

PHYSICS

1. A thin plano-convex lens acts like a concave mirror of focal length 0.2 m when silvered from its plane surface. The refractive index of the material of the lens is 1.5. The radius of curvature of the convex surface of the lens will be

- 1) 0.4 m
- 2) 0.2 m
- 3) 0.1 m
- 4) 0.75 m

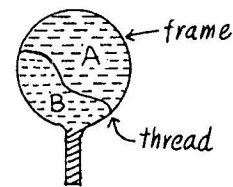
2. The physical quantity having the same dimensions as Planck's constant h is

- 1) Boltzmann constant
- 2) force
- 3) linear momentum
- 4) angular momentum

3. A balloon is rising vertically up with a velocity of 29ms^{-1} . A stone is dropped from it and it reaches the ground in 10 seconds. The height of the balloon when the stone was dropped from it is ($g = 9.8\text{ms}^{-2}$)

- 1) 100 m
- 2) 200 m
- 3) 400 m
- 4) 150 m

4. A thread is tied slightly loose to a wire frame as in figure and the frame is dipped into a soap solution and taken out. The frame is completely covered with the film. When the portion A is punctured with a pin, the thread



- 1) becomes concave towards A
- 2) becomes convex towards A
- 3) remains in the initial position.
- 4) either (1) or (2) depending on the size of A w.r.t. B

5. Oxygen is 16 times heavier than hydrogen. Equal volumes of hydrogen and oxygen are mixed. The ratio of speed of sound in the mixture to that in hydrogen is

- 1) $\sqrt{1/8}$
- 2) $\sqrt{32/17}$
- 3) $\sqrt{8}$
- 4) $\sqrt{2/17}$

(Space for Rough Work)

6. When light is incident on a diffraction grating the zero order principal maximum will be
- 1) one of the component colours
 - 2) absent
 - 3) spectrum of the colours
 - 4) white
7. H - polaroid is prepared by
- 1) stretching polyvinyl alcohol and then heated with dehydrating agent
 - 2) stretching polyvinyl alcohol and then impregnating with iodine.
 - 3) orienting herapathite crystal in the same direction in nitrocellulose.
 - 4) by using thin tourmaline crystals.
8. SI unit of permittivity is
- 1) $C^2 m^2 N^{-1}$
 - 2) $C^{-1} m^2 N^{-2}$
 - 3) $C^2 m^2 N^2$
 - 4) $C^2 m^{-2} N^{-1}$
9. A spherical drop of capacitance $1 \mu F$ is broken into eight drops of equal radius. Then, the capacitance of each small drop is
- 1) $\frac{1}{8} \mu F$
 - 2) $8 \mu F$
 - 3) $\frac{1}{2} \mu F$
 - 4) $\frac{1}{4} \mu F$
10. Two equal forces (P each) act at a point inclined to each other at an angle of 120° . The magnitude of their resultant is
- 1) P
 - 2) $2P$
 - 3) $\frac{P}{2}$
 - 4) $\frac{P}{4}$

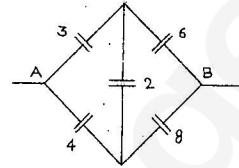
(Space for Rough Work)

16. When a body is earth connected, electrons from the earth flow into the body. This means the body is

- 1) uncharged
2) charged positively
3) charged negatively
4) an insulator

17. Effective capacitance between A and B in the figure shown is (all capacitances are in μF)

- 1) $21 \mu F$
2) $23 \mu F$
3) $\frac{3}{14} \mu F$
4) $\frac{14}{3} \mu F$



18. Which state of triply ionised Beryllium (Be^{+++}) has the same orbital radius as that of the ground state of hydrogen ?

- 1) $n = 1$
2) $n = 2$
3) $n = 3$
4) $n = 4$

19. If M is the atomic mass and A is the mass number, packing fraction is given by

- 1) $\frac{A}{M - A}$
2) $\frac{A - M}{A}$
3) $\frac{M}{M - A}$
4) $\frac{M - A}{A}$

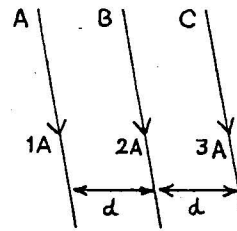
20. A count rate meter shows a count of 240 per minute from a given radioactive source. One hour later the meter shows a count rate of 30 per minute. The half-life of the source is

- 1) 20 min
2) 30 min
3) 80 min
4) 120 min

(Space for Rough Work)

41. Three long straight wires A, B and C are carrying currents as shown in figure. Then the resultant force on B is directed

- 1) towards A.
- 2) towards C.
- 3) perpendicular to the plane of paper and outward.
- 4) perpendicular to the plane of paper and inward.



42. Curie-Weiss law is obeyed by iron at a temperature

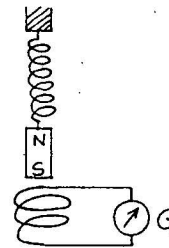
- 1) below Curie temperature
- 2) above Curie temperature
- 3) at Curie temperature only
- 4) at all temperatures

43. The dimensional formula for inductance is

- 1) $ML^2 T^{-1} A^{-2}$
- 2) $ML^2 T^{-2} A^{-1}$
- 3) $ML^2 T^{-2} A^{-2}$
- 4) $ML^2 T A^{-2}$

44. A magnet NS is suspended from a spring and while it oscillates, the magnet moves in and out of the coil C. The coil is connected to a galvanometer G. Then, as the magnet oscillates,

- 1) G shows deflection to the left and right with constant amplitude.
- 2) G shows deflection on one side.
- 3) G shows no deflection.
- 4) G shows deflection to the left and right but the amplitude steadily decreases.



45. The maximum current that can be measured by a galvanometer of resistance 40Ω is 10 mA. It is converted into a voltmeter that can read upto 50 V. The resistance to be connected in series with the galvanometer is (in ohm)

- 1) 5040
- 2) 4960
- 3) 2010
- 4) 4050

(Space for Rough Work)

51. The spectrum obtained from the chromosphere of the sun at the time of total solar eclipse is
- 1) continuous emission spectrum.
 - 2) line absorption spectrum.
 - 3) line emission spectrum.
 - 4) band absorption spectrum
52. Heavy water is
- 1) water, in which soap does not lather
 - 2) compound of heavy oxygen and heavy hydrogen
 - 3) compound of deuterium and oxygen
 - 4) water at 4°C
53. The nuclear reactor at Kaiga is a
- 1) breeder reactor
 - 2) power reactor
 - 3) research reactor
 - 4) fusion reactor
54. When a body moves in a circular path, no work is done by the force since,
- 1) there is no displacement
 - 2) there is no net force
 - 3) force and displacement are perpendicular to each other
 - 4) the force is always away from the centre
55. A bullet moving with a speed of 100 ms^{-1} can just penetrate two planks of equal thickness. Then, the number of such planks penetrated by the same bullet when the speed is doubled will be
- 1) 4
 - 2) 8
 - 3) 6
 - 4) 10

(Space for Rough Work)

