



**End Semester/ Reappear (Semester I) Examination December 2024**

**Programme: Diploma (MiE/CSE)**  
**Course: Basic Physics I**  
**Course Code: 8DBSC103/3DBS C103**  
**Enrolment no. \_\_\_\_\_**

**Full Marks: 70**  
**Time: 3 Hrs.**

**Section I**

**1. Short Answer type questions. Answer any four.**

**4 x 5 = 20**

- The value of Acceleration due to gravity ( $g$ ) is  $9.8 \text{ m/s}^2$ . If the unit of length is kilometre, unit of time is minute, what will be numerical value of  $g$ ?
- Find an expression for Centre of Mass & Centre of gravity of a system of two –Particles.
- How will you find Acceleration of an object from Velocity Time Graph?
- What is the difference between conservative and non-conservative force?
- Define Velocity, Acceleration, Time period and Restoring force of Simple Harmonic motion.
- Define Collision. Explain Elastic & Inelastic Collisions.

**Section II**

**Long Answer type questions. Answer any three.**

**3 x 10 = 30**

- Check the validity of equation  $v = u + at$  where  $u$  is Initial velocity,  $v$  is final velocity is acceleration and  $t$  is time interval.
- State and explain Newton's laws of motion with suitable examples.
- A body of mass 5 kg is moving on a horizontal smooth surface at a velocity of 10m/s. Constant force of 20 N is applied on the body for 10s in the direction of the velocity. Find (a) the work done by the force (b) the increase in KE of the body and (c) the power of the agent that exerts the force.
- Two particle of masses 1 Kg and 4 Kg are placed at a distance 1 m apart. Find the position of Center of mass.
  - A particle is executing SHM, the amplitude of motion is 0.01m and its frequency is 60 Hz. Calculate the maximum acceleration of the particle.
- The position of an object from an arbitrary origin is given by  $x = 5t^3 + 4t^2 + 9$  in metre unit. Find the acceleration of the object as a function of time  $t$ . calculate its value at (i)  $t = 1\text{s}$  (ii)  $t = 5\text{s}$

**Section III**

**Application based questions. Answer any one.**

**1 x 20 = 20**

- The frequency of a stretched string under vibration depends upon Tension force ( $F$ ), length of string ( $l$ ) and mass per unit length ( $m$ ). Use the method of dimensions to find an expression of frequency.
- What do you mean by Relative Velocity? Bus moves east with a speed of 110 Km/h and car moves west with a speed of 90 Km/h. Calculate the relative Velocity of car with respect to bus.
- 60 kg boy climbs with a constant speed a vertical rope of length 6m in 10 s. What is the average power output during the climb?

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