NEET PHYSICS 2018-19 - Chennai

Periodic Test : 02 **Test ID : 014**

Number of questions: 150 **Test date: 21.03.2019**

Name: _____ **Time**: 3HRS

ID No: _____

Negative Marks : 4 marks for correct attempt & 1 mark deducted for every wrong attempt.

1. Of the following quantities, which one has dimensions different from the remaining three?
   (a) Energy per unit volume
   (b) Force per unit area
   (c) Product of voltage and charge per unit volume
   (d) Angular Momentum

2. Dimensional formula of self inductance is
   (a) $[MLT^{-2}A^{-2}]$
   (b) $[ML^{2}T^{-1}A^{-2}]$
   (c) $[ML^{2}T^{-2}A^{-2}]$
   (d) $[ML^{2}T^{-2}A^{-1}]$

3. The dimensional formula of torque is
   (a) $[ML^{2}T^{-2}]$
   (b) $[MLT^{-2}]$
   (c) $[ML^{-1}T^{-2}]$
   (d) $[ML^{-2}T^{-2}]$

4. If C and R denote capacitance and resistance, the dimensional formula of CR is
   (a) $[M^{0}L^{0}T^{1}]$
   (b) $[M^{0}L^{0}T^{0}]$
   (c) $[M^{0}L^{0}T^{-1}]$
   (d) Not expressible in terms of MLT.

5. The dimensional formula of angular momentum is
   (a) $[ML^{2}T^{-2}]$
   (b) $[ML^{-2}T^{-1}]$
   (c) $[MLT^{-1}]$
   (d) $[ML^{2}T^{-1}]$

6. A car moves a distance of 200 m. It covers the first half of the distance at speed 40 km/h and the second half of distance at speed ν. The average speed is 48 km/h. the value of ν is
   (a) 56 km/h
   (b) 60 km/h
   (c) 50 km/h
   (d) 48 km/h

7. A bus travelling the first one-third distance at a speed of 10 km/h, the next one-third at 20 km/h and at last one-third 60 km/h. The average speed of the bus is
   (a) 9 km/h
   (b) 16 km/h
   (c) 18 km/h
   (d) 48 km/h.

8. A car covers the first half of the distance between two places at 40 km/h and another half at 60 km/h. The average speed of the car is
   (a) 40 km/h
   (b) 48 km/h
   (c) 50 km/h
   (d) 60 km/h

9. What will be the ratio of the distance moved by a freely falling body from rest in 4^{th} and 5^{th} seconds of journey?
   (a) 4:5
   (b) 7:9
   (c) 16:25
   (d) 1:1

10. A car is moving along a straight road with a uniform acceleration. It passes through two points P and Q separated by a distance with velocity 30 km/h and 40 km/h respectively.

The velocity of the car midway between P and Q is

(a) 33.3 km/h
(b) $20\sqrt{2}$ km/h
(c) $25\sqrt{2}$ km/h
(d) 35 km/h.

11. An electric fan has blades of length 30 cm measured from the axis of rotation. If the rotating at 120 rpm, the acceleration of a point on the tip of the blade is
(a) 1600 ms^{-2}
(b) 47.4 ms^{-2}
(c) 23.7 ms^{-2}
(d) 50.55 ms^{-2}

12. The maximum range of a gun of horizontal terrain is 16 km. If g=10ms-2,then muzzle velocity of a shell must be
(a) 160 m s-1
(b) ms^{-1}
(c) 400 m s^{-1}
(d) 800 ms $^{-1}$

13. A bus moving on the straight road towards north with a uniform speed of 50 km/hour then it turns left through 90^0. If the speed remains unchanged after turning, the increase in the velocity of bus in the turning process is
(a) 70.7 km/hr along south-west direction
(b) Zero
(c) 50 km/hr along west
(d) 70.7 km/hr along north-west direction

14. The magnitude of vectors $\vec{A}$, $\vec{B}$ and $\vec{C}$ are 3, 4 and 5 units respectively. If $\vec{A} + \vec{B}=\vec{C}$, the angle between $\vec{A}$ and $\vec{B}$ is
(a) $\pi/2$
(b) $\cos^{-1}(0.6)$
(c) $\tan^{-1}(\frac{7}{5})$
(d) $\pi/4$

15. A train of 150 metre length is going towards north direction at a speed of 10 m/s. A parrot files at the speed of 5 m/s towards south direction parallel to the railways track. The time taken by the parrot to cross the train is
(a) 12 sec
(b) 8 sec
(c) 15 sec
(d) 10 sec.

16. When milk is churned, cream gets separated due to
(a) Centripetal force
(b) Centrifugal force
(c) Frictional force
(d) Gravitational force.

