Total No. of printed pages = 6

**Sc-204/A.P-II/2nd Sem/2014/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 blanks with appropriate words : $1 \times 5 = 5$

(i) When light travels from one medium to another, ——— does not change.

(ii) ——— is the surest test for magnetisation.

(iii) In P-type semiconductor majority charge carrier is ———.

(iv) The kinetic energy of photo-electrons increases with ———.

(v) The killowatt-hour is the practical unit of ———.

[Turn over

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

(a) The electric lines of force

(i) always intersect

(ii) never intersect

(iii) sometimes intersect and sometimes not intersect

(iv) are always parallel to each other.

(b) Kirchoffs first law is based on law of conservation of —

(i) charge

(ii) energy

(iii) momentum

(iv) sum of mass and energy.

(c) Two free parallel wires carrying currents in the same directions —

(i) attract each other

(ii) repel each other

(iii) do not attract each other

(iv) None of the above.

(d) Lenzs law helps us to know

(i) the force exerted on a coil

(ii) the direction of induced e.m.f

(iii) the motion of the magnet through the coil

(iv) is the current is A.C or D.C.

(e) Which of the following is used as a rear view mirror in automobiles ?

(i) Concave

(ii) Convex

(iii) Plane

(iv) Parabolic.

2. (a) What is optical image ? Write the difference between real and virtual image. 1+2=3

(b) With a neat ray diagram show the formation of real and virtual image by a concave mirror. 4

(c) Define power of a lens. Write its unit. 2

(d) The refractive index of the material of a prism is 1.5. When the prism is placed in minimum deviation position, the angle of incidence is 51°, calculate the angle of prism and the angle of minimum deviation. 3

3. (a) What is natural and artificial magnetism ? 2

(b) Find an expression for magnetic intensity at a point on the axial line of a bar magnet. Define magnetic moment. 3+1=4

(c) What is terrestial magnetism ? What are magnetic elements ? Explain them. 2+1+3=6

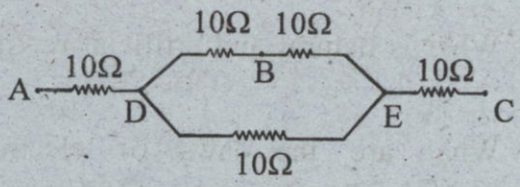
4. (a) State and explain Coulombs law of electrostatics. Define unit of charge. 3+1=4

(b) Define electrostatic potential. Write its S.I unit. Find the relation between electric intensity and electric potential. 1+1+2=4

(c) What is capacitance ? Determine the equivalent capacitance of an parallel plate capacitors in series. 1+3=4

5. (a) State Ohm's law. Define resistance, conductance and conductivity. Write their S.I units. 1+3=4

(b) Find the equivalent resistance of the circuit shown in figure below. 4




Or

What are Faraday's law of Electrolysis ? Define Faraday. 3+1=4

(c) What is a cell ? What are the main defects of simple voltaic cell ? How can they be removed ? 1+3=4

6. (a) What is semiconductor ? Write the difference between intrinsic and extrinsic semiconductor with example. 1+3=4

(b) Why a diode is called valve ? Explain with neat circuit diagram the use of diode as a half-wave rectifier. 1+3=4

(c) Define thermo e.m.f. What is inversion temperature ? Write the difference between e.m.f of a cell and potential difference. 1+1+2=4

7. (a) Define atomic mass unit and binding energy. Write some industrial uses of X-rays. 2+3=5

(b) What is natural and artificial redioactivity ? 2

(c) What are the laws of electromagnetic induction ? Define co-efficient of self induction and mutual induction. 3+2=5