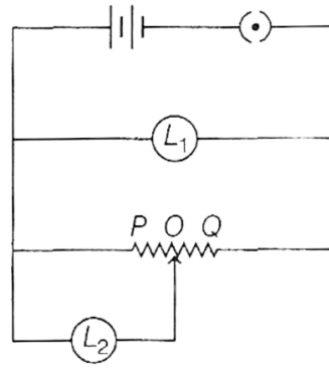


- (c) assertion is false but reason is true.
 (d) assertion is true but reason is false.

- (vii) In the circuit shown, lamps L_1 and L_2 , are identical. If the sliding contact at O moved towards Q, then which of the statements about the effect on the brightness in L_2 is correct?

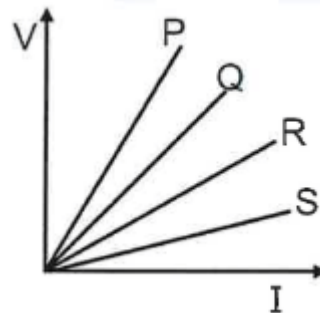


- (a) Initially it has no light, then its brightness increases gradually and becomes equal to that of L_1
 (b) Initially it is same as that of L_1 , and finally become half as that of L_1
 (c) Initially it is half as that of L_1 and finally becomes equal to that of L_1 .
 (d) Initially it is half as that of L_1 and finally becomes zero.

- (viii) Two devices are connected between two points say A and B in parallel. The physical quantity that will remain the same between the two points is:
 (a) current (b) voltage (c) resistance (d) none of these

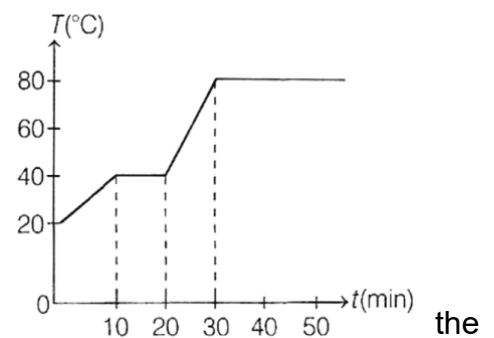
- (ix) From the power rating of any electrical appliance, we can find :
 (a) The resistance of the appliance
 (b) The safe limit of current which can flow through the appliance
 (c) Both (a) and (b)
 (d) Cost per usage.

- (x) The graph of voltage vs current for four different materials is shown below. Which of these four materials would be used for making filament of a bulb?



- (a) Q (b) S (c) P (d) R

- (xi) A certain mass of solid substance is heated for a period of 50 min. Its heating curve is shown below : From the graph, which one of the following statements is correct?

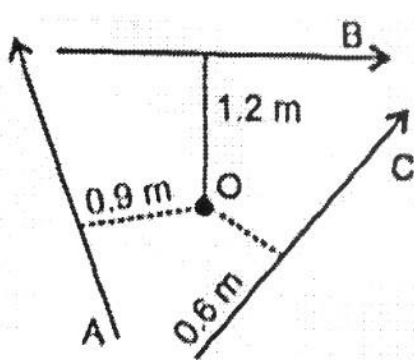
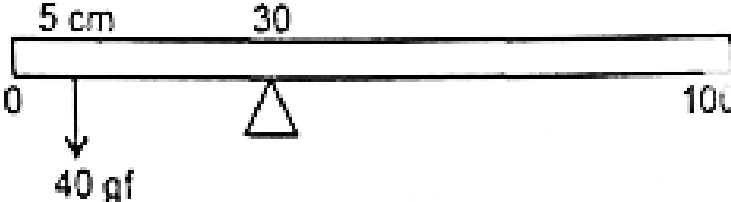


- (a) The boiling point of the given substance is 40°C .
 (b) The specific latent heat of fusion of substance is same as the specific latent heat of vaporisation.
 (c) The substance has a higher specific heat capacity in solid state than that in liquid state.
 (d) The substance has a lower specific heat capacity in solid state than that in liquid state.

