

PHYSICS - 2012

Time : 3 Hours]

Class : 12th

[M. M. : 75

- Note-
- (i) All questions are compulsory.
 - (ii) There are two Sections- Section A and Section B in the question paper.
 - (iii) In Section 'A', Question Nos. 1 to 4 are objective type questions which contain fill in the blank, True/False, Match the columns and Choose the correct answers. Each question is allotted 5 marks.
 - (iv) Internal options are given in Question Nos. 5 to 16 of Section B.
 - (v) Question Nos. 5 to 11 carry 4 marks each and each answer is expected in about 75 words.
 - (vi) Question Nos. 12 to 14 carry 5 marks each and each answer is expected in about 120 words.
 - (vii) Question Nos. 15 and 16 carry 6 marks each and each answer is expected in about 150 words.
 - (viii) Draw neat and labelled diagrams wherever necessary.

Section -A (Objective Type Questions) (5 marks each)

Q. 1.

Write the correct answer from the given options:

- (A) S.I. unit of electrical capacity:
 - (i) Stat Farad
 - (ii) Farad
 - (iii) Coulomb
 - (iv) Stat Coulomb
- (B) Ohmic resistance is:
 - (i) Junction diode
 - (ii) Photo-emissive diode
 - (iii) Transistor
 - (iv) Copper wire
- (C) The waves used in telecommunication are:
 - (i) Infrared
 - (ii) Ultraviolet
 - (iii) Microwaves
 - (iv) Cosmic rays
- (D) The relationship between current gain α in Common Base [CB] mode and current gain β in Common Emitter [CE] mode is:

(i) $\beta = \alpha + 1$

(ii) $\beta = \frac{\alpha}{1 - \alpha}$

(iii) $\beta = \frac{\alpha}{1 + \alpha}$

(iv) $\beta = 1 - \alpha$

(E) Which of the following can be sent from one place to another by a FAX machine?

- (i) Picture (ii) Sound
(iii) Picture and Sound (iv) A copy of document

Q.2. Fill in the blanks:

- (a) is a device which is used to increase electrical capacity without increasing its size.
(b) The fall in potential per unit length of potentiometer wire is called.....
(c) The S.I. unit of magnetic moment is.....
(d) If the incidence is polarising angle, the angle between the Reflected ray and the Refracted ray from a surface is
(e) The meaning of www is.....

Q.3. Write, whether the following statements are True or False:

- (a) Modem is used to transmit a document.
(b) The earth's atmosphere is transparent for the visible light.
(c) The majority charge carriers in p-type semiconductor are electrons. <http://www.mpboardonline.com>
(d) The wire of potentiometer is made up of Aluminium.
(e) In Young's double slit experiment, the two coherent, sources are real.

Q.4. Match the pairs correctly:

- | A | B |
|-------------------------------------|---------------------------------------|
| (a) Capacity of spherical condenser | (i) Newton |
| (b) Internal resistance (r) | (ii) Germanium |
| (c) Corpuscular theory of light | (iii) $R\left(\frac{E}{V} - 1\right)$ |
| (d) Pure semiconductor | (iv) Alexander |
| (e) Fax | (v) $\frac{4\pi \epsilon_0 kab}{b-a}$ |
| | (vi) Arsenic |

Section B (Very Short Answer Type Questions)(4 marks each)

Q.5. State and explain Kirchoffs Laws in the current electricity.

(Or) Write four points of difference between e.m.f (Electromotive Force) and Potential difference.

Q.6. For the terrestrial magnetism establish a relation between angle of dip θ horizontal component H and vertical component V.

(Or) Derive an expression for the intensity of magnetic field on broad side on position due to a bar magnet.

Q. 7. What is Q-factor? Write its expression and write the conditions for its maximum value.

(Or) Prove for an a.c. circuit:

$$P_{av} = V_{rms} \times I_{rms} \times \cos \phi$$

Q. 8. Explain Huygens' principle of secondary wavelets.

(Or) A transparent medium of the angle of polarisation is 60° . Find the angle of refraction.

Q. 9. Establish the relation amongst u, v and f for concave lens.

(Or) Derive an expression

$$\frac{\mu}{v} - \frac{1}{u} = \frac{\mu - 1}{R}$$

for refraction of light at spherical surface.

Q. 10. Give in detail about electron, proton and neutron on the following points:

- (a) Chemical symbol;
- (b) Charge;
- (c) Name of Discoverer.

(Or) Determine de-Broglie wave equation.

Q. 11. Describe LASER under the following points:

- (a) Meaning;
- (b) Basic Principle;
- (c) Uses.

(Or) Write notes on the following (any two):

- (i) FAX;
- (ii) Optical detector;
- (iii) Diode LASER;
- (iv) Difference between amplitude modulation and frequency modulation.

(Short Answer Type Questions) (5 marks each)

Q. 12. Draw labelled diagrams and derive expressions for the resultant capacity when capacitors are connected in:

- (i) Series Combination
- (ii) Parallel Combination.

(Or) Explain the construction and working of Van de Graaff generator. State its uses.

- Q. 13. Explain simple microscope on the basis of the following points:
- (a) Ray diagram for the formation of image;
 - (b) Expression for magnifying power when the final image is formed:
 - (i) At the least distance of distinct vision;
 - (ii) At infinity.

(Or) Describe labelled diagram of Terrestrial telescope and derive expression for its magnifying power.

- Q. 14. What is an oscillator? Explain use of transistor as an oscillator under the following points:
- (i) Labelled circuit diagram;
 - (ii) Working.

(Or) What is main logic gates? How many types are they? Draw their symbols and Truth Table.

(Long Answer Type Questions) (6 marks each)

- Q. 15. What is resonant electrical circuit? What are its types? Find out an expression for resonant frequency for series L-C-R circuit.

(Or) What is a D.C. electric motor? Explain its construction and working.

- Q. 16. Describe the displacement method to determine the focal length of convex lens on the following points:

- (i) Formula derivation;
- (ii) Ray diagram;
- (iii) Observation Table;
- (iv) Precautions (any two).

(Or) Establish the expression for finding the refractive index of material of a prism.

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