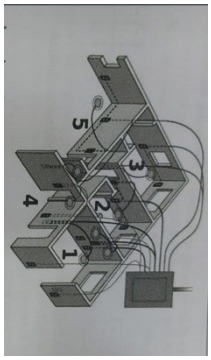
# Tenth Standard Full Numerical Test

1. A converging mirror forms a real image of height 4 cm, of an object of height 1 cm placed 20 cm away from the mirror. calculate the image distance. What is the focal length of the mirror? ( v=-80cm, f=-16cm)
2. An arrow 2.5 cm high is placed at a distance of 25 cm from a diverging mirror of focal length 20 cm. find the nature, position and size of the image formed. (v=11.1cm, hi=1.11cm, m=0.4)
3. An object is placed in front of a concave mirror of focal length 20 cm. The image formed three times the size of the object. Calculate two possible distances of the object from the mirror. ( u=-40/3,u=-20/3)
4. When an object is placed at a distance of 60 cm from a convex spherical mirror, the magnification produced is ½. Where should the object be placed to get a magnification of 1/3. (u=-120cm)
5. Draw the ray diagram when n1>n2, n1=n2, n1<n2.
6. RI of glycerine is 1.46. what is the speed of light in glycerine with respect to air? (2.05m/s)
7. RI of glass is 1.6 and diamond is 2.4. what is the refractive index of diamond w.r.t glass. What's happened when the situation is opposite? (1.5, 0.6)
8. When the focal length of a lens is -25cm then what is the power? ( -4D)
9. A 2 cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 10cm. the distance of the object from the lens is 15 cm. find the nature, position and size of the image. Also find the magnification. (v=30cm, m=-2,hi=-4cm)
10. Find the focal length and nature of lens which should be placed in contact with a lens off focal length 10 cm so that the power of the combination becomes 5 dioptre. (-20cm, concave)
11. A convergent lens of power 8 D is combined with a divergent lens of power -10 D. calculate focal length of the combination. (f=-5cm)
12. Prove n12*n21 =1
13. When a neutron is moving in a magnetic field then what is the direction of deflection? (no deflection)
14. An alpha particle is moving towards the east in a magnetic field directed south what is the direction of deflection? (upward)
15. what is the direction of magnetic field in a solenoid? ( inside south to north, outside north to south)
16. if a person is not able to see beyond 1 m clearly then find the power of his spectacle. (-1D)
17. if we are using three concave lenses having power of 1 D, 2D, 3D then what will be the power of the diverging lens? Also find its focal length. ( -6D, -16.6cm)
18. If angle i is 45 degree then what will be the value of angle r and angle e when light is coming from air to glass slab and from glass slab to air. ( r is less than 45 degree and e= 45 geree)

19. If the current I through a resistor is increased by 100%, what in the increase in power dissipated? (300%)

20.




The diagram above is a schematic diagram of a household circuit. The house shown in the above diagram has 5 usable spaces where electrical connections are made. For this house, the mains have a voltage of 220V and the net current coming from the main is 22A.

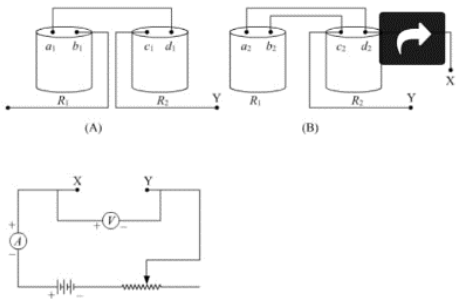
a) What is the mode of connection to all the spaces in the house from the mains?

b) The spaces 5 and 4 have the same resistance and spaces 3 and 2 have respective resistances of 20 ohm and 30 ohm. Space 1 has a resistance double that of space 5. What is the net resistance for space 5.

c) What is the current in space 3?

d) What should be placed between the main connection and the rest of the house's electrical appliances to save them from accidental high electrical current? (parallel, r=150ohm, 11 A, electric fuse)

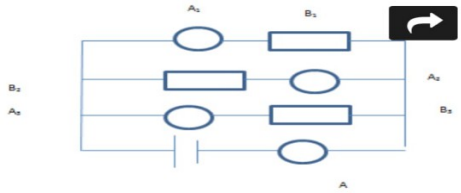
21.




*two students P and Q connect their two given resistors R1 and R2 in the manners shown above. Student P connects the terminal marked b1 and c1 while student Q*

*connects the terminals marked d1 and c2 in their respective circuits at the points marked x and y. whose circuit has maximum resistance and which one has minimum resistance? (A maximum, B minimum)*

22. A1, A2, A3, A are connected in the circuit. B 1, B2 and B3 are three identical bulbs. They are connected to voltage as per thr figure. When the three bulbs are working good and glowing , the current recorded in ammeter A is 6 A.



answer the following questions

a) Same amount of current will go through each bulb and the value is 2A. true or false

b) If the bulb B3 is blown away, the bulb B1 and B2 will start glowing more. True or false

c) What will happen to all the ammeter reading if bulb B1 is blown away

d) The current shown in ammeter A remains even any bulb goes down. True or false (T, No, B2 and B3 show 2A, no)

