Total No. of printed pages = 7

END SEMESTER EXAMINATION -2019

Semester : 2nd (New)

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

PART – A

Marks – 25

1. **Fill in the blanks :** 1×10=10

   (a) When an object is placed at focus in front of a mirror, the image is formed at _____.

   (b) The focal length of a plane mirror is _____.

[Turn over

(c) The angle of Dip at the equator is ————.

(d) Two magnetic lines of force ———— intersect each other.

(e) The unit of capacity of a conductor is ————.

(f) Kilowatt-hour is the practical unit of ————.

(g) Velocity of photoelectrons increases with the increase in ———— of incident light.

(h) The charge on the β ray is ————.

(i) In a diode anode is used to ———— the thermoelectrons.

(j) ———— are the majority charge carriers in an N type semiconductor.

2. Write true or false : 1×10=10

(a) A concave lens always produces a virtual image.

(b) The refractive index of air is 1.

(c) The unit of resistivity is ohm.

(d) β rays are deflected by electric fields.

(e) Fiber optics works on the principle of photo electric emission.

(f) A primary cell converts chemical energy to electrical energy.

(g) A diode can be used as rectifier.

(h) The velocity of X ray is same as that of light.

(i) LASER is a device for producing charged particles.

(j) The resistance of a conductor decreases with increase in temperature.

3. Choose the correct answer : 1×5=5

(a) The velocity of light in liquid is

(i) maximum

(ii) more than in air

(iii) less than in air

(iv) equal to that in air

(b) Power of a concave lens of focal length 25 cm is

(i) – 4D (ii) + 4D

(iii) – 0.4D (iv) – 25D

(c) In a uniform magnetic field, the lines of force are

(i) convergent (ii) parallel

(iii) divergent (iv) irregular

(d) Lenz's law gives us the

(i) force on the coil

(ii) the amount of induced emf

(iii) motion of the coil

(iv) the direction of induced emf

(e) The number of protons in $_{92}U^{235}$ is

(i) 92 (ii) 235

(iii) 143 (iv) 327

PART – B

Marks – 45

4. (a) Differentiate between a real and a virtual image. With a neat ray diagram show how a real image is formed by a convex mirror. 2+2=4

(b) Write the conditions of total internal reflection. 2

(c) Find the velocity of light in glass whose refractive index is 1.5 (velocity of light in air is 3×10^8m). 2

Define power of a lens. 1

5. (a) What do you mean by terrestrial magnetism ? Name its elements. 2

(b) In a hydrogen atom, the distance between the electron and proton is 5.3×10^{-11}m. Find the force of attraction between them. (Charge on electron $= 1.6\times10^{-19}$C) 3

(c) Define electric potential. Deduce an expression for electrostatic potential at a point due to a point charge. 1+3=4

6. (a) What is a secondary cell. Give an example. How are the defects of a cell is rectified in dry cell ? 1+1+2=4

(b) Three resistances each of value 3Ω are connected in parallel and the whole combination is connected across a 18 volt battery. Find the current through each resistance. 3

(c) State Ohm's law and hence define resistance. 2

7. (a) What is Seeback effect ? Describe a thermo-couple. 1+2=3

(b) State Faraday's laws of electromagnetic induction. 3

(c) Define Lenz's law and explain it. State the unit of self induction. 2+1=3

8. (a) Define work function and threshold frequency. The work function of a metal is 3.3 eV. Find out the threshold frequency for the metal. Given $h = 6.6\times10^{-34}$ Js ; $1eV=1.6\times10^{-19}$ J. 2+2=4

(b) Convert 1 amu into eV. 2

(c) Write two properties each of α, β and γ radiations. 3

9. (a) What is thermionic emission ? Explain the working of a diode. 1+2=3

(b) Explain the principle of LASER. What is population inversion ? 2+1=3

(c) With a neat diagram show how a P type semiconductor is formed. 1+2=3