

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)



11. If two waves of the same frequency and amplitude respectively on superposition produce a resultant disturbance of the same amplitude the waves differ in phase by
- 1) $\frac{\pi}{3}$ 2) $\frac{2\pi}{3}$
3) π 4) zero
12. A man, standing between two cliffs, claps his hands and starts hearing a series of echoes at intervals of one second. If the speed of sound in air is 340 ms^{-1} , the distance between the cliffs is
- 1) 340 m 2) 1620 m
3) 680 m 4) 1700 m
13. A beam of light of wavelength 600 nm from a distant source falls on a single slit 1mm wide and the resulting diffraction pattern is observed on a screen 2m away. The distance between the first dark fringes on either side of the central bright fringe is
- 1) 1.2 mm 2) 1.2 cm
3) 2.4 cm 4) 2.4 mm
14. Specific rotation of sugar solution is 0.01 SI units. 200 kgm^{-3} of impure sugar solution is taken in a polarimeter tube of length 0.25 m and an optical rotation of 0.4 rad is observed. The percentage of purity of sugar in the sample is
- 1) 80% 2) 89%
3) 11% 4) 20%
15. An electron is accelerated through a pd of 45.5 volt. The velocity acquired by it is (in ms^{-1}).....
- 1) 4×10^6 2) 4×10^4
3) 10^6 4) zero

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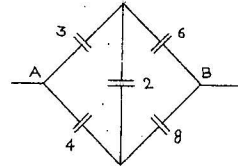


16. When a body is earth connected, electrons from the earth flow into the body. This means the body is

- 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

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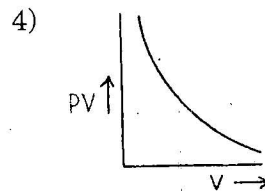
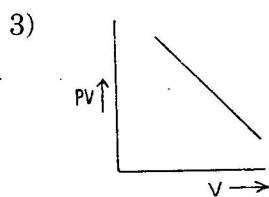
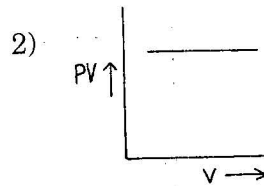
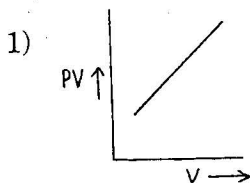
21. The refractive index of a particular material is 1.67 for blue light, 1.65 for yellow light and 1.63 for red light. The dispersive power of the material is

- 1) 0.0615
2) 0.024
3) 0.031
4) 1.60

22. An ideal gas heat engine operates in a Carnot's cycle between 227°C and 127°C . It absorbs $6 \times 10^4 \text{ J}$ at high temperature. The amount of heat converted into work is

- 1) $4.8 \times 10^4 \text{ J}$
2) $3.5 \times 10^4 \text{ J}$
3) $1.6 \times 10^4 \text{ J}$
4) $1.2 \times 10^4 \text{ J}$

23. Which one of the following graphs represents the behaviour of an ideal gas ?



24. Rainbow is formed due to

- 1) refraction
2) dispersion and total internal reflection
3) total internal reflection
4) scattering

25. A beam of parallel rays is brought to a focus by a plano-convex lens. A thin concave lens of the same focal length is joined to the first lens. The effect of this is

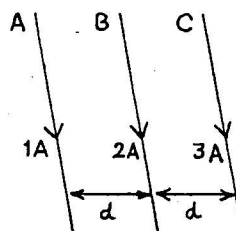
- 1) the focal point shifts away from the lens by a small distance.
2) the focus remains undisturbed.
3) the focus shifts to infinity.
4) the focal point shifts towards the lens by a small distance.

(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

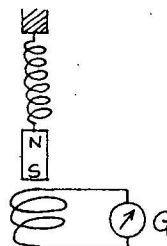
- 1) below Curie temperature
- 2) above Curie temperature
- 3) at Curie temperature only
- 4) at all temperatures

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

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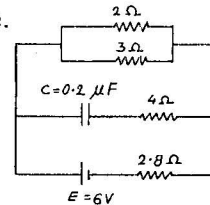
46. An unknown resistance R_1 is connected in series with a resistance of $10\ \Omega$. This combination is connected to one gap of a metre bridge while a resistance R_2 is connected in the other gap. The balance point is at 50 cm. Now, when the $10\ \Omega$ resistance is removed the balance point shifts to 40 cm. The value of R_1 is (in ohm)

- 1) 60
2) 40
3) 20
4) 10

47. In the circuit shown, the internal resistance of the cell is negligible.

The steady state current in the $2\ \Omega$ resistor is

- 1) 0.9 A
2) 1.5 A
3) 0.6 A
4) 1.2 A



48. A rectangular coil of 300 turns has an average area of $25\ \text{cm} \times 10\ \text{cm}$. The coil rotates with a speed of 50 cps in a uniform magnetic field of strength $4 \times 10^{-2}\ \text{T}$ about an axis perpendicular to the field. The peak value of the induced emf is (in volt)

- 1) $3\ \pi$
2) $30\ \pi$
3) $300\ \pi$
4) $3000\ \pi$

49. In a LCR circuit the pd between the terminals of the inductance is 60 V, between the terminals of the capacitor is 30 V and that between the terminals of resistance is 40 V. The supply voltage will be equal to

- 1) 50 V
2) 70 V
3) 130 V
4) 10 V

50. A vertical circular coil of radius 0.1 m and having 10 turns carries a steady current. When the plane of the coil is normal to the magnetic meridian, a neutral point is observed at the centre of the coil. If $B_H = 0.314 \times 10^{-4}\ \text{T}$, the current in the coil is

- 1) 2 A
2) 1 A
3) 0.5 A
4) 0.25 A

(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)



