

MHT CET 2020 Mathematics Memory Based Question Paper PDF

Section: Physics

1. A particle starting from rest moves along the circumference of a circle of radius ' r ' with angular acceleration ' α '. The magnitude of the average velocity, in the time it completes the small angular displacement ' θ ' is
 - (1) $r \left(\frac{2}{\alpha\theta} \right)^2$
 - (2) $r \left(\frac{\alpha\theta}{2} \right)$
 - (3) $r \left(\frac{\alpha\theta}{2} \right)^2$
 - (4) $r \left(\frac{\alpha\theta}{2} \right)^{\frac{1}{2}}$
2. Two wires A and B are stretched by the same load. The radius of wire A is double the radius of wire B. The stress on the wire B as compared to the stress on the wire A is
 - (1) twice.
 - (2) four times.
 - (3) half.
 - (4) equal.
3. When wavelength of light used in optical instruments A and B are $4500\text{\AA}$ and $6000\text{\AA}$ respectively, the ratio of resolving power of A to B will be
 - (1) 16 : 9
 - (2) 7 : 1
 - (3) 9 : 16
 - (4) 4 : 3
4. The ratio of radii of gyration of a ring to a disc (both circular) of same radii and mass, about a tangential axis perpendicular to the plane is
 - (1) $\frac{2}{\sqrt{3}}$
 - (2) $\frac{\sqrt{2}}{1}$
 - (3) $\frac{\sqrt{3}}{\sqrt{2}}$
 - (4) $\frac{2}{\sqrt{5}}$
5. The work done in blowing a soap bubble of radius ' R ' is ' W '. The work done in blowing a bubble of radius ' $2R$ ' of the same soap solution is

- (1) $\frac{W}{4}$
(2) $\frac{W}{2}$
(3) $4W$
(4) $2W$
6. The light of wavelength ' λ ' incident on the surface of metal having work function ϕ emits the electrons. The maximum velocity of electrons emitted is (c = velocity of light, h = Planck's constant, m = mass of electron)
- (1) $\left[\frac{2(hc-\phi)}{m\lambda} \right]$
(2) $\left[\frac{2(hc-\lambda\phi)}{m\lambda} \right]^{\frac{1}{2}}$
(3) $\left[\frac{2(hc-\lambda)}{m\lambda} \right]^{\frac{1}{2}}$
(4) $\left[\frac{2(h\nu-\phi)\lambda}{mc} \right]$
7. A thin uniform rod has mass ' M ' and length ' L '. The moment of inertia about an axis perpendicular to it and passing through the point at a distance $\frac{L}{3}$ from one of its ends, will be
- (1) $\frac{ML^2}{12}$
(2) $\frac{7}{8}ML^2$
(3) $\frac{ML^2}{9}$
(4) $\frac{ML^2}{3}$
8. Two spherical black bodies of radius ' r_1 ' and ' r_2 ' with surface temperature ' T_1 ' and ' T_2 ' respectively, radiate same power, then $r_1 : r_2$ is
- (1) $\left(\frac{T_2}{T_1} \right)^2$
(2) $\left(\frac{T_1}{T_2} \right)^4$
(3) $\left(\frac{T_1}{T_2} \right)^2$
(4) $\left(\frac{T_2}{T_1} \right)^4$
9. At absolute zero temperature, pure silicon behaves as
- (1) extrinsic semiconductor.
(2) non-metal.
(3) insulator.
(4) metal.
10. A spherical rubber balloon carries a charge, uniformly distributed over the surface. As the balloon is blown up and increases in size, the total electric flux coming out of the surface
- (1) decreases.
(2) remains unchanged.

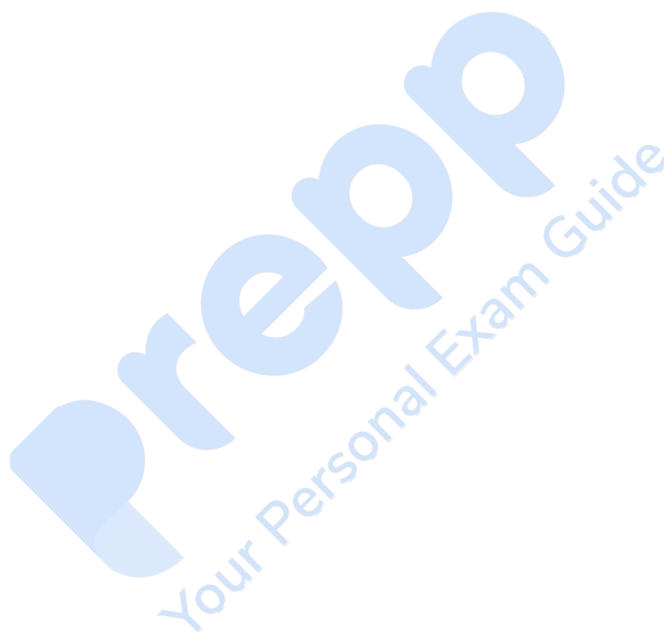
- (3) increases.
- (4) becomes zero.
11. A step-up transformer has 300 turns of primary winding and 450 turns of secondary winding. A primary is connected to 150 volt and the current flowing through it is 9A. The current and voltage in the secondary are
- (1) 13.5 A, 225 V
- (2) 13.5 A, 100 V
- (3) 4.5 A, 100 V
- (4) 6.0 A, 225 V



