the events E and F is:

|  |
| --- |
|  |
|  | A.  \cfrac{1}{18} |
|  | B.  \cfrac{1}{2} |
|  | C.  \cfrac{49}{50} |
|  | D.  \cfrac{1}{50} |

Six faces of an unbiased die are numbered with 2, 3, 5, 7, 11 and 13. If two dice are thrown, then the probability that the sum on the uppermost faces of the dice is an odd number is:

|  |
| --- |
|  |
|  | A.  \cfrac{5}{18} |
|  | B.  \cfrac{5}{36} |
|  | C.  \cfrac{13}{18} |
|  | D.  \cfrac{25}{36} |

A person who tosses an unbiased coin gains two points for turning up a head and loses one point for a tail. If three coins are tossed and the total score X is observed, then the range of x is:

|  |
| --- |
|  |
|  | A.  \Big\{0,\ 3,\ 6\Big\} |
|  | B.  \Big\{-3,\ 0,\ 3\Big\} |
|  | C.  \Big\{-3,\ 0,\ 3,\ 6\Big\} |
|  | D.  \Big\{-3,\ 3,\ 6\Big\} |

If X is a Poisson variate with P(X = 0) = 0.8, then the variance of X is:

|  |
| --- |
|  |
|  | A.  \log_e\ 20 |
|  | B.  \log_{10}\ 20 |
|  | C.  \log_e\ 5/4 |
|  | D. 0 |

If the distance between the points  (a\ \cos \theta,\ a \sin \theta) and  (a\ \cos \phi,\ a\ \sin \phi) is 2a then  \theta is equal to:

|  |
| --- |
|  |
|  | A.  2n\pi \pm \pi + \phi,\ n \in\ Z |
|  | B.  n\pi + \cfrac{\pi}{2} + \phi,\ n \in\ Z |
|  | C.  n\pi - \phi,\ n \in\ Z |
|  | D.  2n\pi + \phi,\ n \in\ Z |

The number of circles that touch all the three lines  x + y - 1 = 0,\ x - y - 1 = 0 and  y + 1 = 0 is:

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

Suppose A,B are two points on  2x - y + 3 = 0 and P(1, 2) is such that PA = PB. Then the mid-point of AB is:

|  |
| --- |
|  |
|  | A.  \Bigg(\cfrac{-1}{5},\ \cfrac{13}{5} \Bigg) |
|  | B.  \Bigg(\cfrac{-7}{5},\ \cfrac{9}{5} \Bigg) |
|  | C.  \Bigg(\cfrac{7}{5},\ \cfrac{-9}{5} \Bigg) |
|  | D.  \Bigg(\cfrac{-7}{5},\ \cfrac{-9}{5} \Bigg) |

The angle between the lines represented by  y^2\sin^2\theta - xy\ \sin^2\theta + x^2(\cos^2\theta - 1) = 0 is:

|  |
| --- |
|  |
|  | A.  \cfrac{\pi}{3} |
|  | B.  \cfrac{\pi}{4} |
|  | C.  \cfrac{\pi}{6} |
|  | D.  \cfrac{\pi}{2} |

Area of the triangle formed by the lines  3x^2 - 4\ xy + y^2 = 0,\ 2x - y = 6 is:

|  |
| --- |
|  |
|  | A. 16 sq. units |
|  | B. 25 sq. units |
|  | C. 36 sq. units |
|  | D. 49 sq. units |

If  P_1,\ P_2,\ P_3 are the perimeter of the three circles  x^2 + y^2 + 8x - 6y = 0,\ 4x^2 + 4y^2 - 4x - 12y - 186 = 0 and  x^2 + y^2 - 6x + 6y - 9 = 0 respectively, then:

|  |
| --- |
|  |
|  | A.  P_1 < P_2 < P_3 |
|  | B.  P_1 < P_3 < P_2 |
|  | C.  P_3 < P_2 < P_1 |
|  | D.  P_2 < P_3 < P_1 |

If the direction ratio of two lines are given by  l + m + n = 0,\ mn - 2ln + lm = 0, then the angle between the lines is:

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

If (2, -1, 3) is the foot of the perpendicular drawn from the origin to the plane, then the equation of the plane is:

|  |
| --- |
|  |
|  | A. 2x + y – 3z + 6 = 0 |
|  | B. 2x – y + 3z – 14 = 0 |
|  | C. 2x – y + 3z – 13 = 0 |
|  | D. 2x + y + 3z – 10 = 0 |

