Physics — Important Numericals

(1) A diverging Lens of focal length 15 cm form an image 10 cm from lens. Calculate the distance of object from lens. (Ans → −30 cm)

(2) A thin prism of angle 5° angle gives minimum deviation of 3.2°. Calculate the refractive index of prism. (Ans → 1.64)

(3) A house wiring supplied with 220 Volt supply protected by 5A fuse. Calculate the maximum number of 60 Watt bulb in parallel that can be flow. (Ans − 22)

(4) 4.5 cm needle is placed 12 cm away from a convex mirror of focal length 15 cm find the position, size and natal of image. (Ans − 6.17, / 3.6, Virtual)

(5) A needle of 3 cm size placed 25 cm away from a concave mirror of focal length 10 cm. find position, size and nature of image. (Ans − 16.67 cm, 2 cm, Real)

(6) A resistance of a wire is 2Ω. Calculate its new Resistance if
(a) length of wire become 2 times (b) length 2 times by stretching
(c) Wire become doubled up by folding (d) diameter become half
(e) diameter become 2 times. (Ans − (a) 4Ω (b) 8Ω (c) 5Ω (d) 8Ω (e) 5Ω)

(7) An electric heating element consume 500 Watt when Voltage is 100 Volt. If Voltage become 150 Volt Calculate the power consumed. (Ans 1125 W)

(8) Two lens first is convex of focal length 20 cm and second is concave of focal length 60 cm. find the focal length, power and nature of combination. (Ans 30 cm, 3.33 D)

(9) Two Thin lenses are placed in contact and focal length of the combination is 8 cm. If focal length of one lens is 20 cm. find the focal length and power of other lens. (Ans 13.3, −33.3 D)

(10) Three resistance 1Ω, 2Ω and 3Ω are connected in series by supply of 12 Volt. find potential difference at each Resistance. (Ans − 2V, 4V, 6V)

(11) Three Resistance 1Ω, 2Ω and 3Ω are connected in parallel by by a battery of 10 Volt Calculate (i) Total Resistance (ii) & Voltage on each resistance. (iii) Current on each Resistance. (Ans − 5Ω, 10 Volt, 10 A, 0.67 A, 0.33 A)

(12) A ray of light falling at angle of 45° is refracted through a prism and suffer minimum deviation prism angle is 60°. find the refractive index for prism. (Ans √2)

(13) A ray falls on Equilateral prism and suffer minimum deviation of 60°. find the refractive index for prism. (Ans - $\sqrt{3}$)

(14) Calculate the heat produced by 200 W heater in 5 minute. (Ans - 60000 J)

(15) If a bulb of 100 Watt is connected by 200 volt supply. find Resistance and Current. (Ans 400Ω, 0.5A)

(16) A Concave Lens of focal length 15 cm form an image 10 cm from the lens. How far object placed also find magnification. Draw ray diagram. (Ans u = -30, m = 0.3)

(17) Three Resistance are connected in parallel draw current 7.5 A by 30 volt battery. Two resistance have 10Ω and 12Ω. find out third resistance and current through each resistance. (Ans - 15Ω, 3A, 2.5A, 2A)

(18) A current 5 mA passes through Resistance of 2200Ω find Voltage. (Ans - 11 V)

(19) find speed of light in glass if its refractive index is 3/2. (Ans = 2×10^8 m/s)

(20) An object ht 6 cm is placed at a distance of 10 cm from a Convex Mirror with radius of Curvature 30 cm. find position size and nature of image. (Ans v = 6)

(21) Two lamps of 100 W and 60 W are connected in parallel by supply of 220 Volt. Calculate Current drawn. (Ans - 0.72A)

(22) Two lenses of focal length 20 cm and 30 cm are placed in contact find the focal length and power of combination. (Ans - 12 cm, 8.33 D)

(23) Two lens of power 3.5 D and -1.5 D are placed in contact find focal length and power of combination. (Ans 2D, 50 cm)

(24) find the Critical Angle of a medium whose refractive index is $2/\sqrt{3}$. (Ans - 60°)

