ATUL VIDYALAYA
PRELIMINARY EXAM-2012-13
PHYSICS

STD-X
MM-80
DATE- / /
TIME-1½HRS
SESSION - I

GENERAL INSTRUCTIONS

Answers to this paper should be written on the paper provided separately.
You will not be allowed to write during the first 15 minutes.
This time is to be spent in reading the Question paper.
Time given at the head of the paper is the time allowed for writing the answers.

Attempt **all** questions from **Section I** and **any four** questions from **Section II.**
The intended marks for questions or parts of questions are given in the brackets [].

SECTION I (40 MARKS)

Compulsory: Attempt all questions from this section.

Q.1
(a) Write down the gravitational unit of force. How is it related to Newton?
(b) A water pump raises 50 litres of water through a height of 25 m in 5 s. Calculate the power which the pump supplies. [Take g = 10 Nkg-1 and density of water = 1000kgm-1]
(c) Name the three classes of levers and distinguish between them. Give two examples of each.
(d) A man weighs 600 N on the earth. What would be his approximate weight on the moon? What is the reason for your answer?
(e) Give an example when work done by the force of gravity acting on a body is zero even though the body gets displaced from its initial position.

Q.2
(a) If the power of a motor is 40 kW, at what speed can it raise a load of 20,000N?
(b) A ray of light, after refraction through a concave lens emerges parallel to the principal axis. Draw a ray diagram to show the incident ray and its corresponding emergent ray.
(c) Draw a diagram to show how a converging lens can form a real and enlarged image of an object.
(d) Water is used in hot water bottles for fomentation. Give reason for this.
(e) How is the kinetic energy of a moving cart affected if (i) its mass is doubled, (ii) its velocity is doubled.

Q.3
(a) State two application of an echo.
(b) How does the resistance of a wire depend on its radius? Explain your answer.
(c) Why is a fuse always connected to the live wire in a circuit?
(d) Draw a triangular arrangement to illustrate the mixing (or addition) effect of spectral colours.
(e) State the factors on which the deviation produced by a prism depends.

Q.4
(a) State two differences between an electromagnet and a permanent magnet.
(b) Steam at 100ºC is passed over 1000 g of ice at 0ºC. After some time, 600 g of ice at 0ºC is left and 450 g of water at 0ºC is formed. Calculate the specific latent heat of vaporisation of steam. [Sp. Latent heat of ice is 336 Jg-1 and sp. Heat capacity of water is 4.2 Jg-1K-1]
(c) On what factors does the resistivty of a wire depend?
(d) State two properties which are common to both beta rays and cathode rays.
(e) What is the source of energy released in a fusion reaction? Explain your answer with the help of an equation.

SECTION – II (40 marks)

Answer ANY FOUR questions from this section

5.(a) What do you understand by the conservation of mechanical energy. [3]

(b) Name a machine which is used to : (i) multiply force, (ii) multiply speed, and (iii) change the direction of force applied. [3]

(c) A block and tackle system has the velocity ratio 3. A man can exert a pull of 200 kgf. What is the maximum load he can raise with this pulley system if its efficiency is 60%? [4]

6.

(a) What is a prism? With the help of a diagram of a prism, indicate its refracting surfaces, refracting edge and base. [3]

(b) What are secondary colours? Name the three secondary colours. [3]

(c) A boy of mass 40 kg runs up a flight of 15 steps, each 15 cm high in 10 s. Find the work done and the power developed by him. Take g = 10 Nkg-1. [4]

7.

(a) Define the term critical angle and total internal reflection. State two conditions necessary for total internal reflection to occur. Write down the relation for the critical angle in terms of refractive index. [3]

(b) Why do the qualities of sound of the same pitch differ when produced by different instruments? [3]

(c) A radioactive sample is kept at the centre of a large evacuated sphere. How safe will it be? What changes do you suggest for more safety? [4]

8.

(a) A bucket containing 8 kg of water at 25ºC. 2 kg of water at 80ºC is poured into it. Neglecting the heat energy absorbed by the bucket, calculate the final temperature of water. [4]

(b) Why is the base of a cooking pan made thick and heavy? [3]

(c) State with reason, which of the two, boiling water or steam both at 100ºC will produce more severe burns. [3]

9.

(a) Differentiate between the e.m.f. and terminal voltage of a cell. [3]

(b) An electric iron is rated at 750 W, 230 V. Calculate the electrical energy consumed by the iron in 16 hours. If the cost of electricity is Rs.5 per unit, calculate the total cost. [3]

(c)State four main ways by which the speed of rotation of an electric motor can be increased. [4]

10.

(a)(i) What would happen if two deutrons (2H1) combine to form a single nucleus? (ii) Write down the nuclear reaction. (iii) Name the phenomenon[3]

(b) Define the term work function of a metal. Why are the materials of low work function preferred as electron emitters ? [3]

(c) State two medical and two industrial uses of radioactivity. [4]

ANSWERS

1. (b) 2500 W (d) 100 N 2.(a) 2ms-1 4.(b) 2268Jg-1 5.(c) 360kgf 6. (c) 900 J, 90 W

8. (a) 36ºC 9. (b) 12 kWh, Rs.60.