Atomic Energy Central Schoool No.4 Rawatbhata
Multiple Choice Test (January 2019)
Class XI, (Physics, Chemistry, Mathematics)

MM: 60 **Time : 60 minutes**

1 The compressibility of water is 4×10^{-5} per unit atmospheric pressure. The decrease in volume of 100 cm^3 of water under a pressure of 100 atmosphere will be

A) $0.4cm^3$ B) $4x\ 10\text{-}5cm^3$ C) $0.004cm^3$ D) $0.025cm^3$

2 The largest and the shortest distance of the earth from the sun are r1and r2. Its distance from the sun when it is at perpendicular to the major-axis of the orbit drawn from the sun is

A) $(r1 + r2)/4$ B) $(r1 + r2)/ 3$ C) $2(r1 \times r2)/ (r1 + r2)$ D) $(r1 + r2)/ (r1 - r2)$

3 The terminal velocity v_t of a small steel ball of radius r falling under gravity through a column of a viscous liquid of coefficient of viscosity depends on mass of the ball m, acceleration due to gravity g, coefficient of viscosity η and radius r. Which of the following relations is dimensionally correct?

A) $v_t \propto \frac{mgr}{\eta}$ B) $v_t \propto mg\eta r$ C) $v_t \propto \frac{mg}{r\eta}$ D) $v_t \propto \frac{\eta mg}{r}$

4 If the gravitational force between two objects were proportional to 1/R (and not as $1/R^2$) where R is separation between them, then a particle in circular orbit under such a force would have its orbital speed v proportional to

A) $1/R$ B) R^0 C) R D) $1/R^2$

5 The angle of contact between pure water and pure glass, is

A) 1350° B) 45° C) 90° D) 0°

6 A planet is moving in an elliptical orbit around the sun. If T, V, E, and L stands for kinetic energy, gravitational potential, total energy, and magnitude of angular moment bout the center of force respectively

A) T is conserved B) L is conserved but direction of vector L changes continuously C) E is always negative D) V is always positive

7 A rectangular block of mass m and area of cross-section A floats in a liquid of density ρ. if it is given a small vertical displacement from equilibrium it undergoes oscillation with a time period T. Then

A) $T \propto \sqrt{\rho}$ B) $T \propto 1/\rho$ C) $T \propto 1/\sqrt{m}$ D) $T \propto 1/\sqrt{A}$

8 A soap bubble has radius r and volume V. If the excess pressure inside the bubble is P. Then PV is proportional to

A) r B) r^4 C) r^3 D) r^2

9 A satellite of mass am is orbiting around the earth in a circular orbit with a velocity v. What will be its total energy?

A) $(3/4)\ mv^2$ B) $(1/2)\ mv^2$ C) mv^2 D) $-(1/2)mv^2$

10 A ball is falling in a lake of depth 200m creates a decrease of 0.1% in its volume at the bottom. The bulk modulus of the material of the ball will be ..

A) 19.6×10^{-8} N/m2 B) 19.6×10^{8} N/m2 C) 19.6×10^{-10} N/m2 D) 19.6×10^{10} N/m2

11 A seconds pendulum is mounted in a rocket. Its period of oscillation decreases when the rocket

A) comes down with uniform acceleration B) moves round the earth in a geostationary orbit C) moves up with a uniform velocity D) moves up with uniform acceleration

12 The kinetic energy of one gram molecule of a gas at normal temperature and pressure is (R=8.31 J/ mole K)

A) 3.4×10^{3} B) 2.97×10^{3} C) 1.2×10^{3} D) 0.66×10^{3}

13 A big drop of radius R is formed by 1000 small droplets of water, the radius of small drop is

A) R/10 B) R/100 C) R/500 D) R/1000

14 Satellite A of mass m is at a distance of r from the surface of the earth. Another satellite B of mass 2m is at a distance of 2r from the earth's center. Their time periods are in the ratio of

A) 1:2 B) 1:16 C) 1:32 D) $1 : 2\sqrt{2}$

15 An iron rod of length 2m and cross -sectional area of 50 mm2is stretched by 0.5mm, when a mass of 250kg is hung from its lower end. Young's modulus of iron rod is

A) $19.6 \times 10^{20} N/m^2$ B) $19.6 \times 10^{18} N/m^2$ C) $19.6 \times 10^{15} N/m^2$ D) $19.6 \times 10^{10} N/m^2$

16 The escape velocity from earth is 11.2 km/s. If a body is to be projected in a direction making an angle 45° to the vertical, then the escape velocity is

A) 11.2×2 km/s B) 11.2km/s C) 11.2 √2 km/s D) 11.2 / √2 km/s

17 A ball is dropped from a satellite revolving around the earth at a height of 120 km: The ball will -

A) continue to move with same speed along a straight line tangentially to the satellite at that time B) continue to move with the same speed along the original orbit of satellite C) fall down to earth gradually D) go far away in space