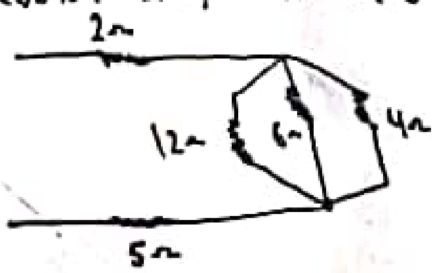
(25) Three Resistance of 2Ω, 4Ω and 6Ω are connected in series by supply of 12 Volt. Calculate (i) Total Resistance (ii) Current on each resistance (Ans - 1A, 2V, 4V, 6V)

(26) find Equivalent Resistance b/w A and B

(a)

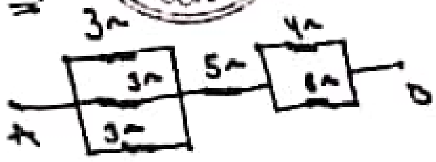
Ans - $\frac{16}{3}$ Ω

(b)



Ans - 2Ω

(c)



(Ans - 8.4Ω)

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(27) A wire of uniform thickness with a resistance of 27 Ω is cut into three equal pieces and they are joined in parallel. Find the resistance in parallel combination. (Ans - 3 Ω)

(28) What current will be required by a lamp marked 225 volt and 40 W? Find resistance of this lamp and heat produced in 5 minute. (Ans - 0.18 A, 1265.6 Ω, 12000 J)

(29) There are three resistance 10 Ω, 15 Ω and 30 Ω. Find the ratio in the minimum and maximum resistance in this combination. (Ans - 4 : 39)

(30) A ray falls on a prism and suffer minimum deviation of 40°. If prism angle is 60°. Find refractive index for prism. (Sin 50° = 0.7660) (Ans - 1.532)

(31) For a thin prism, it angle of minimum deviation is 5° and prism angle is 6°. Find refractive index for prism. (Ans - 1.83)

(32) An object 5 cm size is placed at the focus of convex lens of focal length 10 cm. Find position, size and nature of image. Draw ray diagram also. (-5 cm, 2.5 cm, Virtual)

(33) If two bulb of 25 watt and 100 W each rated 220 volt connected in series with supply of 440 volt. Then calculate potential across both the bulb. Comment whether any bulb will fuse? (352 volt, 88 volt, 25 W fuse)

(34) A wire of resistance 10 Ω is drawn out into thin wire due to this its length become 3 times. Find new resistance. (Ans - 90 Ω)

(35) Find equivalent resistance b/w A and B

(36) A needle of size 4.5 cm is placed at distance of 12 cm from a convex mirror of focal length 15 cm. Find position, size and nature of image. (Ans - 6 cm, 2.5 cm, Virtual Erect)

(37) Two lens of power +3.5 D and -4.75 D are placed in contact. Find the focal length of combination. (Ans - -80 cm)

(38) Two lenses of focal length 20 cm and 50 cm are placed on same axis at 20 cm. Find equivalent focal length and power. (Ans - 20 cm, 5 D)

(39) There is a prism of angle 60° has refractive index $\sqrt{2}$. In case of minimum deviation find (i) angle of deviation (ii) angle ... Ans-

In a coil the value of Magnetic flux decreases from 12×10^{-3} Weber to 6×10^{-3} wb in 0.01 sec. Calculate emf produced in coil (Ans - 0.6 Volt)

(41) An electron enter in Magnetic field at 5×10^7 m/sec at angle 30°. If Magnetic field is 1 Tesla. find Magnetic force exerted on it. (Ans - 4×10^{-12} Newton)

(42) There is a straight for wire of length 1 cm having 1 ampere in it. placed perpendicularly in magnetic field of 5 Tesla. find Magnetic force on it (Ans - 5 Neuton)

(43) The current of 1 ampere flow in a straight wire find Magnetic field at a point 1 cm away from it (Ans $= 2 \times 10^{-5}$ Tesla)

(44) The current of 1 A flow in a Circular wire of radius 1 cm. find magnetic field at its centre. It has 100 turn. (Ans $2\pi \times 10^{-2}$ Tesla)

(45) The far point of a myopic person is 80 cm. what is the nature and power of lens required to correct defect. (Ans → -1.25 D, Concave Lens)

(46) The near point of hypermetropic eye is 1 m. find the nature and power of lens required to correct defect (Ans → 3D, Convex Lens)

(47) An electric oven of 2 KW power rating is operated in a domestic electric circuit (220 V) that has a current rating of 5A. What result do you expect? (fuse blown)

