

S.H.C of copper = $0.4\text{J/g}^\circ\text{C}$ S.H.C of water = $4.2\text{Jg}^{-1}\text{ }^\circ\text{C}^{-1}$, specific latent heat on fusion of ice = 336J/g . [4]

- (c) Give reasons [3]
- The surrounding become pleasantly warm when water in a lake starts freezing in cold countries.
 - Calorimeter is made up of copper.

Half Yearly Examination 2018-2019

Phyics

Class : X

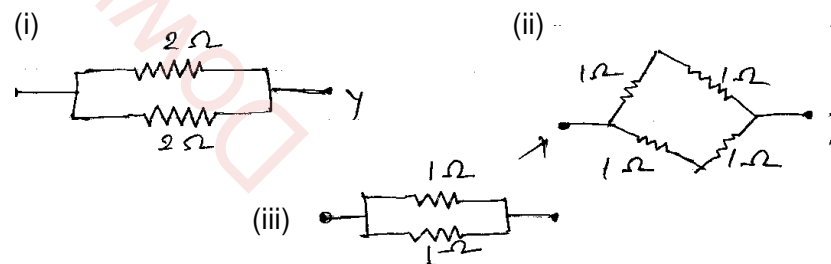
Time : 2 hrs.

Full Marks : 80

Section A (40 Marks)

[Attempt all questions]

- Q.1.** (a) Name the physical quantity which is measured in —
- phon
 - mho
 - eV
 - cycle per second. [2]
- (b) State two ways of increasing the frequency of a note produced by an air column. [2]
- (c) Which of the cables, one rated 5A and the other 15A will be of thicker wire ? Give a reason for your answer. [2]
- (d) Which of the following combinations have the same equivalent resistance between x and y ? [2]



- (e) Name the material used for (i) heating element of a room heater (ii) fuse wire. Give reason for your answer. [2]

{Turn Over}

Q.2. (a) What do you understand by the following statement:

- (i) The heat capacity of the body is 70 J/K.
- (ii) The specific heat capacity of lead is $130 \text{ JKg}^{-1} \text{ K}^{-1}$. [2]

(b) Calculate the quantity of heat produced in a 20Ω resistor carrying 2.5A current in 5 min. [2]

(c) Two bodies of masses m and $2m$ are placed at a height h . Find the ratio of their gravitational potential energy. [2]

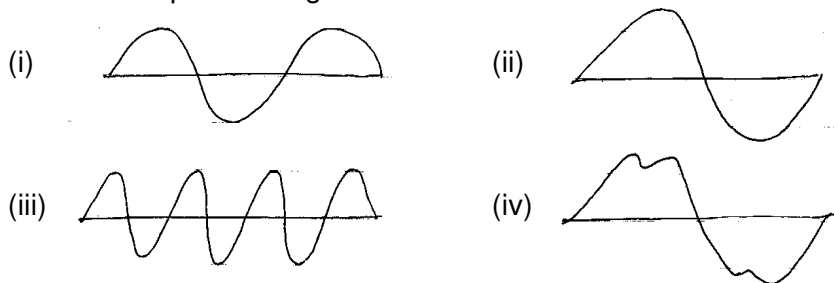
(d) How much work is needed to be done on a ball of mass 100g to give it a momentum of 5 kgm/s? [2]

(e) Differentiate between single fixed pulley and single movable pulley in terms of — [2]

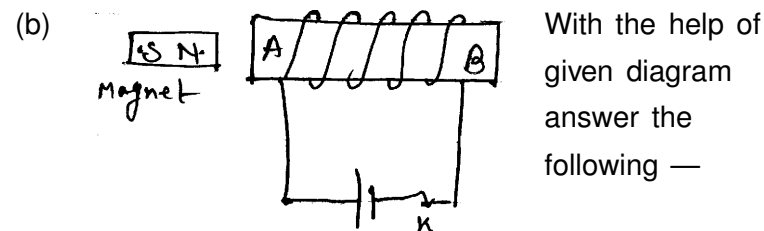
- (i) It's mechanical advantage.
- (ii) It's use.

Q.3. (a) The refractive index of water is $\frac{4}{3}$ and of glass is $\frac{3}{2}$. What is the refractive index of glass with respect to water? [2]

(b) With the help of following diagrams answer the questions. given below.

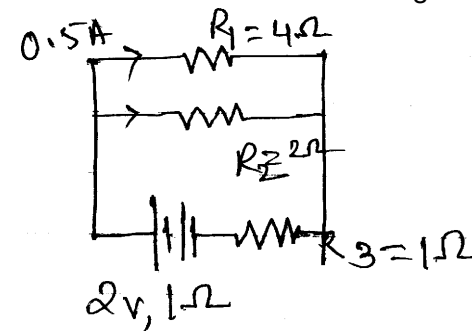


(ii) Why is soft iron used as the core of the electromagnet in an electric bell? [3]



- (i) State the polarity at the ends A and B
- (ii) Will the magnet be attracted or repelled? Give reason. [3]

(c) In an electric circuit shown alongside find, [4]



- (i) Current in resistor 2Ω
- (ii) Current in resistor 1Ω
- (iii) terminal voltage of the battery.