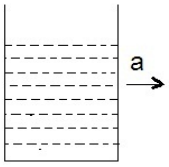
18 A roller coaster is designed such that riders experience "weight lessens" as they go round the lop of a hill whose radius of curvature is 20 m. The speed of the car at the top of the hill is between:

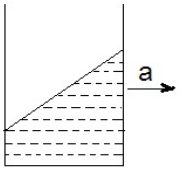
A) 14 m/s and 15 m/s B) 15 m/s and 16 m/s C) 16 m/s and 17 m/s D) 13 m/s and 14 m/s

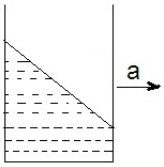
19 Two rods of thermal conductivities K1 and K2 cross-sections A1 and A2 and specific heats S1 and S2 are of equal lengths. The temperatures of two ends of each rod are T1, and T2. The rate of flow of heat at the steady state will be equal if

A) $\frac{K_1}{A_1 S_1} = \frac{K_2}{A_2 S_2}$ B) $K_1A_1=K_2A_2$ C) $K_1S_1=K_2S_2$ D) $A_1S_1=A_2S_2$

20 A vessel containing water is given a constant acceleration 'a' towards the right along a straight horizontal path. Which of the following diagram in fiure represents the surface

A) 

B) 

C) 

D) none of these

21 The alkali metals are low melting. Which of the following alkali meral is expected to melt if the room temperature rises to 30^0C?

A) Na B) K C) RB D) Cs

22 Alkali metals react with water vigorously to form hydroxide and dihydrogen. Which of the following alkali metals reacts with water least vigorously?

A) Li B) Na C) K D) Cs

23 The reducing power of a metal depends on various factors. Suggest the factor which makes lithium, the strongest reducing agent in aqueous solution:

A) Sublimation enthalpy B) Ionization enthalpy C) Hydration enthalpy D) Electron gain enthalpy

24 Which of the following metal hydroxides is least basic?

A) $Mg(OH)_2$ B) $Ca(OH)_2$ C) $Sr(OH)_2$ D) $Ba(OH)_2$

25 In the synthesis of sodium carbonate, the recovery of ammonia is done by treating NH_4Cl witjh$Ca(OH)_2$. The byproduct in this process is:

A) $CaCl_2$ B) NaCl C) NaOH D) $NaHCO_3$

26 When sodium dissolves in liquid ammonia, a deep blue solution is obtained. The colour of solution is due to:

A) Ammoniated electron B) Sodium ion C) Sodium amide D) Ammoniated cation

27 By adding gypsum to cement:

A) Setting time of cement decrees B) Setting time of cement increases C) Colour becomes light D) Surface becomes shining

28 Dead burnt plaster is:

A) $CaSO_4$ B) $CaSO_4.H_2O$ C) $CaSO_4.1/2H_2O$ D) $CaSO_4.2H_2O$

29 Washing soda is:

A) Na_2CO_3 B) $NaHCO_3$ C) $Na_2CO_3.10H_2O$ D) K_2CO_3

30 Molecular formula of Glauber's salt is:

A) $MgSO_4.7H_2O$ B) $CuSO_4.5H_2O$ C) $Na_2SO_4.10H_2O$ D) $FeSO_4.7H_2O$

31 Which of the following is Lewis acid?

A) $AlCl_3$ B) $MgCl_2$ C) $CaCl_2$ D) $BaCl_2$

32 Which of the following oxides is acidic in nature?

A) B_2O_3 B) Al_2O_3 C) Ga_2O_3 D) In_2O_3

33 Boric acid is an acid because the molecule:

A) Contains replaceable hydrogen ion B) Gives up a proton C) Accepts OH^- ion from water releasing proton D) Combines with proton from water molecule

34 Quartz is extensively used as piezoelectric material, it contains:

A) Pb B) Si C) Ti D) Sn

35 The most commonly used reducing agent is:

A) AlCl3 B) PbCl2 C) SnCl2 D) SnCl4

36 Which of the following is the most abundant metal in the earth's crust?

A) Fe B) Al C) Ca D) Na

37 Shape of BF3 molecule is:

A) Linear B) Planer C) Tetrahedral D) Pyramidal

38 Thallium show +1 oxidation state because:

A) Its high reactivity B) Inert pair effect C) Its amphoteric nature D) None

39 The formula of aluminiun nitride is:

A) AlN B) Al3N C) AlN3 D) Al2N3

40 Thermodynamically most stable form of carbon is:

A) Diamond B) graphite C) Fullerenes D) Coal

41 The distance between the foci of a hyperbola is 16 and its eccentricity is $\sqrt{2}$. its equation is

A) $x^2 - y^2 = 32$ B) $\frac{x^2}{4} - \frac{y^2}{9} = 1$ C) $2x - 3y^2 = 7$ D) None

