

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 _____.

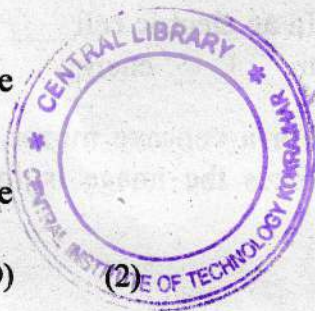
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- (c) Two parallel current flowing in the same direction _____ each other.
- (d) Repulsion is the surest test of electrification than _____.
- (e) There are _____ defects of simple voltaic cell.
- (f) The focal length of _____ mirror is positive.
- (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 : $1 \times 10 = 10$

- (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

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(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 $4\mu\text{F}$ capacitors in series is equal to

(i) $8\mu\text{F}$

(ii) $4\mu\text{F}$

(iii) $2\mu\text{F}$

(iv) $0.2\mu\text{F}$

(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

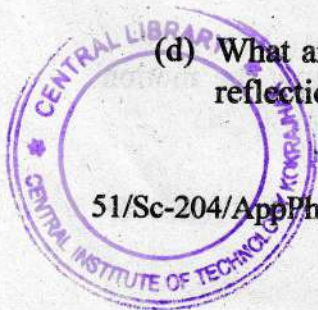
- (a) Unit of capacity of a conductor is farad.
- (b) The SI unit of resistance is ohm.
- (c) The direction of induced emf is obtained from Lenz's law.
- (d) The photo-electric effect proves that light is quantum.
- (e) Faraday's law helps us to know the motion of a magnet.

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 $5\mu\text{F}$, $10\mu\text{F}$ and $20\mu\text{F}$ 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

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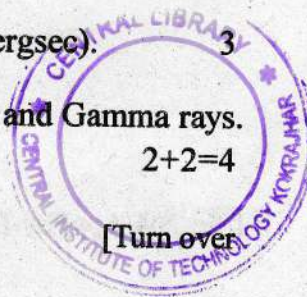
6. (a) State Kirchoffs voltage law. 2
(b) What is resistivity ? Explain briefly. 3
(c) The specific resistance of a copper wire is 49×10^{-6} ohm cm. The length is 110 m and diameter is 0.2 mm. Find its resistance. 3
(d) What is the dimension of resistivity ? 1
7. (a) What is seebeck effect ? Give one 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 ($h = 6.62 \times 10^{-27}$ ergsec). 3

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

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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

