**c**            **ATUL VIDYALAYA-ATUL**
            **FIRST PRELIMINARY EXAM-2012-13**
**STD-X**              **PHYSICS**             **MM-80**
**DATE- 24-09-12**                      **TIME-1½HRS**

## SECTION I (40 MARKS)
### Compulsory: Attempt all questions from this section.

**Question 1**
(a) A ball of mass 250 g initially at rest is allowed to fall freely from a height of
    5 m from the surface of the Earth.
     (i) Calculate the potential energy of the ball.
     (ii) Calculate the kinetic energy just before it hits the ground. ($g = 9.8$ ms$^{-2}$).    [2]
(b) Under what condition does a lever act as a force multiplier?    [2]
(c) A boat at anchor is rocked by waves whose crests are 100 m apart and
     whose velocity is 25 rn/sec. How often do the crests reach the boat?    [2]
(d) Name two systems of wiring used in a household electricity. Which one
     is preferred?    [2]
(e) State one source each of infrared radiation and ultraviolet radiation.    [2]

**Question 2**
(a) What is the effect of electric field and magnetic field on a beam of gamma
     rays?    [2]
(b) When a body is in momentum what type of energy does it possesses?    [2]

(c) Calculate the current flowing through a 5 ohm resistor when a potential
     difference of 10 volt is applied across it.    [2]
(d) Amongst the alpha particles and the beta particles which has more ionizing
     power and which has more penetrating power? Name the element formed
     when an alpha particle gains electrons.    [2]
 (e) State any two properties that are common to all types of electromagnetic
     spectrum.    [2]

**Question 3**
(a) A man weighing 500 N carries a load of 1100 N up a flight of stairs 4 in 5 s.
     What is his power?    [2]
(b) Define a watt. Show its relation with ampere and volt.    [2]
(c) Why do dogs hang out there tongues in summer?    [2]

(d) What is the advantage of fusion over fission?    [2]

(e) Trace the path of light coming from an object placed outside a thick rectangular
     glass block whose lower surface is silvered. Give the characteristics of the
     images formed.    [2]

**Question 4**
(a) A man is cutting down a tree with an axe, he hears the echo of the impact the
     axe hitting the tree after 1.6 sec. What is the distance of the tree from the
     obstacle? The speed of sound is 330 m/sec.    [2]
(b) A lamp draws a current of 0.5 amps when connected to a 230 volts supply.
     What is the resistance of the filament of the lamp?    [2]
 (c) The MA. of a single fixed pulley is less than 1. Even then it is used as a
     simple machine for doing work, why?    [2]
(d) State the energy changes in (i) a burning coal  (ii)  a solar cell.
(e) Explain, why a cut diamond sparkles.    [2]

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## SECTION II (40 MARKS)
Answer *any four* questions in this section.
## Question 5
(a) A pair of scissors and a pair of pliers are known to belong to the same class of lever. (i) Name the class.
  (ii) Which of the two has M.A. less than one?
  (iii) What is the utility of a machine whose M.A is less than one?                [3]
(b) A crowbar of total length 150 cm is at a distance of 25 cm from the load. What is the M.A. of this crowbar?                [3]
(c) Why do we transmit alternating current at high voltage?                [2]
(d) A roller is pushed by applying a force of 30 N. The line of action of the force makes an angle of 60° with the horizontal. Find the work done through a distance of 10 m.                [2]
## Question 6
(a) (i) Define specific heat capacity of a substance. State its SI unit.                [2]
  (ii) Give one example each when high specific heat capacity of water is used : (1)in cooling (2) as heat reservoir                [2]

(b) A vessel of negligible heat capacity contains 40 g of ice in it at 0°C. 8 g of steam at 100°C is passed into the ice to melt it. Find the final temperature of the contents of the vessel.                [4]
  (Specific latent heat of vaporization of steam = 2268 J/g, Specific latent heat of fusion of ice = 336 J/g Specific heat capacity of water = 4.2 J/g°C)
(c) How does nuclear change differ from chemical change?                [2]
## Question 7
(a) Name the two substances each which (i) expand on freezing
  (ii) contract on freezing.                [2]
(b) Explain why $\alpha$ and  particle emissions are often accompanied by $\gamma$ ?                [2]
(c) Draw a neat & labeled diagram for an AC generator.                [3]
(d) A postage stamp appears reduced by 2 mm when placed under a glass plate of 6 mm thickness. Find the refractive index of glass plate.                [3]
## Question 8
(a) (i) What is meant by fuse ratings?                [2]
  (ii) Name the device which is used to reverse the direction of current in the coil of a motor after every half rotation.                [1]
(b) A monochromatic light strikes the side AB of glass block of refractive index 1.5.
  (i) Complete the path of ray through the glass slab.                [2]
  (ii) Write down the expression for the critical angle.                [1]
(c) (i) A pair of colour on mixing form white light. What name is given to such a pair? Write names of two such pairs.                [2]
  (ii) During day light an object appears red when viewed through red glass. However, the same object appears black when viewed through blue glass. Explain the observation.                [2]
## Question 9
(a) A cell supplies a current of 2.2 A through two 2 $\Omega$ resistors connected in parallel. When the resistors are connected in series it supplies a current of 0.4 A.                [4]
  Calculate the internal resistance and the emf of the cell.
(b) Can a hydrogen atom emit $\alpha$-particles?  Explain by giving reason.                [2]
(c) What are infrared radiations? State the range. Give two uses of infrared radiation.                [4]
## Question 10
(a) Draw a neat & labeled diagram of a hot cathode ray tube.                [3]
(b) State briefly two uses of a cathode ray tube.                [2]
(c) Mention two factors which determine the rate of themionic emission from a metal surface.                [2]
(d)A transformer lowers e.m.f from 240 V. If the ratio of number of turns in primary and secondary coil is 40:1, find the e.m.f produced in the secondary coil.                [3]
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