DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/
COMMERCIAL PRACTICE – APRIL -2020.

ENGINEERING PHYSICS - II

(Maximum Marks :75)   [Time : 2.15 hours]

PART–A

Marks

I. Answer **any three** questions in one or two sentences. Each question carries 2 marks.

1. Define angular velocity and angular acceleration.

2. Explain moment of inertia of a body.

3. What is mean by a geo stationary satellite.

4. State Biot and Saveart's law.

5. Explain chain reaction.   (3x2=6)

PART - B

II   Answer **any four** of the following questions . Each question carries 6 marks.

1. Explain Parallel axis theorem and perpendicular axis theorem in connection
   with moment of inertia.

2. Discuss the variation of acceleration due to gravity with height.

3. Applying Kirchhoff's laws, explain how an unknown resistance can be determined
   using Wheat stones's bridge.

4. With the help of a neat diagram explain the working of Ruby Laser.

5. Two spherical bodies each having mass 100 kg separated by a distance 0.5 m.
   If the force of attraction between them is 2.66×10^{-6} N. Determine the value of the
   gravitational constant G.

6. With theory and diagram explain, how a galvanometer can be converted into a
   voltmeter

7. The work function of a photo electric material is 2.81 eV. Find the threshold
   wave length. Velocity of light is 3×10^8 m/s   and h = 6.63×10^{-34} Js.

[4x6 =24]

PART - C

(Answer **any of the three units** from the following. Each full question carries 15 marks)

UNIT I

III (a) Define radius of gyration and write its equation. (3)

(b) Derive an equation for moment of inertia of a uniform circular disc about an axis passing through its centre and perpendicular to its plain. (6)

(c) A body of mass 2 Kg attached to a string of length 0.5 m is rotated at a speed of 360 rpm. Calculate the angular momentum. (6)

OR

IV (a) Derive total kinetic energy of a rolling uniform circular disc. (3)

(b) Define centripetal force and derive an equation for centripetal force. (6)

(c) A uniform circular disc rolling on a horizontal surface with a speed of 4 rotations per second. If the radius of the disc is 5 cm and its mass is 1 Kg. Calculate its rotational kinetic energy. (6)

UNIT- II

V (a) Find a relation between acceleration due to gravity and gravitational constant. (3)

(b) Define orbital velocity and derive an equation for orbital velocity of a satellite revolving at a height h from the surface of earth. (6)

(c) Calculate the escape velocity on the surface of earth using the following datas $G=6.67 \times 10^{-11}$ Slunits $M=6 \times 10^{24}$ Kg.R=6500Km. (6)

OR

VI (a) State Newton's law of gravitation and write the equation for the force of attraction between two bodies separated by a distance. (3)

(b) Define the period of a satellite and derive equation for period of a satellite. (6)

(c) Calculate the acceleration due to gravity at a depth 200 Km below the surface of earth. Radius of earth=6500 Km and g=9.8 m/s. (6)

UNIT- III

VII (a) Explain resistivity and write its equation. (3)

(b) Describe the experiment with necessary theory to determine the resistance of a wire using meter bridge. (6)

(c) A circular coil of radius 0.05m and having 500 turns carries a current 1 A calculate the magnetic field at the centre of the circular coil. (6)

OR

VIII (a) Find the equation for the effective resistance of three resistors connected in parallel. (3)

(b) With a neat diagram explain the theory and working of a moving coil galvanometer. (6)

(c) The resistance of a metal wire of length 50 m and radius 0.3 mm is 5 ohms. Calculate the resistivity of the material of the wire. (6)

UNIT – IV

IX (a) Write three characteristics of LASER. (3)

(b) With the help of a diagram discuss the parts and working of a nuclear power reactor. (6)

(c) In a fusion reaction two deuterons ($_1H^2$) combines to form a helium atom ($_2He^4$). Calculate the energy released in this fusion reaction in MeV. Mass of $_1H^2$ =2.01472 u, mass of $_2He^4$ =4.00268 u. (6)

OR

X (a) State three advantages of gas LASER over solid LASER. (3)

(b) Explain the terms spontaneous emission, stimulated emission, optical pumping and population inversion. (6)

(c) The threshold wavelength of a photoelectric material is 610 nm. What is the maximum velocity of the electrons emitted from the metal when a light of wavelength 220 nm falls on the material.
Velocity of light is $3x10^8$ m/s, h=$6.63x10^{-34}$Js.,
mass of electron = $9.1x10^{-31}$kg. (6)

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