23.

| Samples | X | Y | Z |
|---|---|---|---|
| Resistivity | $3 \times 10^{-9}$ | $11.1 \times 0^{-6}$ | $18X10^{-17}$ |

a) Arrange the samples in increasing order of conductivity

b) Which of this is the best conductor?

c) Which of this is the best insulator? (Y,X,Z, Z is the best conductor, Y is the best insulator)

24. An electric bulb draws a current of 8 A and works on 250 V on the average 8 hours a day

a) Find the power consumed by the bulb

b) If the electric distribution company charges Rs 5 for 6 units what is the monthly bill for 60 days. (2000W, 800rs)

25. $6*10^{17}$ electrons cross per minute through an area. what is the electric current? ($1.6*10^{-3}$ A)

26. Resistance of a conductor of length 1m and cross section $1mm^2$ is 8 ohm. Calculate the specific resistance. ($8*10^{-6}$ ohm m)

27. Two resistors are connected in series and parallel to 5 V emf. R1=10 ohm, R2=15 ohm. Find the maximum and minimum amount of current. (max=0.8A,min=0.2A)

28. Six resistors of 20 ohm are connected parallel to 2V. find the value of an ammeter placed in between $2^{nd}$ and $3^{rd}$ resistors. (0.6A)

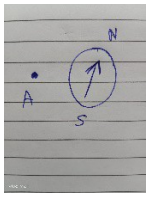
29. Two resistors of 4 ohm and 6 ohm are connected parallel across of 6 V battery with negligible resistance. Calculate the power of the battery and the power dissipated by each resistor. (15W,9W,6W)

30. Three identical bulbs are connected in parallel with a battery. The current drawn from a battery is 6A. if one bulb is fused what will be the total current drawn from the battery? (4A)

31. An electric iron of resistance 660ohm is connected to a main supply of 220V. compute the current through the element and the heat produced in joules in 11 minutes. (0.3 A,48400 J)

32. Four cells of 2V each are connected in series with 5 ohm R. if by mistake 2 cells are connected wrongly what will be the change in the current in 5 ohm resistor? (no current will pass)

33. A magnetic compass needle is placed in the plane of paper near point A. in which plane should a straight current carrying conductor be placed so that it passes through A and there is no change in in the deflection of the compass? When the deflection is maximum?




34. A resistor of 8 ohm is connected in parallel with another resistor x. the resultant resistance of the combination is 4.8ohm what is the value of X? (12ohm)

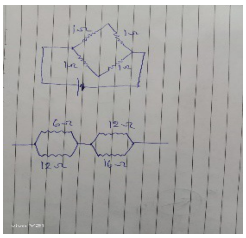
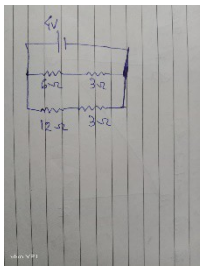
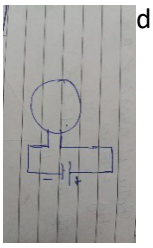
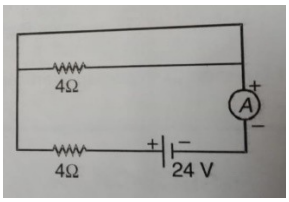
35. RI of alcohol is 1.36 and $CS_2$ 1.63. find refractive index of alcohol w.r.t $CS_2$. ( 0.83)

36. A concave lens of power 5D and a concave lens of power 7.5D are placed in contact. Find the power of combination. (-12.5D)

37. An object placed at a distance of 50 cm from a concave lens of focal length 20 cm, find the nature and position of the image. ( V=-14.28 cm, m=0.28)

38. An object of height 4 cm is placed at a distance of 15 cm in front of a concave lens of power -10D, find the size of the image. (hi=1.6cm)

39. An object placed 20 cm in front of a mirror is found to have an image 15 cm a) in front of b) behind the mirror. Find the focal lengths of both of the mirrors ( -8.5cm, 60 cm)

40. A person is able to see 40 cm to 400cm. find the power of his bi focal lens. (1.5 D, -0.25D)
41. Find the RI of glass w.r.t air when the speed of light in glass is $2.25*10^8$m/s. (1.33)
42. A convex lens of focal length 10cm is placed at a distance of 12 cm from a wall. How far away the lens should be placed from an object to get a real image? (-60cm)
43.  find the equivalent resistance (1ohm, 12 ohm)
44.  find current through 6ohm and voltage of 12 ohm ( 0.44A, 3.2V)
45.  draw the magnetic field lines
46. The refractive indices of glass and water with respect to air are 3/2 and 4/3respectively. If speed of light in glass is $2* 10^8$ m/s, find the speed of light in water. (2.25 m/s)
47. A person with myopic eyes cannot see objects beyond 1.2m distinctly. What should be the nature and power of the lens used to restore proper vision? (-0.8D)
48. An object is placed at a distance of 50 cm in front of a mirror of focal length 20cm. write any four characteristics of image formed by the mirror.
49. A devise of 600 W is used in domestic circuit. What is the rating of the fuse? (3A)
50. 

find the reading of the ammeter (3A)