Q.10. (a) A certain mass of ice at 0°C is converted to steam at 100°C by constant heating. Draw temperature - time graph showing the change in phases. [3]

(b) A copper vessel of mass 100g contains 150g of water at 50°C . How much ice is needed to cool it to 10°C ?

- (c) (i) Name the waves used for sound ranging. State one reason for their use. Why are the waves mentioned by you not audible to us ? [2]
- (ii) A person standing between the two vertical cliffs produces a sound. Two successive echoes are heard at 4S and 6S. Calculate the distance between the cliffs speed of sound in air is 320m/s. [2]

- Q.8.** (a) (i) Name any two factors on which the heat produced in a wire depends when current is passed in it, and state how does it depend on the factors stated by you.
- (ii) At what voltage and frequency is the electric power generated at the power generating station ? [2+1=3]
- (b) Draw a circuit diagram using the dual control switches to light a staircase electric light. [3]
- (c) (i) Give two characteristics of a high tension wire. [2+2=4]
- (ii) A house has main fuse of 5A rating. 5 bulbs each of 60 w and 2 tube lights each of 40W are used simultaneously. Find the current drawn from the mains of 220V.

- Q.9.** (a) (i) Differentiate electromagnet and permanent magnet in terms of —
- (i) Polarity (ii) Magnetic field strength.

which diagram shows —

- (i) a note from a musical instrument
- (ii) a loud note
- (iii) has same pitch
- (iv) a shriller note
- (c) Why is the switch connected to live wire ? [2]
- (d) An electric motor of power 3kw is to be operated at mains of 220V. Find the current rating of the fuse to be connected with the motor. [2]
- (e) Calculate the frequency of yellow light of wavelength 550nm. The speed of light is 3×10^8 m/s. [2]
- Q.4.** (a) The power of a lens is 0.5D. Find its focal length and name the type of the lens. [2]
- (b) Water is used in hot water bottles fomentation. Give a reason. [2]
- (c) Define the term specific latent heat of fusion of ice. State its SI Unit. [2]
- (d) Write any two advantages of connecting the appliances in parallel connection. [2]
- (e) A straight wire lying in a horizontal plane carries a current from South to North.
- (i) What will be the direction of magnetic field at a point just underneath it ?
- (ii) Name the law used to arrived at the answer in part (i). [2]

Section B (40 Marks)

[Attempt only four questions]

- Q.5.** (a) State whether work is done or not and write the reason for your answer. [3]
- (i) A man pushes a wall.
 - (ii) A boy climbs up 20 stairs.
 - (iii) A coolie walks on a horizontal ground while carrying a load on his head.
- (b) A cook uses the fire tongs of length 28 cm to lift a piece of the burning coal of mass 250g. If he applies the effort at a distance of 7cm from the fulcrum find the effort. ($g = 10\text{m/s}^2$). [3]
- (c) (i) State the principle of conservation of energy.
- (ii) State the condition under which the mechanical energy is conserved. [2]
- (iii) A body of mass 10kg is moving with a velocity 20m/s. If the mass of the body is doubled and its velocity is halved, find the ratio of the initial kinetic energy to the final kinetic energy. [2]
- Q.6.** (a) A ray of light is normally incident on one face of an equilateral glass prism. Answer the following :
- (i) What is the angle of incidence on the first face of the prism ?
 - (ii) What is the angle of refraction from the first face of the prism ?

- (iii) What will be the angle of incidence of the second face of the prism ?
 - (iv) Will the light ray suffer minimum deviation by the prism ?
 - (v) Draw a diagram to show the emergent ray.
- (b) (i) State the condition when a lens has both its focal lengths equal. [1+2]
- (ii) Draw a ray diagram when a convex lens is used as a reading lens. Show the position of object and image.
- (c) (i) Name the electromagnetic wave which is used in (I) radar communication (II) Photography.
- (ii) Compare the speeds of electromagnetic waves with wavelength 0.01\AA and 9000\AA . [2]
- (iii) The focal length of a camera lens is 20cm. Find how far away from the film must the lens be set in order to photograph an object located at a distance 100 cm from the lens. [2]
- Q.7.** (a) (i) Differentiate between the forced and resonant vibrations. [2]
- (ii) State the condition for the occurrence of resonance. [1]
- (b) (i) What is the safe limit of sound level for our ears ?
- (ii) State the effect of following factors on loudness of sound - (I) amplitude (II) surface area of vibrating body. [3]