(48) A circuit has a fuse of 5A. What is the maximum number of 100 W (220 V) bulbs that can be safely used in the circuit? [x = 11]

(49) What is the maximum number of 60 W bulbs that can be run from the main supply of 220 volts if you do not want to overload a 5A fuse? [18 bulbs]

(50) A 1.25 KW heater works on a 220 V mains supply. What current rating would a suitable fuse have? [10 A]

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Q4 An electric lamp of 100 Ω, a toaster of resistance 50 Ω, and a water filter of resistance 500 Ω are connected in parallel to a 220 V source. What is the resistance of an electric iron connected to the same source that takes as much current as all three appliances, and what is the current through it? (7.04 A)

Q5 How can three resistors of resistance 2 Ω, 3 Ω and 6 Ω be connected to give a total resistance of (a) 4 Ω, (b) 1 Ω? (2 Ω, 4 Ω and 1 Ω)

Q6 What is (a) the highest, and (b) the lowest, total resistance that can be secured by the combination of four coils of resistance 4 Ω, 8 Ω, 12 Ω, 24 Ω? (48 Ω, 2 Ω)

Q7. Compute the heat generated while transferring 96000 coulombs of charge in one hour through a potential difference of 50 V. (4.8×10^6 J)

Q8 An electric iron of resistance 20 Ω takes a current of 5 A. Calculate the total heat developed in 30 s. (15000 J)

Q9 An electric motor takes 5 A from a 220 V line. Determine the power of the motor and the energy consumed in 2 h. (7.92×10^6 J)

Q10 An electric bulb is rated 220 V and 100 W. When it is operated on 110 V, the power consumed calculate: (25 W)

Q11 When a 12 V battery is connected across an unknown resistor, there is a current of 2.5 mA in the circuit. Find the value of the resistance of the resistor. (4800 Ω)

Q12 A battery of 9 V is connected in series with resistors of 0.2 Ω, 0.3 Ω, 0.4 Ω, 0.5 Ω and 12 Ω respectively. How much current would flow through the 12 Ω resistor? (I = 0.67 A)

Q13 How many 176 Ω resistors in parallel are required to carry 5 A on a 220 V line. (n = 4)

Q14 Several electric bulbs designed to be used on a 220 V electric supply line are rated 10 W each. How many bulbs can be connected in parallel with each other across the two wires of 220 V line if the maximum allowable current is 5 A?
(110 bulbs)

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Two lamps, one rated 100W at 220 V and the other 60W at 22
are connected in parallel to electric mains supply. What curren
is drawn from the line if the supply voltage is 220V?
(I = 0.727A or 0.73A)

Q8 Which uses more energy, a 250W TV set in 1hr or a 1200W toaster in 10min? (E = 0.20 kwh)

Q9 An electric heater of resistance 8Ω draws 15A from the service mains for 2 hours. Calculate the rate at which hea is developed in the heater. (P = 1800W)

Q10 Find the focal length of a convex mirror whose radius of curvature is 32cm. (f = 16cm)

Q11 Find the power of a concave lens of focal length 2m (-0.5

Q12 An object 5cm in length is held 25cm away from a converging lens of focal length 10cm. Draw the ray diagram and find the position, size and nature of the image formed. (16.67, -3.3cm)

Q13 A concave lens of focal length 15cm forms an image 10cm from the lens. How far is the object from the lens? Draw the ray diagram. (u = -30cm)

Q14 An object 5.0 cm in length is placed at a distance of 20cm in front of a convex mirror of radius of curvature 30cm. Find the position of the image, its nature and size. (2.1cm)

Q15 An object of size 7.0 cm is placed at 27cm in front of a concave mirror of focal length 18cm. At what distance from the mirror should a screen be placed so that a sharp focussed image can be obtained? Find the size and nature of the image. (14.0cm)

Q16 Find the focal length of a lens of power, -2.0 D. What type of lens is this? (f = -50cm)

Q17 A doctor has prescribed a corrective lens of power +1.5D. Find the focal length of the lens. Is the prescribed lens diverging or converging? (f = +66.7cm)

Q18 The filament of a lamp is 80cm from a screen and a converging lens forms an image of it on a screen, magnified three times. Find the distance of lens from the filament and the focal length of the lens. (20cm, 15cm)

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