**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANGEMENT/
COMMERCIAL PRACTICE - NOVEMBER 2021**

ENGINEERING PHYSICS II

(Maximum Marks:75)   (Time: 2¼ hours)

PART - A

Marks

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

   1.   What does banking of road and track mean?

   2.   Define escape velocity. Write its mathematical expression.

   3.   State Ohm's law and write the mathematical equation.

   4.   Distinguish between spontaneous and stimulated emission.

   5.   Why the control rods used in nuclear fission reactor? Mention the names of
            two materials used as control rods.   (3 x 2 = 6)

PART - B

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

   1. Two particles of equal mass are revolving in a circular path of radius **2R** and **3R**
        with speed **V** and **2V** respectively. What is the ratio of their centripetal force?

   2. A circular disc is rolling on a horizontal surface at a speed of **3 rev/s**. Radius of
        the disc is **10 cm** and mass is **1.2 kg**. Calculate its total kinetic energy.

   3. The acceleration due to gravity on the surface of the earth is **9.8m/s^2**. Find the
        height above the earth at which *g* is **9.6 m/s^2**. Given that radius of the earth is
        6400km.

   4. Two wires when connected in series have an effective resistance **10Ω**. When they
        connected in parallel the effective resistance is **2.4 Ω**. Find the individual
        resistances.

   5. The threshold wavelength for photo electric effect in a metal is **500n m**. What is
        the maximum velocity with which electrons eject out when it is irradiated with a
        light of wavelength **100n m**.

   6. A galvanometer has resistance **100Ω**. It gives full scale deflection for **1 mA**. Find
        out the voltage range that the instrument can read when a resistance of **4900Ω** is
        connected in series.

7. Find out the mass of the moon if the acceleration due to gravity at the surface is **1.62 m/s^2.** Radius of the moon is **1750 km** and universal gravitation constant G=6.67 x 10^{-11} SI unit. (4 x 6 = 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. Write its expression. (3)

(b) Explain parallel axis and perpendicular axis theorems of moment of inertia. (6)

(c) A string can withstand a tension of **25N**. What is the greatest speed at which **2 Kg** mass can be whirled in a horizontal circle using a string of **2m** length. (6)

OR

IV (a) What you mean by angular velocity? Derive the relation between linear velocity and angular velocity. (3)

(b) Derive the expression for moment of inertia of a disc about an axis passing through its centre and perpendicular to its plane. (6)

(c) Five masses are placed on a massless road as shown in figure. The distance between two consecutive masses is **0.1 m**. Find the moment of inertia about the axis passing through **1 kg** mass
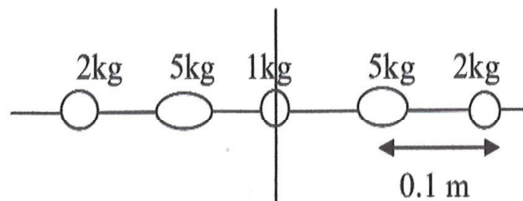
(6)

UNIT – II

V (a) State Newton's universal law of gravitation. Write the mathematical expression of the law . (3)

(b) Discuss the variation of acceleration due to gravity *g* with height from the surface of the earth. (6)

(c) Calculate the force of attraction between two masses each of **5000kg**

separated by a distance of **10cm**. G=6.67 x 10^{-11} SI unit. (6)

OR

VI (a) Explain the term Gravitation potential. (3)

(b) Obtain the expression for the orbital velocity of an artificial satellite revolving around the planet in terms of acceleration due to gravity ***g*** (6)

(c) A remote sensing satellite of earth revolving in an orbit at a height **300km** above the earth surface. What is its orbital velocity? Given earth radius as 6400 km. (6)

UNIT – III

VII (a) State Kirchhoff's laws. (3)

(b) Using Kirchhoff's laws derive the balancing condition for Wheatstone's bridge (6)

(c) Explain the construction and working of a moving coil galvanometer (6)

OR

VIII (a) State and explain Biot's Savart's law. (3)

(b) Explain the construction and working of Metre Bridge (6)

(c) Calculate the length of a conducting wire of radius **0.1 mm** to get a resistance of **10Ω** if the resistivity of the wire materials is **49 x 10^{-8} Ωm** (6)

UNIT – IV

IX (a) Using neat diagram explain the construction and working of Ruby laser (6)

(b) What are the uses of a nuclear reactor . (3)

(c) State Einstein's photoelectric equation. Explain the laws of photoelectric effect. (6)

OR

X (a) Using neat diagram explain the construction and working of He-Ne laser (6)

(b) List the applications of photoelectric effect (3)

(c) List the essential components of nuclear fission reactor. Discuss the energy production in Sun. (6)

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