

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. Define radius of gyration.
3. State Newton's law of gravitation.
4. Define gravitational potential.
5. Define photo electric effect. (3x2=6)

PART - B

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

1. (a) Define centripetal force and centripetal acceleration. (3)
(b) Find the value of centripetal force acting on a body of mass 1 kg is moving on a circle of radius 50cm with an angular velocity of 5π rad/s. (3)
2. State and explain parallel and perpendicular axis theorems. (6)
3. (a) What are geostationary satellites? Give 2 uses. (3)
(b) What are polar satellites. Give 2 uses. (3)
4. State and explain Biot-Savart law. Give the expression for magnetic field at the centre of a current carrying circular coil. (6)
5. With the help of a neat diagram, obtain the conditions for balancing of a Wheatstone's bridge. (6)
6. Describe an experiment to demonstrate photoelectric effect. (6)
7. Explain the principle and working of a nuclear reactor. (6)

[4x6 =24]

PART - C

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

UNIT I

- III** (a) Explain banking of roads and rails. (3)
- (b) Derive the expression for moment of inertia of uniform circular disc about an axis passing through its centre and perpendicular to its plane. (6)
- (c) Four masses 2g, 4g, 6g and 8g are arranged on a light rod such that the distance between two consecutive masses is 0.1m. Find the moment of inertia and radius of gyration about an axis perpendicular to its plane and passing through the 1st mass. (6)

OR

- IV** (a) Derive $v=r\omega$. (3)
- (b) Define torque, angular momentum and rotational kinetic energy. Give the relation between torque and angular momentum. (6)
- (c) A constant torque acting on a disc of mass 5kg and radius 25cm change its angular velocity from 20π rad/s to 60π rad/s in 10s. Find the torque. (6)

UNIT- II

- V** (a) Distinguish between 'g' and 'G'. (3)
- (b) Derive the expression for orbital velocity and period of an artificial satellite. (6)
- (c) Find the orbital velocity and time period of an artificial satellite moving at a height of 650km from the surface of the earth. ($R=6400\text{km}$ and $g=9.8\text{m/s}^2$). (6)

OR

- VI** (a) Define escape velocity. Give its expression. (3)
- (b) Discuss the variation of acceleration due to gravity with altitude and depth. (6)
- (c) Calculate the escape velocity on the surface of the Earth. (Radius of the Earth $R=6400\text{km}$ and acceleration due to gravity $g=9.8\text{m/s}^2$). (6)

UNIT- III

- VII** (a) State Kirchoff's laws. (3)
- (b) Describe the principle construction and working of a moving coil galvanometer. (6)
- (c) A straight current carrying conductor of length 5m experiences a force of 20N, when placed perpendicular to a uniform magnetic field of 1 tesla. Determine the current flowing through it. (6)

OR

- VIII** (a) Define the terms electrical resistance, resistivity and conductivity. (3)
- (b) With adequate theory explain how a galvanometer can be converted into an ammeter and a voltmeter? (6)
- (c) Given three resistances 3Ω each. Draw the diagrams explaining how these resistances can be combined to give 9Ω , 2Ω and 1Ω . (6)

UNIT – IV

- IX** (a) Write any 3 laws of photoelectric effect. (3)
- (b) Describe how Einstein explain photoelectric effect. (6)
- (c) The photoelectric threshold of a metal is 400nm. Find the kinetic energy of the emitted photo electron when the metal is irradiated with a light of wavelength 200nm. ($h=6.626 \times 10^{-34} \text{J.s}$ and $c=3 \times 10^8 \text{ m/s}$). (6)

OR

- X** (a) Define Nuclear fission and Nuclear fusion. (3)
- (b) Describe the construction and working of a Ruby laser. (6)
- (c) Calculate the photoelectric work function of a metal of threshold wavelength is 600nm. ($h=6.626 \times 10^{-34} \text{J.s}$ and $c=3 \times 10^8 \text{ m/s}$). (6)