If the plane 3x – 2y – z – 18 = 0 meets the coordinate axes in A,B,C then the centroid of  \triangle ABC is:

|  |
| --- |
|  |
|  | A. (2, 3, -6) |
|  | B. (2, -3, 6) |
|  | C. (-2, -3, 6) |
|  | D. (2, -3, -6) |

If the line 3x – 2y + 6 = 0 meets X-axis and Y-axis respectively at A and B, then the equation of the circle with radius AB and centre at A is:

|  |
| --- |
|  |
|  | A.  x^2 + y^2 + 4x + 9 = 0 |
|  | B.  x^2 + y^2 + 4x - 9 = 0 |
|  | C.  x^2 + y^2 + 4x + 4 = 0 |
|  | D.  x^2 + y^2 + 4x - 4 = 0 |

A line l meets the circle  x^2 + y^2 = 61 in A,B and P(-5,6) is such that PA = PB = 10. Then the equation of i is:

|  |
| --- |
|  |
|  | A.  5x + 6y + 11 = 0 |
|  | B.  5x - 6y - 11 = 0 |
|  | C.  5x - 6y + 11 = 0 |
|  | D.  5x - 6y + 12 = 0 |

If (1, a), (b, 2) are conjugate points with respect to the circle  x^2 + y^2 = 25, then 4a + 2b is equal to:

|  |
| --- |
|  |
|  | A. 25 |
|  | B. 50 |
|  | C. 100 |
|  | D. 150 |

The eccentricity of the conic  36x^2 + 144y^2 - 36x - 96y - 119 = 0 is:

|  |
| --- |
|  |
|  | A.  \cfrac{\sqrt3}{2} |
|  | B.  \cfrac{1}{2} |
|  | C.  \cfrac{\sqrt3}{4} |
|  | D.  \cfrac{1}{\sqrt3} |

The polar equation  \cos \theta + 7 \sin \theta = \cfrac{1}{r} represent a:

|  |
| --- |
|  |
|  | A. Circle |
|  | B. Parabola |
|  | C. Straight line |
|  | D. Hyperbola |

The centre of the circle  r^2 - 4r (\cos \theta + \sin \theta) - 4 = 0 in Cartesian coordinates is:

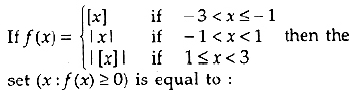
|  |
| --- |
|  |
|  | A. (1, 1) |
|  | B. (-1, -1) |
|  | C. (2, 2) |
|  | D. (-2, -2) |

The radius of the circle  r = \sqrt3\ \sin \theta + \cos \theta is:

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

The value of  \underset{n \rightarrow \infty}{\lim}\ \cfrac{1}{n^3}\ \overset{n}{\underset{k=1}{\sum}}\ (k^2\ x) is:

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



|  |
| --- |
|  |
|  | A. (-1, 3) |
|  | B. [-1, 3) |
|  | C. (-1, 3] |
|  | D. [-1, 3] |

If  f : R \longrightarrow R is an even function having derivatives of all orders, then an odd function among the following is:

|  |
| --- |
|  |
|  | A. f “ |
|  | B. f ”’ |
|  | C. f ’ + f “ |
|  | D. f ” + f ”’ |

If  x > 0,\ x^y = e^{x-y}, then  \cfrac{dy}{dx} is equal to:

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

If  f(x) = \cfrac{1}{x^2}\ \int^x_3\ (2t - 3f' (f)) dt, then  f' (3) is equal to:

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

If the function  y = \sin^{-1} x, then  (1 - x^2)\ \cfrac{d^2y}{dx^2} is equal to:

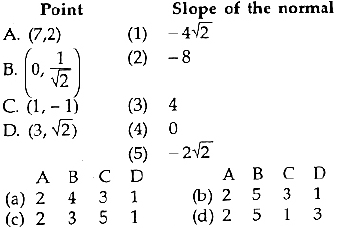
|  |
| --- |
|  |
|  | A.  -x\ \cfrac{dy}{dx} |
|  | B. 0 |
|  | C.  x\ \cfrac{dy}{dx} |
|  | D.  x\ \Bigg(\cfrac{dy}{dx}\Bigg)^2 |

