1. How many seconds are there in a light fermi?
   (a) 10^{-15}s
   (b) 3.0×10^8s
   (c) 3.33×10^{-24}s
   (d) 3.3×10^{-7}s

2. A machine is delivering constant power to drive a body along a straight line. What is the relation between the distance travelled by the body against time?
   (a) $s^2 \infty t^3$
   (b) $s^2 \infty t^{-3}$
   (c) $s^2 \infty t^2$
   (d) $s \infty t^3$

3. The square of resultant of two equal forces is three times their product. Angle between the forces is
   (a) π
   (b) $\dfrac{\pi}{2}$
   (c) $\dfrac{\pi}{4}$
   (d) $\dfrac{\pi}{3}$

4. An object placed on a ground is in stable equilibrium. If the object is given a slight push then initially the position of centre of gravity
   (a) moves nearer to ground
   (b) rises higher above the ground
   (c) remains as such
   (d) may remain at same level

5. How much work must be done by a force on 50 kg body in order to accelerate it from rest to 20 m/s in 10 s?
   (a) 10^3J
   (b) 10^4J
   (c) 2×10^3J
   (d) 4×10^4J

6. Moment of inertia of circular loop of radius R about the axis of rotation parallel to horizontal diameter at a distance $R/2$ from it is
   (a) MR^2
   (b) $\dfrac{1}{2}MR^2$ MR
   (c) $2MR^2$
   (d) $\dfrac{3}{4}MR^2$

7. What will happen to the weight of the body at the south pole, if the earth stops rotating about its polar axis?
   (a) No change
   (b) Increases
   (c) Decreases but does not become zero
   (d) Reduces to zero

8. A beam of metal supported at the two ends is loaded at the centre. The depression at the centre is proportional to
   (a) Y^2
   (b) Y
   (c) $\dfrac{1}{Y}$
   (d) $\dfrac{1}{Y^2}$

9. A common hydrometer reads specific gravity of liquids. Compared to the 1.6 mark of the stem the mark 1.5 will be
   (a) upwards
   (b) downwards
   (c) in the same place
   (d) may be upward or downward depending upon the hydrometer

10. A balloon contains 500 m^3 of Heat 27°C and 1 atmospheric pressure. The volume of Heat -3°C and 0.5 atmospheric pressure will be
    (a) 700m^3
    (b) 900m^3
    (c) 1000m^3
    (d) 500m^3

11. Which of the following is different from others?
    (a) Wavelength
    (b) Velocity
    (c) Frequency
    (d) Amplitude

12. Two pendulums have time periods T and 5T/4. They starts SHM at the same time from the mean position. What will be the phase difference between them after the bigger pendulum completed one oscillation ?
    (a) 45°　　　　　　　　(b) 90°
    (c) 60°　　　　　　　　(d) 30°

13. A balloon is filled with hydrogen. For sound waves, this balloon behaves like
    (a) a converging lens　　(b) a diverging lens
    (c) a concave mirror　　(d) None of the above

14. Each of the two point charges are doubled and their distance is halved. Force of interaction becomes n times, where n is
    (a) 4　　　　　　　　　(b) 1
    (c) 1/16　　　　　　　(d) 16

15. Two soap bubbles have radii in the ratio of 2:1. What is the ratio of excess pressures inside them?
    (a) 1: 2　　　　　　　(b) 1: 4
    (c) 2:1　　　　　　　(d) 4 : 1

16. The phenomenon of Brownian movement may be taken as evidence of
    (a) kinetic theory of matter
    (b) EMT of radiation
    (c) corpuscular theory of light
    (d) photoelectric phenomenon

17. Two sound waves of slightly different frequencies propagating in the same direction produce beats due to
    (a) interference　　　　(b) diffraction
    (c) reflection　　　　　(d) refraction

18. An ice block floats in a liquid whose density is less than water. A part of block is outside the liquid. When whole of ice has melted, the liquid level will
    (a) rise　　　　　　　(b) go down
    (c) remain same
    (d) first rise then go down

19. Two bodies of different masses of 2 kg and 4 kg moving with velocities 2 m/s and 10 m/s towards each other due to mutual gravitational attraction. What is the velocity of their centre of mass?
    (a) 5 m/s　　　　　　(b) 6 m/s

(c) 8 m/s　　　　　　(d) Zero

20. Given that the displacement of an oscillating particle is given by $y = A \sin (Bx + Ct + D)$. The dimensional formula for (ABCD) is
    (a) $[M_0 L^{-1} T^0]$　　　　(b) $[M^0 L^0 T^{-1}]$
    (c) $[M^0 L^{-1} T^{-1}]$　　　　(d) $[M^0 L^0 T^0]$

21. Two waves having intensities in the ratio of 9:1 produce interference. The ratio of maximum to minimum intensity is equal:
    (a) 10 : 8　　　　　　(b) 9 : 1
    (c) 4 :1　　　　　　　(d) 2 : 1

22. Four wires each of same length, diameter as. materials are connected to each other to form square. If the resistance of each wire is R. then equivalent resistance across the opposite corners is
    (a) R　　　　　　　　(b) $R/2$
    (c) $R/4$　　　　　　　(d) None of these

23. An electric motor runs on DC source of emf 200 V and draws a current of 10 A. If the efficiency be 40% then the resistance of armature is
    (a) 20　　　　　　　　(b) 80
    (c) 120　　　　　　　(d) 160.

