SUBJECT : PHYSICS   **CLASS : X**
TIME   : 2 HOURS   **MARKS : 80**

Note: Answer to this paper must be written on the paper provided separately. You will not be allowed to write during the first 10 minutes. This time is to be spent in reading the question paper. The time given at the head of this paper is the time allowed for writing the answers.

Section I is compulsory

Attempt any four questions from Section II. Each section carries 40 marks.

Section – I

Compulsory 40 marks

Q.1.

A) i) How do the input & output powers in a transformer compared? [2]

   ii) How is the loss of energy due to induced current in the core of a transformer prevented?

B) Give two conditions for the nucleus of an atom to be radioactive. [2]

C) A pulley system has three pulleys. A load of 240 N is overcome by applying [2] an effort of 100 N. Calculate the mechanical advantage & efficiency of the system.

D) A ray of light passes through a glass block as shown in the diagram below. [2] What is the geometrical relation between surfaces AD & BC in diagram 1 & 2.
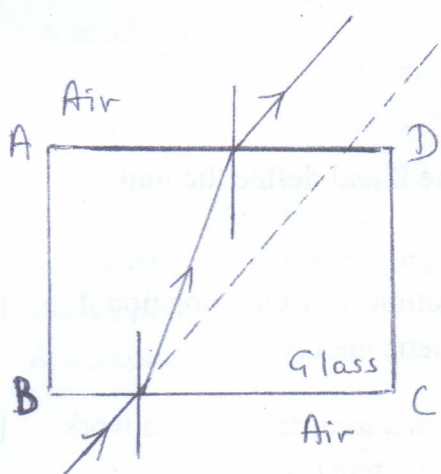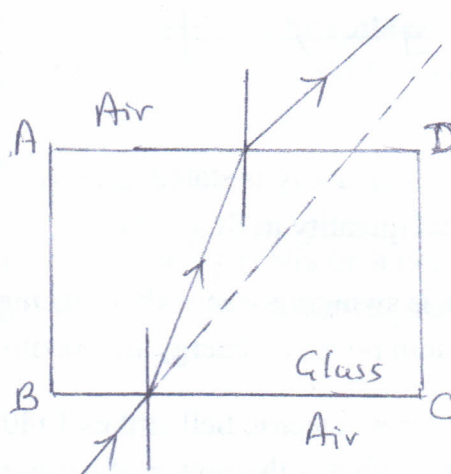

E) A geyser has rating 2000 W, 240 V what is the cost of using it for 30 minutes, [2] if the cost of electricity is Rs. 8.50 per commercial unit.

Q. 2.

A) State the energy conversion taking place in a solar cell. Give one [2]
disadvantage of using a solar cell.

B) Establish a relation between an electron volt & the SI unit of the physical [2]
quantity it measures.

C) What are radioisotopes. State its one use. [2]

D) Calculate the equivalent resistance from the circuit diagram given below. [2]
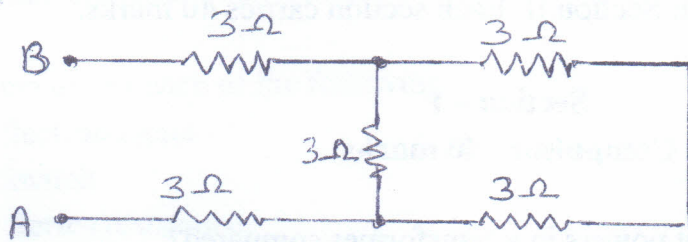
E) The box shown below has a lens kept inside. Copy the diagram & draw the [2]
lens and complete the path of rays.

