Total No. of printed pages = 8

END SEMESTER EXAMINATION – 2020

Semester : 2nd (New/Old)

Subject Code : Sc-204

APPLIED PHYSICS – II

Full Marks – 70

Time – Three hours

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

Instructions :

1. *All* questions of PART–A are compulsory.
2. Answer any *five* questions from PART–B.

PART – A

Marks – 25

1. Fill in the blanks with appropriate words : 1×10=10

   (a) In an electric cell _____ energy is converted to _____ energy.

   (b) For a concave mirror, when the object is at focus the image is formed at _____.

[Turn over

(c) Two parallel current flowing in the same direction _____ each other.

(d) Repulsion is the surest test of electrification than _____.

(e) There are _____ defects of simple voltaic cell.

(f) The focal length of _____ mirror is positive.

(g) Watt hour is unit of _____.

(h) The angle of dip at the pole is _____.

(i) The particle emitted by metal under the action of light is _____.

(j) P-type germanium is obtained by doping pure germanium with elements like _____.

2. Choose the correct answer in each of the following : 1×10=10

(a) The power of a convex lens of focal length 50 cm is

(i) 5 Dioptre

(ii) 0.5 Dioptre

(iii) 2 Dioptre

(iv) 0.2 Dioptre

(b) Two parallel conduction wires carrying current in the same direction

(i) attract one another

(ii) repel one another

(iii) exert no force

(iv) may attract or repel

(c) Two 4μF capacitors in series is equal to

(i) 8μF (ii) 4μF

(iii) 2μF (iv) 0.2μF

(d) X-ray consists of

(i) photon

(ii) electron

(iii) positively charged particle

(iv) neutral particles

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

(i) convex mirror (ii) plane mirror

(iii) concave mirror (iv) parabolic mirror

(f) With the increase of temperature, the resistivity of semiconductor

(i) decreases

(ii) increases

(iii) remains unaffected

(iv) may be increased or decreased depending on the nature of the semiconductor

(g) An N-type crystal is

(i) neutral

(ii) positively charged

(iii) negatively charged

(iv) None of the above

(h) The nature of the nucleus is not affected by the emission of

(i) α -rays

(ii) β -rays

(iii) positron

(iv) γ -rays

(i) The specific resistance of a wire

(i) varies with its temperature

(ii) varies with its length

(iii) varies with its cross-section

(iv) varies with its mass

(j) An uniform magnetic field is represented by a set of force which are

(i) parallel

(ii) convergent

(iii) divergent

(iv) None of the above

3. Write true or false : 1×5=5

(a) Unit of capacity of a conductor is farad.

(b) The SI unit of resistance is ohm.

(c) The direction of induced emf is obtained from Lenz's law.

(d) The photo-electric effect proves that light is quantum.

(e) Faraday's law helps us to know the motion of a magnet.

PART – B

Marks – 45

4. (a) Establish the relation between focal length and radius of curvature of spherical mirror. 2

   (b) An object is placed at a distance of 60 cm from a spherical mirror and produces a virtual image at a distance 20 cm behind the mirror. Find the focal length of the mirror. Is the mirror concave or convex ? 2+1=3

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

   (d) Define neutral point. What is the unit of magnetic intensity ? 2

5. (a) What is field intensity ? 1

   (b) Three capacitors of capacitance 5μF, 10μF and 20μF are connected in series across a 12 volt battery. Find the potential difference across each of capacitance. 3

   (c) Briefly describe the construction of Leclanche cell. 3

   (d) What are the two conditions for total internal reflection ? 2

6. (a) State Kirchoffs voltage law. 2

(b) What is resistivity ? Explain briefly. 3

(c) The specific resistance of a copper wire is $49\times10^{(-6)}$ ohm cm. The length is 110 m and diameter is 0.2 mm. Find its resistance. 3

(d) What is the dimension of resistivity ? 1

7. (a) What is seebeck effect ? Give one example of thermocouple material. 2+1=3

(b) Give two applications of Eddy Current. 2

(c) What is photoelectric effect ? Deduce Einstein's photoelectric effect. 1+2=3

(d) Mention one application of photocell. 1

8. (a) What is Mass defect ? Give the expression with its symbolic meaning. 2

(b) Calculate energy of a photon of radio waves of wavelength 30 metres.

Given ($h = 6.62\times10^{-27}$ ergsec). 3

(c) Give two properties of Beta and Gamma rays. 2+2=4

9. (a) Differentiate between intrinsic and extrinsic semiconductor . 3

(b) What is thermionic emission ? 1

(c) How N-type semiconductor is prepared ? 3

(d) What are the types of lasers based on laser medium used ? 2