Total No. of printed pages = 4

Sc-204/AP-II/2nd Sem/2015/M

APPLIED PHYSICS – II

Full Marks – 70

Pass Marks – 28

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. Fill in the blanks : $1\times5=5$

   (i) The velocity of light in water is ——— than the velocity of light in vacuum.

   (ii) Power of a lens is given by $D=\frac{100}{\ldots}$.

   (iii) Frequency of X-rays is ——— than the frequency of visible light.

   (iv) Photo-electric emission depends upon the ——— of the incident of light.

   (v) P. type germanium is obtained by doping pure germanium with elements like ———.

[Turn over

2. (a) Write two properties of magnetic lines of force. 2

(b) A small magnet is pivoted to move freely. At what place on the earth's surface will the magnet be vertical ? Explain. 2

(c) Explain the terms – declination, dip and horizontal intensity of the earth's magnetic field at a point. 6

(d) The specific resistance of copper is 1.76×10^{-6} ohm.cm, the radius of the wire is 1 mm. Calculate the length of the wire needed for having resistance of 10·5 ohm. 3

3. (a) Draw a neat ray diagram to show the formation of a real image by concave mirror. 3

(b) Power of a lens is +2D. State the nature of lens and calculate its focal length. 2

(c) Why do diamonds sparkle ? 2

(d) What do you understand by the angle of deviation of a ray of light ? Explain the position of minimum deviation of a prism. 2+4=6

4. (a) Draw a labelled diagram of a triode valve. Why the middle electrode is called the control grid ? 3+3=6

(b) Which of the following radiations possess the maximum penetrating power ? 1

(i) α-rays

(ii) β-rays

(iii) γ-rays

(c) What is photo-electric effect ? Deduce Einstein's photo-electric equation stating the significance of the symbols used. What is photo-electric work function ? 2+3+1=6

5. (a) Define 'local action' and 'polarization' defect of simple voltaic cell. How they are avoided in the Lechlanche cell ? 3+3=6

(b) What do you understand by the term internal resistance of a cell ? 2

(c) Three capacitors 1 μfd, 2 μfd and 3 μfd are connected in parallel. Find the equivalent capacity of this combination. 3

(d) What is electroplating ? 2

6. (a) Define magnetic intensity. Calculate the magnetic intensity at a point on the axial line of a bar magnet. 1+4=5

(b) Distinguish between primary and secondary cell. 3

(c) A current of 1.5 amp passes through a wire. Find the total charge that will pass in 20 sec. 3

(d) What is seebeck effect ? 2

7. (a) What is binding energy of a nucleus ? 2

(b) What are thermionic emission ? 2

(c) What is a semi-conductor ? How N-type and P-type semi-conductors are prepared ? 2+5=7

(d) State two properties each of α and β-rays. 2