17. A particle of mass m is moving with a uniform velocity v_1. It is given an impulse such that its velocity becomes v_2. The impulse is equal to
(a) $m[|v_2|-|v_1|]$
(b) $\frac{1}{2}\, m[|v_2^2|-|v_1^2|]$
(c) $m[v_1+v_2]$
(d) $m[v_2+v_1]$

18. A 600 kg rocket is set for a vertical fring. If the exhaust speed is 1000 ms^{-1}, the mass of the gas ejected per sound to supply the thrust needed to overcome the weight of rocket is
(a) 117.6 kg s^{-1}
(b) 58.6 kg s^{-1}
(c) 6 kg s^{-1}
(d) 76.4 kg s^{-1}

19. The body of the mass 5kg explodes at rest into three fragments with masses in the ratio 1 : 1: 3. The fragments with equal masses fly in mutually perpendicular directions with speeds of 21 m/s. The velocity of velocity of heaviest fragment in m/s will be
(a) $7\sqrt{2}$
(b) $5\sqrt{2}$
(c) $3\sqrt{2}$
(d) $\sqrt{2}$

20. Starting from rest, a body slides down a 45^0 inclined plane in twice the time it takes to slide down the same distance in the absence of friction. The coefficient of friction between the body and the inclined plane is
(a) 0.80
(b) 0.75
(c) 0.25
(d) 0.33.

21. Two masses of 1 g and 9 g are moving with equal kinetic energies. The ratio of the magnitudes of their respective linear momenta is

(a) 1 : 9
(b) 9 : 1
(c) 1 : 3
(d) 3 : 1

22. A particle of mass M is moving in a horizontal circle of radius R with uniform speed v. When it moves from one point to diametrically opposite point, its
(a) Kinetic energy change by $Mv^2/4$
(b) Momentum does not change
(c) Momentum change by $2Mv$
(d) Kinetic energy changes by Mv^2

23. How much water a pump of 2 kW can raise in one minute to a height of 10m? (take g=10 m/s^2)
(a) 1000 litres
(b) 1200 litres
(c) 100 litres
(d) 2000 litres

24. A bullet of mass 10 g leaves a rifle at an initial velocity of 1000 m/s and strikes the earth at the same level with a velocity of 500 m/s. The work done in joule overcoming the resistance of air will be
(a) 375
(b) 3750
(c) 5000
(d) 500

25. The coefficient of restitution e for a perfectly elastic collision is
(a) 1
(b) 0
(c) ∞
(d) -1

26. A fly wheel rotating about fixed axis has a kinetic energy of 360 joule when its angular speed is 30 radian/sec. The moment of inertia of the wheel about the axis of rotation is
(a) 0.6 kgm^2
(b) 0.15 kgm^2
(c) 0.8 kgm^2
(d) 0.75 kgm^2

27. The moment of inertia of a body about a given axis is 1.2 kgm^2. Initially, the body is at rest. In order to produce a rotational kinetic energy of 1500 joule, an angular acceleration of 25 radian/sec^2 must be applied about that axis for a duration of
(a) 4 s
(b) 2 s
(c) 8 s
(d) 10 s

28. The moment of inertia of a uniform circular disc about a diameter is *I*. its moment of inertia about an axis perpendicular to its plane and passing through a point on its rim will be
(a) 5*I*
(b) 3*I*
(c) 6*I*
(d) 4*I*

29. A solid homogenous sphere of mass *M* and radius is moving on a rough horizontal surface, partly rolling and partly sliding. During this kind of motion of this sphere
(a) Total kinetic energy is conserved
(b) The angular momentum of the sphere about the point of contact with the plane is conserved
(c) Only the rotational kinetic energy about the centre of mass is conserved
(d) Angular momentum about the centre of mass of conserved.

30. A ring of mass m and radius r rotates about an axis passing through its centre and perpendicular to its plane with angular velocity ω. Its kinetic energy is
(a) $½ mr^2\omega^2$
(b) $mr\omega^2$
(c) $mr^2\omega^2$
(d) $½ mr\omega^2$

31. The mean radius of earth is R, its angular speed on its own axis is ω and the acceleration due to gravity at earth's surface is g. What will be the radius of the orbit of a geostationary satellite?
(a) $(R^2g/\omega^2)^{1/3}$
(b) $(Rg/\omega^2)^{1/3}$
(c) $(R^2\omega^2/g)^{1/3}$
(d) $(R^2g/\omega)^{1/3}$

32. The satellite of mass m 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) $-(1/2)mv^2$

33. A planet is moving in an elliptical orbit around the sun. If *T, V, E* and *L* stand respectively for its kinetic energy, gravitational potential energy, total energy and magnitude of angular momentum about the centre of force, which of the following is correct?
    (a) *T* is covered
    (b) *V* is always positive
    (c) *E* is always negative
    (d) *L* is conserved but direction of vector *L* changes continuously.

