

PHYSICS

1. A zero resultant cannot be obtained by combining ——— vectors of different magnitude.
(A) Two (B) Three (C) Four (D) Five

2. The gravitational force of attraction between two bodies each of mass 1 Kg and separated by 1 m is
(A) 6.675×10^{-11} N (B) 6.675×10^{-8} N (C) 6.675 N (D) 1 N

3. An oil drop placed on the surface of water spreads as a thin layer because
(A) Surface tension of water is greater than that of oil
(B) Surface tension of water is less than that of oil
(C) Viscosity of oil is greater than viscosity of water
(D) Of large difference in densities of oil and water

4. Two identical wires of iron and copper are joined to make a cylindrical composite wire. A load is hung from the bottom of the wire keeping its top end fixed. If $Y_{Fe} > Y_{Cu}$, (Y is Young's modulus and Δl the change in length)
(A) Stresses in the two wires will be unequal (B) Strains in the wires will be equal
(C) $\Delta l_{Cu} > \Delta l_{Fe}$ (D) $\Delta l_{Cu} < \Delta l_{Fe}$

5. The radius of the earth is 6400 Km and $g = 10 \text{ ms}^{-2}$. In order that a body of 5 Kg weighs zero at the equator, the angular speed of the earth is
(A) $1 / 80 \text{ rad S}^{-1}$ (B) $1 / 400 \text{ rad S}^{-1}$ **(C) $1 / 800 \text{ rad S}^{-1}$** (D) $1 / 1600 \text{ rad S}^{-1}$

6. A particle of mass 2 g moves on a straight line and its time-distance relationship is $s = 5 t + 4 t^2$ in the c g s system. The force acting on it is
(A) 16 dyne (B) 20 dyne (C) 24 dyne (D) 28 dyne

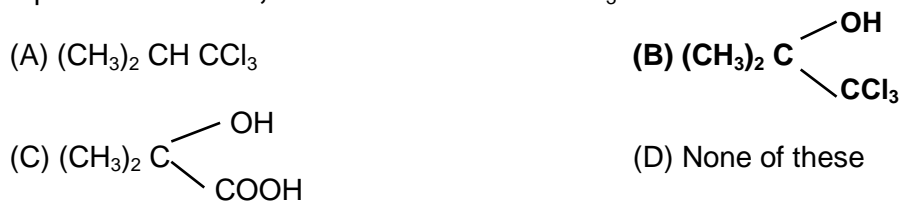
CHEMISTRY

1. The pair in which two species are isostructural ?
(A) SiF_4 and SF_4 (B) IO_3^- and XeO_3 **(C) BH_4^- and NH_4^+** (D) PF_6^- and SF_6
2. The enthalpies of formation of $\text{CO}_2(\text{g})$ and $\text{CaO}(\text{s})$ are -94.0 kJ and -152 kJ respectively and the enthalpy of the reaction $\text{CaCO}_3(\text{s}) \rightarrow \text{CO}_2(\text{g}) + \text{CaO}(\text{s})$ is 42.0 kJ . The enthalpy of formation of $\text{CaCO}_3(\text{s})$ is
(A) -42 kJ (B) -202 kJ (C) $+202 \text{ kJ}$ **(D) -288 kJ**
3. Which is expected to be paramagnetic ?
(A) $[\text{Ni}(\text{H}_2\text{O})_6]^{2+}$ (B) $[\text{Ni}(\text{CO})_4]$ (C) $[\text{Zn}(\text{NH}_3)_4]^{2+}$ (D) $[\text{Co}(\text{NH}_3)_6]^{3+}$

4. The reaction, $\text{C}_6\text{H}_5\text{CHO} + \text{CH}_3\text{CHO} \xrightarrow{\text{Dil. NaOH}} \text{C}_6\text{H}_5\text{CH}=\text{CHCHO}$ is called
(A) Benzoin condensation **(B) Claisen condensation**
(C) Perkin reaction (D) Cannizzaro's reaction

5. In the conversion $\text{CH}_3\text{CONH}_2 \xrightarrow[\Delta]{\text{P}_2\text{O}_5} \text{CH}_3\text{CN}$, the hybridization state of the carbon changes from
(A) sp^2 to sp^3 (B) sp to sp^3 (C) sp to sp^2 **(D) sp^2 to sp**

6. In presence of KOH , acetone reacts with CHCl_3 to form



MATHEMATICS

1. If the sum of the roots of the quadratic equation $ax^2 + bx + c = 0$ is equal to the sum of the squares of their reciprocals, then a/c , b/a and c/b are in
- (A) Arithmetic - Geometric Progression (B) Arithmetic Progression
(C) Geometric Progression **(D) Harmonic Progression**
2. If $\cos x = \tan y$, $\cos y = \tan z$, $\cos z = \tan x$, then the value of $\sin x$ is
- (A) $2 \cos 18^\circ$ (B) $\cos 18^\circ$ (C) $\sin 18^\circ$ **(D) $2 \sin 18^\circ$**
3. If coordinates of the vertices of a triangle are (2,0) (6,0) and (1,5), then distance between its orthocentre and circumcentre is
- (A) 4 (B) 6 **(C) 5** (D) 8
4. Equation of tangent at the vertex of parabola $x^2+8x+4y = 0$ is
- (A) $x = 4$ (B) $x = -4$ **(C) $y = 4$** (D) $y = -4$
5. The area bounded by two branches of the curve $(y-x)^2 = x^3$ and $x = 1$ equals
- (A) $3/5$ (B) $5/4$ (C) $6/5$ **(D) $4/5$**
6. If A, B, C are the angles of a triangle, then the value of $\sin^2 A + \sin^2 B + \sin^2 C - 2 \cos A \cos B \cos C$ is given by
- (A) 1 **(B) 2** (C) 3 (D) 4