- (xii) When a conductor carrying current is placed in a magnetic field, perpendicular to it then the direction of the force experienced can be found out by using:
 (a) Lenz's law (b) Fleming's left, hand rule
 (c) Fleming's right hand rule (d) Right hand thumb rule

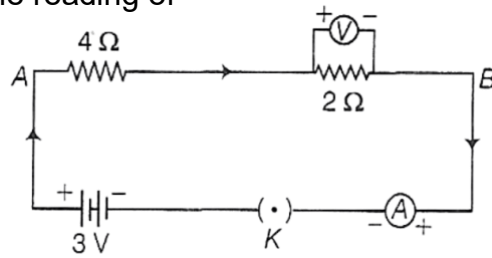
- (xiii) Two hot bodies, A and B, are kept in contact. After some time it is found that there is no heat flow between the two. This means.
- The temperature of body A is higher than B
 - The temperature of body B is higher than A
 - Two bodies have same temperature
 - You cannot say anything about the temperature
- (xiv) Consider the following statements :
- Statement 1 : There is no loss of energy.
 Statement 2 : The vibration is caused only by the restoring force.
 Statement 3 : The frequency of vibration is determined by the size and shape of the body.
 Which of the following is/are best suited for the above statements?
- Natural vibration
 - Force of damped vibration
 - Both natural and damped vibration
 - None of the above
- (xv) A nucleus of an atom consists of 146 neutrons and 95 protons. It decays after emitting an alpha particle. How many protons and neutrons are left in the nucleus after an alpha emission?
- protons 93, neutrons = 142
 - protons 95, neutrons 144
 - protons 93, neutrons = 144
 - protons= 95, neutrons = 142

Question 2

- i.
 - How many pulleys are there in a movable block of a block and tackle system with Velocity Ratio 3?
 - A radioactive nucleus emits a gamma ray. Does the position of daughter nucleus change in a periodic table as compared to the parent nucleus?
 - To which electrically charged plate a gamma ray will deflect while passing through an electric field? [3]
- ii. A, B and C are three forces each of magnitude 4 N acting in the plane of paper as shown in the figure. The point O lies in the same plane.
- Which force has the least moment about O?
 - Which force has the greatest moment about O?
- 
- [2]
- iii. A uniform metre scale is in equilibrium position. Calculate the mass of the ruler. [2]
- 
- iv.
 - A cell is sending current in an external circuit. How does the terminal voltage compare with the emf of the cell?
 - At what voltage is the alternating current supplied to our houses? [2]
- v.
 - Name the phenomenon involved in tuning a radio set to a particular station.
 - Define the phenomenon named by you in part (a) above [2]

vi. Study the following electric circuit. Find the reading of

- (a) the ammeter and
(b) the voltmeter



[2]

vii. Write the uses of radio isotopes in

- (a) agriculture
(b) industries.

[2]

Questions 3

(i) It is established that an electric current through a metallic conductor produces a magnetic field around it. Is there a similar magnetic field produced around a thin beam of moving

- (a) α -particles and
(b) neutrons? Justify your answer.

[2]

(ii) (a) Is it possible to switch off an appliance by placing the switch in a neutral wire?

(b) Is it possible for current to flow between a neutral and an earth wire?

[2]

(iii) How is the magnetic field around a straight conductor affected if:

- (a) current through the conductor is increased?
(b) distance of the point of observation is increased.

[2]

(iv) A metal of mass 250g is heated to a temperature of 65°C . It is then placed in 50 g of water at 20°C . The final steady temperature of water becomes 25°C . Neglecting the heat taken by the container, calculate the specific heat capacity of the metal. (specific heat capacity of water is $4.0 \text{ j g}^{-1} \text{ k}^{-1}$)

[2]

(vii) Write reactions of a nucleus ${}_{11}\text{X}^{23}$ when it loses

- (a) one proton
(b) one β particle

[2]

SECTION - B (Attempt any four questions.)