34. For a satellite escape velocity is 11 km/s. If the satellite is launched at an angle 60^0 with the vertical, then escape velocity will be
    (a) 11 km/s
    (b) $11\sqrt{3}$ km/s
    (c) $11/\sqrt{3}$ km/s
    (d) 33 km/s

35. The largest and the shortest distance of the earth from the sun are r1 and r2. Its distance from the sun when it is at perpendicular to the major-axis of the orbit drawn from the sun is
    (a) $\frac{r_1+r_2}{4}$
    (b) $\frac{r_1+r_2}{r_1-r_2}$
    (c) $\frac{2r_1r_2}{r_1+r_2}$
    (d) $\frac{r_1+r_2}{3}$

36. If the temperature of the sun is doubled, the rate of energy received on earth will be increased by a factor of
    (a) 2
    (b) 4
    (c) 8
    (d) 16

37. Mercury thermometer can be used to measure temperature upto
    (a) 260℃
    (b) 100℃
    (c) 360℃
    (d) 500℃

38. A Centigrade and a Fahrenheit thermometer are dipped in boiling water. The water temperature id lowered until the Fahrenheit thermometer registers 140℉. What is the fall in temperature as registered by the centigrade thermometer?
    (a) 80℃
    (b) 60℃
    (c) 40℃
    (d) 30℃

39. Thermal capacity of 40 g of aluminum (s=0.2 cal/g K) is
    (a) 168 J/K
    (b) 672 J/K
    (c) 840 J/K
    (d) 33.6 J/K.

40. 10 gm of ice cubes at 0℃ are released in a tumbler (water equivalent 55 g) at 40℃. Assuming that negligible heat is taken from the surroundings, the temperature of water in the tumbler becomes nearly (L=80 cal/g)
    (a) 31℃
    (b) 22℃
    (c) 19℃
    (d) 15℃

41. For a certain gas the ratio of specific heats is given be $\gamma = 1.5$. For this gas
    (a) $C_V = 3R/J$
    (b) $C_P = 3R/J$
    (c) $C_P = 5R/J$
    (d) $C_V = 5R/J$

42. A polyatomic gas with n degrees of freedom has a mean energy per molecule given by
    (a) $\frac{nkT}{N}$
    (b) $\frac{nkT}{2N}$
    (c) $\frac{nkT}{2}$
    (d) $\frac{3kT}{2}$

43. At the volume temperature is increased then
    (a) Collision on walls will be less

(b) Number of collisions per unit time will increase
(c) Collisions will be in straight lines
(d) Collisions will not change.

44. Two containers A and B are partially filled with water and closed. The volume of A is twice that of B and it contains half the amount of water in B. If both are at the same temperature, the water vapour in the containers will have pressure in the ratio of
(a) 1 : 2
(b) 1 : 1
(c) 2 : 1
(d) 4 : 1

45. First law of thermodynamics is consequence of conservation of
(a) Work
(b) Energy
(c) Heat
(d) All of these.

46. A simple pendulum is suspended from the roof of a trolley which moves in a horizontal direction with an acceleration α, then the time period is given by $T=2\pi\sqrt{l/g}$, where g is equal to
(a) g
(b) g- α
(c) g+ α
(d) $\sqrt{(g^2+\alpha^2)}$

47. A body is executing simple harmonic motion. When the displacements from the mean position is 4cm and 5cm, the corresponding velocities of the body is 10 cm/sec and 8 cm/sec. Then the time period of the body is
(a) 2π sec
(b) $\pi/2$ sec
(c) π sec
(d) $3\pi/2$ sec

48. The angular velocity and the amplitude of a simple pendulum is ω and α respectively. At a displacement x from the position if its kinetic energy is T and potential energy is V, then the ratio of T to V is
(a) $\frac{(a^2-x^2\omega^2)}{x^2\omega^2}$
(b) $\frac{x^2\omega^2}{(a^2-x^2\omega^2)}$
(c) $\frac{(\alpha^2-x^2)}{x^2}$
(d) $\frac{x^2}{(\alpha^2-x^2)}$

49. The composition of two simple harmonic motions of equal periods at right angle to each other and with a phase difference of π results in the displacement of the particle along
(a) Circle
(b) Figure of eight
(c) Straight line
(d) Ellipse

50. A mass m is suspended from the two coupled springs connected in series. The force constant for springs are k_1 and k_2. The time period of the suspended mass will be
(a) $T = 2\pi\sqrt{m/k_1-k_2}$
(b) $T = 2\pi\sqrt{mk_1k_2/k_1+k_2}$
(c) $T = 2\pi\sqrt{m/k_1+k_2}$
(d) $T = 2\pi\sqrt{m(k_1+k_2)/k_1k_2}$