Box
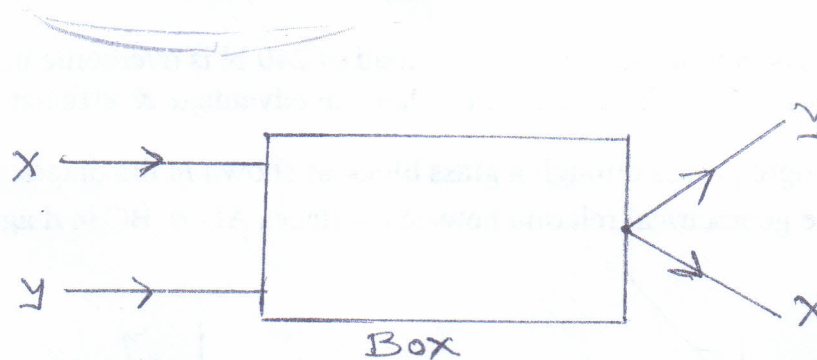
Q.3.

A) A unit physical quantity is stated as kgm^2s^{-2}. Name it and define the unit [2]
of the physical quantity in SI system.

B) A pendulum is swinging freely about its mean position. In which position it [2]
has i) Maximum potential energy ii) Maximum kinetic energy.

C) The hammer of an electric bell strikes 1440 times in a minute & does a work [2]
of 0.2 J/strike. What is the power of hammer in SI system?

D) Why does a cracked window pane appears silvery at some particular angle? [2]

E) The focal length of a camera lens is 20 cm. Find how far away from the film [2]
must the lens be set in order to photograph an object located at a distance of
100 cm from the lens.

Q.4.

A) What is couple? How is it useful? [2]

B) Is it possible to have an accelerated motion with a constant speed? Explain. [2]

C) A radioactive nucleus undergoes a series of decay according to a sequence [2]
given below.

$$Y \xrightarrow{-\beta} Y_1 \xrightarrow{-\alpha} Y_2 \xrightarrow{-\alpha} Y_3$$
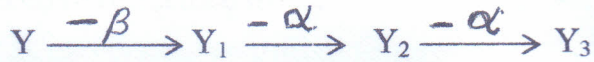
If the mass number & atomic number of Y_3 are 172 & 69 respectively. What is
the mass number and atomic number of Y?

D) Which type of lens you will select if you want to burn a paper using solar [2]
energy? At what distance you will keep a paper from the lens?

E) Draw a neat labeled diagram for the verification of Ohm's law. [2]

SECTION – II
Attempt any four complete questions from this section (40 marks)

Q.5.

A) What relation you will get between the mechanical advantage & number of [3]
strands used in block and tackle system, when you work in laboratory? Why?

B) Name the factors on which the heat produced in a conductor depends when [3]
current is passed through it. Also state how does it depend on the factors stated
by you.

C) A mechanic can open a nut by applying a force of 120 N while using a lever [4]
handle of length 30 cm. What length of handle is required if he wants to open
it by applying a force of 50 N?

Q.6.

A) A ray of monochromatic light enters a liquid & then falls on a mirror as [3]
shown in the figure. $m\angle i = 45°$, $m\angle r = 30°$. Copy the figure in your answersheet
& complete it.
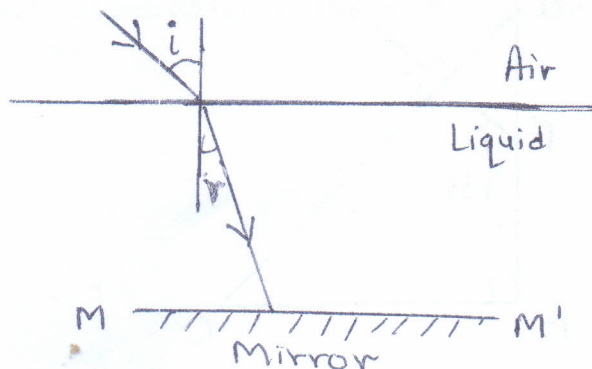
B) i) Which radiation from a radioactive element produces maximum biological [3] damage?

  ii) Give two properties of the radiation stated by you in Q6 – B – i.