Question 4

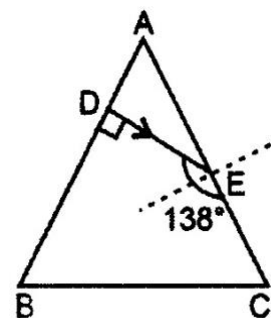
(i) (a) Ring system is a better wiring system, why?

(b) State the relation between electrical power, resistance and potential difference in an electrical circuit.

[3]

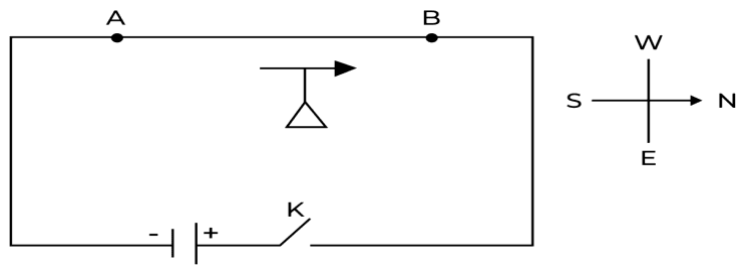
(ii) The critical angle for the glass which the equilateral prism ABC is made of is 48° . A ray of light incident on the side AB of the prism is refracted along DE such that the angle it makes with the side AC is 138° as shown in figure below. Also, angle $\text{EDB} = 90^\circ$. Copy the diagram.

- (a) Draw the path of ray incident on side AB (which travels along DE).
(b) Show the path along which the ray DE travels from point E onwards through the side BC.



[3]

- (iii) The figure below shows a magnetic needle kept just below the conductor AB which is kept in North-South direction.

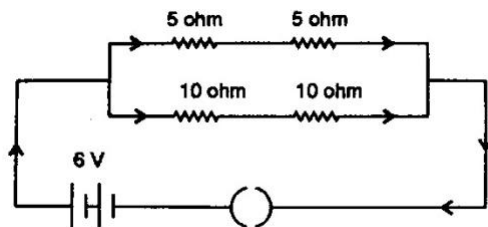


- (a) In which direction will the needle deflect when the key is closed?
 (b) Why is the deflection produced?
 (c) What will be the change in the deflection, if the magnetic needle is taken just above the conductor AB?
 (d) Name one device which works on this principle.

[4]

Question 5

- (i) (a) Which particles are responsible for current in conductors?
 (b) To which wire of a cable in a power circuit should the metal case of a geyser be connected?
 (c) To which wire should the fuse be connected?
- (ii) (a) State two common properties of γ -rays and X-rays.
 (b) Name two main sources of nuclear radiation. How is nuclear radiation harmful?
- (iii) A 6 V battery is connected to the arrangement of resistance given below. Calculate:

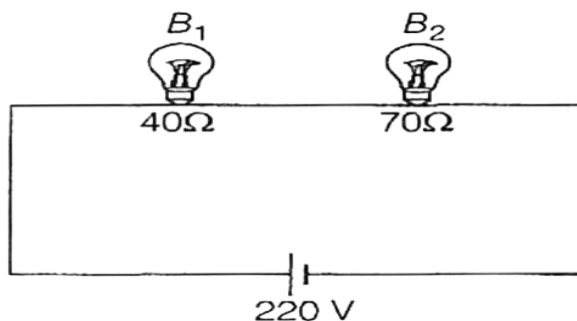


- (a) the total effective resistance of the arrangement and
 (b) the total current flowing in the circuit.

[4]

Question 6

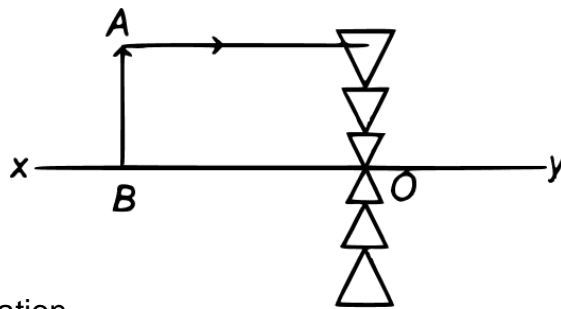
- (i) Rudra 's room have two electric bulbs, these bulbs are connected in series and power supplied by 220 V.