24. A capacitor having capacity of 2.0 μF is charged to 200 V and then the plates of the capacitor are connected to a resistance wire The heat produced in joule will be
    (a) 2×10^{-2}　　　　　(b) 4×10^{-2}
    (c) 4×10^4　　　　　(d) 4×10^{10}

25. A voltmeter of range 2V and resistance 300 Ω cannot be converted into ammeter of range
    (a) 1A　　　　　　　　(b) 1mA
    (c) 100mA　　　　　　(d) 10mA

26. If a magnet is suspended at angle 30° to the magnetic meridian, the dip needle makes angle of 45° with the horizontal. The real dip is
    (a) $\tan^{-1}(\sqrt{3}/2)$　　　　(b) $\tan^{-1}(\sqrt{3})$
    (c) $\tan^{-1}(\sqrt{3}/2)$　　　　(d) $\tan^{-1}(2/\sqrt{3})$

27. Which quantity is increased in step-down transformer?
    (a) Current　　　　　　(b) Voltage
    (c) Power　　　　　　(d) Frequency

28. The ratio of intensity at the centre of a bright fringe to the intensity at a point distant or one fourth of the distance between two successive bright fringes will be
(a) 4
(b) 3
(c) 2
(d) 1

29. Which has more luminous efficiency?
(a) A 40 W bulb
(b) A 40 W fluorescent tube
(c) Both have same
(d) Cannot say

30. When a ray of light enters from one medium to another, then its velocity in second medium becomes double. The maximum value of angle of incidence, so that total internal reflection may not take place will be
(a) 60°
(b) 180°
(c) 90°
(d) 30°

31. What should be the velocity of an electron so that its momentum becomes equal to that of a photon of wavelength 5200 Å?
(a) 700 m/s
(b) 1000 m/s
(c) 1400 m/s
(d) 2800 m/s

32. A radioactive element has half-life period of 600 years. After 3000 years, what amount will remain ?
(a) $\frac{1}{2}$
(b) $\frac{1}{16}$
(c) $t\frac{1}{8}$
(d) $\frac{1}{32}$

33. Beyond which frequency, the ionosphere bends any incident electromagnetic radiation but do not reflect it back towards the earth?
(a) 50MHz
(b) 40MHz
(c) 30MHz
(d) 20MHz

34. In intrinsic semiconductor at room temperature number of electrons and holes are
(a) equal
(b) zero
(c) unequal
(d) infinite

35. The unit of thermal conductance is
(a) WK^{-1}
(b) JK^{-1}
(c) WK
(d) JK

36. The value of P so that the vectors $2\hat{i} - \hat{j} + \hat{k}; +2\hat{j} - 3\hat{k}$ and $3\hat{i} + p\hat{j} + 5\hat{k}$ are coplanar should be
(a) 16
(b) -4
(c) 4
(d) -8

37. A capacitor of capacitance C has charge Q and stored energy is W. If the charge is increased to 2Q, the stored energy will be
(a) $\frac{W}{4}$
(b) $\frac{W}{2}$
(c) $2W$
(d) $4W$

38. Pure silicon at 300 K has equal electron (n_e) and hole (n_h) concentration of 1.5×10^{16} m^{-3}. Doping by indium increases n_h to 4.5×10^{22} m^{-3}. The n_e in the doped silicon is
(a) 9×10^5
(b) 5×10^9
(c) 2.25×10^{11}
(d) 3×10^{19}

39. A cylindrical conductor is placed near another positively charged conductor. The net charge acquired by the cylindrical conductor will be
(a) positive only
(b) negative only
(c) zero
(d) either positive or negative

40. If the unit of force is 1 kilo newton, the length is 1 km and time 100 s, what will be the unit of mass?
(a) 1,000kg
(b) 1kg
(c) 10,000kg
(d) 100kg

Answer – Key

1. c	2. a	3. d	4. b	5. b	6. d	7. a	8. c	9. a	10. b
11. d	12. b	13. b	14. d	15. a	16. a	17. a	18. b	19. d	20. b
21. c	22. a	23. c	24. b	25. b	26. d	27. a	28. c	29. b	30. d
31. c	32. d	33. b	34. a	35. a	36. b	37. d	38. b	39. c	40. c