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**END SEMESTER EXAMINATION -2019**

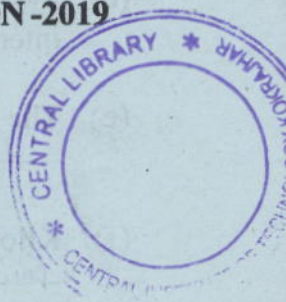
Semester : 2nd (New)

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 infinity.

(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 do not intersect each other.

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

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

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

(h) The charge on the  $\beta$  ray is Negative.

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

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

2. Write true or false :  $1 \times 10 = 10$

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

(b) The refractive index of air is 1.4

(c) The unit of resistivity is ohm. T

(d)  $\beta$  rays are deflected by electric fields. f

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

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

(g) A diode can be used as rectifier. f

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

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

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

3. Choose the correct answer :  $1 \times 5 = 5$

(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  ${}_{92}\text{U}^{235}$  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  $3 \times 10^8$  m). 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  $5.3 \times 10^{-11}$  m. Find the force of attraction between them. (Charge on electron =  $1.6 \times 10^{-19}$  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  $3\Omega$  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 thermocouple.  $1+2=3$
- (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  $h = 6.6 \times 10^{-34} \text{ Js}$ ;  $1\text{eV} = 1.6 \times 10^{-19} \text{ J}$ .  $2+2=4$
- (b) Convert 1 amu into eV.  $2$
- (c) Write two properties each of  $\alpha$ ,  $\beta$  and  $\gamma$  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.  $1+2=3$

