Total No. of printed pages = 5

Sc-204/AP-II/2nd Sem/2016/N

APPLIED PHYSICS - II

Full Marks – 70

Pass Marks – 21

Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer question No. 1 and any *five* from the rest.

1. (A) Fill in the gaps : 1×5=5

(i) The focal length of a plane mirror is ———.

(ii) Watt-hour is the unit of ———.

(iii) The angle of dip at the pole is ———.

(iv) X-rays have ——— charge.

(v) A rectifier converts alternating current to ———.

[Turn over

(B) Select the correct answer in each of the following : $1 \times 5 = 5$

(a) The SI unit of electric current is

(i) Joule

(ii) Ampere

(iii) Volt

(iv) Ohm

(b) The focal length of a concave mirror

(i) is positive

(ii) is negative

(iii) depends on the position of the object

(iv) is infinity

(c) Einstein's photoelectric effect proves that

(i) light waves are transverse in nature

(ii) velocity of light is constant

(iii) light is quantum in nature

(iv) light waves are e.m waves

(d) Three capacitors of capacitances 2 μF each when connected in parallel gives the equivalent capacitance of

(i) 2 μF

(ii) 0.5 μF

(iii) 4 μF

(iv) 6 μF

(e) A P-type semiconductor has

(i) more electrons than hole

(ii) holes more than electrons

(iii) same number of holes and electrons

(iv) none of the above

2. (a) What is an optical image ? How you differentiate a real image from a virtual image ? 1+3=4

(b) The refracting angle of a prism is 60° and the minimum deviation of a ray through the prism is 40°. Calculate the refractive index of the prism. (Given, sin 50° = 0.0776). 4

(c) Find the position, nature and size of the image formed when an object of height 10cm is placed 30 cm in front of a converging mirror of radius of curvature of 40 cm. 4

3. (a) Deduce a mathematical expression to determine the electrostatic potential at any point due to a point charge of magnitude +q. 6

(b) State and explain Coulomb's law of magnetism with mathematical expression. 2+2=4

(c) Define magnetic lines of force. State two of its properties. 1+1=2

4. (a) Define electric cell. Explain the theory of action of a simple voltaic cell with its chemical reactions. 1+4=5

(b) Deduce an expression for intensity due to short bar magnet at end on position. 6

(c) State Ohm's law. 1

5. (a) What is electromagnetic induction ? State laws of electromagnetic induction. 4

(b) What is capacity of a conductor ? Show that the capacity of a spherical conductor is numerically equal to its radius in C.G.S system. 1+3=4

(c) State Kirchhoff's law regarding current and voltage in a circuit. 4

6. (a) State Faraday's laws of electromagnetic induction. How will you determine the direction of the induced current ? What is eddy current ? 3+1=4

(b) What are the different components of a diode ? Explain the working of a diode with circuit diagram. 1+3=4

(c) Obtain an expression to find the equivalent resistance when a number of resistances are connected in parallel. 3

(d) Define electric power. 1

7. (a) What is Radioactivity ? Mention some uses of X-ray in medical and technical fields. 1+2=3

(b) State intrinsic and extrinsic semiconductor with at least one example of each. 3

(c) State some properties of alpha, beta and gamma particles. 4

(d) State atomic mass unit and binding energy. 2