Section: Chemistry

- Which of the following elements belongs to first inner transition series?
 - (1) Bk
 - (2) Pu
 - (3) Pr
 - (4) Fm
- What is IUPAC name of hydroquinone?
 - (1) Benzene-1,4-diol
 - (2) Benzene-1,3,5-triol
 - (3) Benzene-1,2-diol
 - (4) Benzene-1,2,4-triol
- Which of the following is multimolecular colloid?
 - (1) Silver sol
 - (2) Solution of rubber in organic solvent
 - (3) Aqueous solution of protein
 - (4) Aqueous polyvinyl alcohol
- Identify the process of refining to obtain pig tin
 - (1) Liquation
 - (2) Mond process
 - (3) van Arkel
 - (4) Polling
- Which of the following actinoids exhibits only +3 oxidation state?
 - (1) Lr ($z = 103$)
 - (2) U ($z = 92$)
 - (3) Th ($z = 90$)
 - (4) Pa ($z = 91$)
- A first order reaction has a rate constant 0.00813 min^{-1} . How long will it take for 60% completion?
 - (1) 98.7 min
 - (2) 56.35 min
 - (3) 112.7 min
 - (4) 62.77 min
- If entropy of a solid is greater than zero, at $T = 0$, it is called
 - (1) standard entropy
 - (2) residual entropy

- (3) formal entropy
 - (4) absolute entropy
8. Propane nitrile on reaction with ethyl magnesium iodide in presence of dry ether gives complex. This imine complex on acid hydrolysis forms
- (1) 2-Pentanone
 - (2) Butanone
 - (3) Propanone
 - (4) 3-Pentanone
9. Which polymer from following is used as synthetic leather?
- (1) Bakelite
 - (2) PVC
 - (3) Polystyrene
 - (4) Polythene



Section: Mathematics

1. For any non-zero vectors $\vec{a}$ and $\vec{b}$, $|\vec{b} \times \vec{a} \times \vec{b} \cdot \vec{a}| =$
 - (1) $|\vec{a} \times \vec{b}|$
 - (2) $|\vec{a} \times \vec{b}|^2$
 - (3) 0
 - (4) $\vec{a} \times \vec{b}$
2. The integrating factor of the differential equation $\sin y \left(\frac{dy}{dx} \right) = \cos y (1 - x \cos y)$ is
 - (1) e^{-x}
 - (2) $e^{-\cos y}$
 - (3) e^{-y}
 - (4) $e^{\sin y}$
3. $\int \frac{1+2e^{-x}}{1-2e^{-x}} dx =$
 - (1) $x - \log(1 - 2e^{-x}) + c$
 - (2) $\log(1 - 2e^{-x}) + c$
 - (3) $x + \log(1 - 2e^{-x}) + c$
 - (4) $x + 2 \log(1 - 2e^{-x}) + c$
4. The area included between the parabolas $y^2 = 5x$ and $x^2 = 5y$ is
 - (1) $\frac{25}{7}$ sq. units
 - (2) $\frac{25}{3}$ sq. units
 - (3) $\frac{25}{4}$ sq. units
 - (4) 25 sq. units
5. The domain of the function $f(x) = \sqrt{x}$ is
 - (1) $R - \{0\}$
 - (2) R^+
 - (3) $R^+ \cup \{0\}$
 - (4) R
6. The maximum value of $Z = 3x + 5y$, subject to $3x + 2y \leq 18, x \leq 4, y \leq 6, x, y \geq 0$ is
 - (1) 30
 - (2) 27
 - (3) 36
 - (4) 32
7. The rational form of a number $1.\overline{41}$ is
 - (1) $\frac{154}{99}$
 - (2) $\frac{55}{99}$
 - (3) $\frac{140}{99}$

(4) $\frac{41}{99}$

8. The order and degree of the differential equation $[1 + (\frac{dy}{dx})^2]^{7/3} = 7\frac{d^2y}{dx^2}$ are respectively

(1) 2, 1

(2) 2, 3

(3) 1, 2

(4) 3, 2

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