- (a) Calculate the total resistance of the circuit.
 (b) Calculate the current in the circuit.
 (c) Calculate the voltage drop across each bulb.

[3]

- (ii) The diagram given below shows a lens as combination of glass prisms of different refractive indices. Copy the diagram and answer the following questions.



- (a) Name the lens formed by the combination.
 (b) Complete the ray diagram when AB is between optical centre and 2F. [3]
- (iii) (a) Define convex lens and give its nature of refraction.
 (b) A 6 cm tall object is placed perpendicular to the principal axis of convex lens of focal length 25 cm. The distance of the object from the lens is 40 cm. By calculation determine
 1. the position and
 2. the size of the image formed. [4]

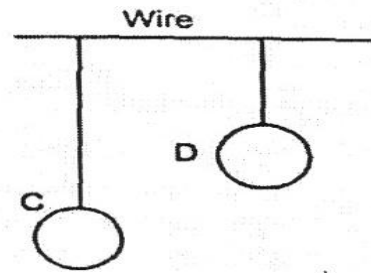
Question 7

- (i) (a) The melting point of naphthalene is 80°C and the room temperature is 25°C . A sample of liquid naphthalene at 90°C is cooled down to room temperature. Draw a temperature-time graph to represent this cooling. On the graph mark the region which corresponds to the freezing process.
 (b) It takes a much longer time to boil off (change to steam) a certain quantity of water rather than bring it to its boiling point from room temperature, say 25°C . Explain the reason for this. [3]
- (ii) (a) Calculate the electrical energy consumed when a bulb of 40 W is used for 12.5 h every day for 30 days.
 (b) Draw the diagrams of a dual control switch when the appliance is switched ON [3]
- (iii) If a light of a single colour is passed through a liquid having a piece of glass suspended in it, so on changing the temperature of the liquid, at a particular temperature, the glass piece is not seen.
 (a) At what situation, the glass piece will not be seen?
 (b) Why is the light of a single colour used?
 (c) How can you define the term refractive index of a medium? State whether it can be less than 1 or not. [4]

Question 8

- (i) A student stands 330 m from a tall cliff which is 990 m from another tall cliff. The student fires a pistol and hears some echoes. If the speed of sound between the cliffs is 330 m/s,
 (a) What is the time taken by first echo to reach the student?
 (b) Find the time interval between the first echo and the second echo. [3]
- (ii) A virtual, diminished image is formed when an object is placed between the optical centre and the principal focus of a lens.
 (a) Name the type of lens which forms the above image.
 (b) Draw a ray diagram to show the formation of the image with the above stated characteristics. [3]

- (iii) Two pendulums C and D are suspended from a wire as shown in the figure. Pendulum C is made to oscillate by displacing it from its mean position. It is seen that D also starts oscillating,



- (a) Name the type of vibrations, C will execute.
(b) Name the type of vibrations, D will execute.
(c) If the length of D is made equal to C then what difference will you notice in the oscillations, of D?
(d) What is the name of the phenomenon when the length of D is made equal to C? [4]

Question 9

- (i) There are three pins in an electric plug top. Answer the following: [3]
(a) How would you identify the earth pin ?
(b) In which of the three connecting wires should the electric switch be connected?
(c) Explain why a switch should not be touched with wet hands.
- (ii) A coil of insulated copper wire is connected to a galvanometer. What will happen, if a bar magnet is
(a) pushed in to the coil and withdrawn from inside the coil
(b) held stationary inside the coil?
(c) Name the phenomenon involved. [3]
- (iii) Calculate the mass of ice required to lower the temperature of 378 g of water at 50°C to water at 10°C. (Take, specific latent heat of ice = 336 Jg⁻¹ and specific heat capacity of water = 4.2 Jg⁻¹°C⁻¹) [4]