C) Observer the diagram given below and answer the questions that follow- [4]
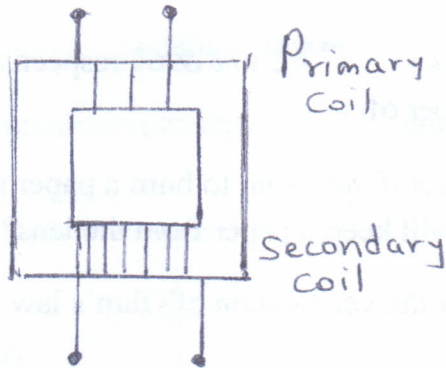
  i)   Name the device
  ii) State the purpose for which it is used.
 iii) State with reason the nature of a wire used in primary coil.

Q.7.
A) Give one point of difference between the following pairs- [3]
i) E.m.f. of a cell & Terminal voltage
ii) Centripetal force & Centrifugal force
iii) Energy & Power

B) What do you mean by background radiations? Name its two sources with [3] one example each.

C) ΔABC represents a total reflecting prism. A ray DE is incident on the surface [4] AC of the glass prism. Study the diagram given below and answer the questions that follow.
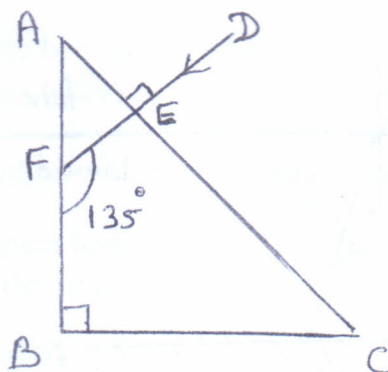
i) Copy the diagram and complete the path of ray of light.

ii) State two conditions responsible for a path of light drawn by you in Q7 C ii

Q.8.

A) What resistance must be connected to a 15Ω resistance to provide an effective resistance of 6Ω?　　　　　　　　　　　　　　　　　　　　[3]

B) Draw a neat labeled ray diagram using a suitable lens to get an image on the screen in cinema.　　　　　　　　　　　　　　　　　　　　　[3]

C) i) Give two precautions to be taken while handling radioactive elements.　　[4]
ii) Give two ways to dispose the radioactive wastes.

Q.9.

A) What are isobars? Give its two examples.　　　　　　　　　　　　　[3]

B) The diagram below shows a rectangular coil ABCD suspended freely between　[3]
the concave poles of U shaped magnet such that the plane of coil is parallel to magnetic field.
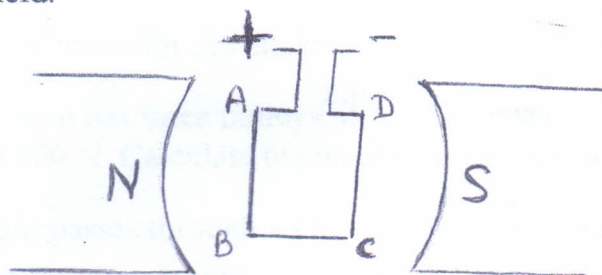
i) State the observation when current is switched on.
ii) State the rule/ law on which your observation in Q.9 B (i) is based on .
iii) State one way of increasing the magnitude of force acting on a coil.

C) Draw a neat labelled diagram of block & tackle system with V.R.= 4.　　　[4]
Calculate a load that can be lifted with an effort of 320 N if efficiency of the system is 78.125%

Q.10.

A) i) Name the wires used in cable for distribution of power to a house. [3]

ii) Which wires mentioned by you in Q 10 A i are at same potential difference
and how much is it?

iii) To which wire of a cable in a power circuit should the metal case of a geyser
be connected?

B) Define [3]

i) Machine   ii) Refractive index

iii) Second focal point of a convex lens.

C) Give one use of each of the following [4]

i) Electromagnet

ii) Switch

iii) Series resistance

iv) Concave lens.