42 The equation of ellipse whose focus is(1,-1) directrix is like x-y-3=0 and eccentricity $\frac{1}{2}$ is

A) $7x^2 + 2xy + 7y^2 - 10x + 10y + 7 = 0$ B) $7x^2 + 2xy + 7y^2 + 7 = 0$ C) $7x^2 + 7y^2 - 10xy = 0$ D None

43 The distance of point P(3,4,5) from YZ-plane is

A) 3 uints B) 5 units C) 4 units D) 550

44 L is the foot of perpendicular drawn from a point P(3,4,5) on the XY plane. The Coordi of point L are

A) (3,0,0) B) (3,4,0) C) (3,0,5) D) None

45 If a parallelepiped is formed by planes drawn through the pts(5,8,10) and (3,6,8) parallel to the coordinate planes, then the length of diagonal of parallelepiped is

A) $\sqrt{2}$ B) $3\sqrt{2}$ C) $2\sqrt{3}$ D $\sqrt{3}$

46 $\lim_{x \to 1} \frac{x^m - 1}{x^n - 1}$ is equal to

A) 1 B) m/n C) $-\frac{m}{n}$ D) $\frac{m^2}{n^2}$

47 $\lim_{\theta \to 0} \frac{1 - cos4\theta}{1 - cos6\theta}$ is equal to

A) 4/9 B) 1/2 C) -1/2 D -1

48 $\lim_{x \to 0} \left(sinmxcot\frac{x}{\sqrt{3}}\right) = 2$, then m=-----

A) $\frac{2}{\sqrt{3}}$ B) $\frac{2\sqrt{3}}{3}$ C) $\sqrt{3}$ D) none

49 $\lim_{x \to 0} \frac{|sinx|}{x}$ is equal to

A) 1 B) -1 C) Does not exist D None of these

50 $\lim_{x \to 0} \frac{x^2 cosx}{1 - cosx}$ *is equal to*

A) 2 B) 3/2 C) -3/2 D) 1

51 If the equation $(4a - 3)x^2 + ay^2 + 6x - 2y + 2 = 0$ *represents a circle, then its centre is*

A) (3, -1) B) (3, 1) C) (-3, 1) D) None of these

52 The vertex of the parabola $(y + a)^2 = 8a(x - a)$ *is*

A) (-a, -a) B) (a, -a) C) (-a, a) D) None of these

53 The eccentricity of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ *if its latus − rectum is equal to one half of its minor axis, is*

A) $\frac{1}{\sqrt{2}}$ B) $\frac{\sqrt{3}}{2}$ C) $\frac{1}{2}$ D) None of these

54 The sum of the focal distances of any point on the ellipse $9x^2 + 16y^2 = 144$ is

A) 32 B) 18 C) 16 D 8

55 The coordinates of the foot of the perpendicular drawn from the point P(3,4,5) on the yz-plane are

A) (3,4,0) B) (0,4,5) C) (3,0,5) D) (3,0,0)

56 The perpendicular distance of the point P(3,3,4) from the x-axis is

A) $3\sqrt{2}$ B) 5 C) 3 D) 4

57 $\theta \xrightarrow{lim} \pi/2 \ \frac{1-sin\theta}{(\pi/2-\theta)cos\theta}$ is equal to

A) 1 B) -1 C) 1/2 D) -1/2

58 $x \xrightarrow{lim} 0 \frac{\sqrt{1+x}-1}{x}$ *is equal to*

A) 1/2 B) 2 C) 0 D) 1

59 If $y = \sqrt{x} + \frac{1}{\sqrt{x}}, then \ \frac{dy}{dx} \ at \ x = 1 \ is$

A) 1 B) $\frac{1}{2}$ C) $\frac{1}{\sqrt{2}}$ D) 0

60 If $y = \frac{\sin(x+9)}{cosx}, then \ \frac{dy}{dx} \ at \ x = 0 \ is$

A) Cos9 B) Sin9 C) 0 D) 1

Answer Key

1	2	3	4	5	6	7	8	9	10
A	C	C	B	D	C	D	D	D	B
11	12	13	14	15	16	17	18	19	20
D	A	A	D	D	B	B	A	B	C
21	22	23	24	25	26	27	28	29	30
D	A	B	A	A	A	B	A	C	C
31	32	33	34	35	36	37	38	39	40
A	A	C	B	C	B	B	B	A	B
41	42	43	44	45	46	47	48	49	50
A	A	A	B	C	B	A	B	C	A
51	52	53	54	55	56	57	58	59	60
C	B	B	D	B	B	C	A	D	A