A particle moves along the curve  y = x^2 + 2x. Then the point on the curve such that x and y co-ordinates of the particle change with the same rate is:

|  |
| --- |
|  |
|  | A. (1, 3) |
|  | B.  \Bigg(\cfrac{1}{2}, \cfrac{5}{2} \Bigg) |
|  | C.  \Bigg(-\cfrac{1}{2}, -\cfrac{3}{4} \Bigg) |
|  | D. (-1, -1) |

A point is moving on  y = 4 - 2x^2. The x-co-ordinate of the point is decreasing at the rate of 5 units per second. Then the rate at which y co-ordinate of the point is changing when the point is at (1, 2) is:

|  |
| --- |
|  |
|  | A. 5 unit / s |
|  | B. 10 unit / s |
|  | C. 15 unit / s |
|  | D. 20 unit / s |

Match the points on the curve  2y^2 = x + 1 with the slopes of normals at those points and choose the correct answer.  
  


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

 f(x,\ y) = 2\ (x - y)^2 - x^4 - y^4   
  
 \Bigg|(f_{xx}f_{yy} - f_{xy}{^2}) \Bigg|\ (0,0) :

|  |
| --- |
|  |
|  | A. 32 |
|  | B. 16 |
|  | C. 0 |
|  | D. -1 |

 \int\ \cfrac{dx}{(x+100)\ \sqrt{x + 99}} = f(x) + c \Rightarrow f(x) : 

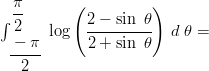
|  |
| --- |
|  |
|  | A.  2(x + 100)^{1/2} |
|  | B.  3(x + 100)^{1/2} |
|  | C.  2\ \tan^{-1}\ (\sqrt{x + 99}) |
|  | D.  2\ \tan^{-1}\ (\sqrt{x + 100}) |

 \int\ \cfrac{3 - x^2}{1 - 2x + x^2}\ e^x\ d\ x = e^x\ f(x) + c \Rightarrow f(x): 

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

 \int\ \cfrac{\sqrt{\cot x}}{\sin\ x\ \cos\ x}\ dx = -f(x) + c \Rightarrow f(x): 

|  |
| --- |
|  |
|  | A.  2\ \sqrt{\tan\ x} |
|  | B.  -2\ \sqrt{\tan\ x} |
|  | C.  -2\ \sqrt{\cot\ x} |
|  | D.  2\ \sqrt{\cot\ x} |



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

The area bounded by  y = x^2 + 2, x-axis, x = 1 and x = 2 is:

|  |
| --- |
|  |
|  | A.  \cfrac{16}{3}\ sq\ unit |
|  | B.  \cfrac{17}{3}\ sq\ unit |
|  | C.  \cfrac{13}{3}\ sq\ unit |
|  | D.  \cfrac{20}{3}\ sq\ unit |

 \int^2_0\ \cfrac{2x - 2}{2x - x^2}\ dx = 

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

Integrating factor of  (x + 2y^3)\ \cfrac{dy}{dx} = y^2 is:

|  |
| --- |
|  |
|  | A.  e^{\Bigg(\cfrac{1}{y} \Bigg)} |
|  | B.  e^{-\Bigg(\cfrac{1}{y} \Bigg)} |
|  | C. y |
|  | D.  \cfrac{-1}{y} |

 y = Ae^{x} + Be^{2x} + Ce^{3x} satisfy the differential equation:

|  |
| --- |
|  |
|  | A. y ”’ – 6y ” + 11y ’ – 6y = 0 |
|  | B. y ”’ + 6y ” + 11y ’ + 6y = 0 |
|  | C. y ”’ + 6y ” – 11y ’ + 6y = 0 |
|  | D. y ”’ – 6y ” + 11y ’ + 6y = 0 |

bserve the following statements:  
  
**A :** Integrating factor of  \cfrac{dy}{dx} + y = x^2 is  e^x   
  
**R :** Integrating factor of  \cfrac{dy}{dx} + p(x) y = Q(x) is  e\ \int\ p(x)dx   
Then the true statement among the following is:

|  |
| --- |
|  |
|  | A. A is true, R is false |
|  | B. A is false, R is true |
|  | C. A is true, R is true,  R \Rightarrow A |
|  | D. A is false, R is false |