

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) $\frac{P}{4}$

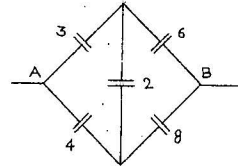
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16. When a body is earth connected, electrons from the earth flow into the body. This means the body is

- 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

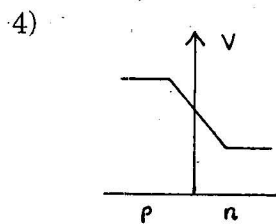
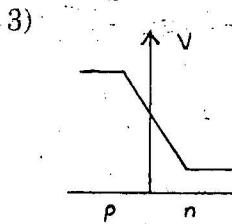
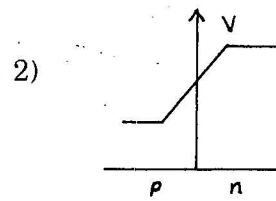
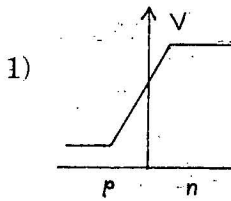
- 1) $\frac{A}{M - A}$
 2) $\frac{A - M}{A}$
 3) $\frac{M}{M - A}$
 4) $\frac{M - A}{A}$

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

(Space for Rough Work)

36. Threshold wavelength for photoelectric emission from a metal surface is 5200 \AA . Photoelectrons will be emitted when this surface is illuminated with monochromatic radiation from
- 1) 50 W IR lamp 2) 10 W IR lamp
3) 1 W IR lamp 4) 50 W UV lamp
37. The emitter-base junction of a transistor is biased while the collector-base junction is biased.
- 1) reverse, forward 2) reverse, reverse
3) forward, forward 4) forward, reverse
38. In a forward biased p-n junction diode, the potential barrier in the depletion region is of the form

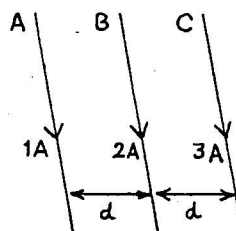


39. A cylinder of radius r and length l is placed in an uniform electric field E parallel to the axis of the cylinder. The total flux for the surface of the cylinder is given by
- 1) $\pi r^2 E$ 2) $(\pi r^2 + \pi l^2) E$
3) zero 4) $2\pi r^2 E$
40. Two electric bulbs A and B are rated as 60 W and 100 W. They are connected in parallel to the same source. Then,
- 1) both draw the same current
2) A draws more current than B
3) B draws more current than A
4) current drawn are in the ratio of their resistances.

(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

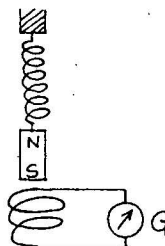
- 1) below Curie temperature
- 2) above Curie temperature
- 3) at Curie temperature only
- 4) at all temperatures

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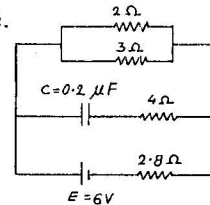
46. An unknown resistance R_1 is connected in series with a resistance of $10\ \Omega$. This combination is connected to one gap of a metre bridge while a resistance R_2 is connected in the other gap. The balance point is at 50 cm. Now, when the $10\ \Omega$ resistance is removed the balance point shifts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

