**Code No.ES202CE**

**METHODIST COLLEGE OF ENGINEERING & TECHNOLOGY**

**(An Autonomous Institution)**

**B.E. (CIVIL) II-Semester (Supplementary) Examination, FEB-2024**

**Subject: ENGINEERING MECHANICS-II**

**Time: 3 hours Max.Marks:60**

**Note: Missing data, if any, maybe suitably assumed.**

**PART-A**

**Answer All the questions.(10X2M=20M)**

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| --- | --- | --- | --- | --- |
| **Q.No.** | **Questions** | **Marks** | **CO** | **BTL** |
| **1. a** | Distinguish a rectilinear motion from curvilinear motion of a body. | 2 | 1 | 2 |
| **b** | A stone is thrown vertically upwards and returns to earth in 3 sec. How much height does it go? | 2 | 1 | 2 |
| **c** | State D’ Alembert’s principle. | 2 | 2 | 1 |
| **d** | Explain the types of rigid body motion with equations. | 2 | 2 | 1 |
| **e** | State Work Energy Theorem and derive the same for rectilinear motion | 2 | 3 | 1 |
| **f** | Recall law of conservation of energy | 2 | 3 | 1 |
| **g** | State the principle of conservation of linear momentum of a particle | 2 | 4 | 1 |
| **h** | Summarize Types of Impacts | 2 | 4 | 1 |
| **i** | A particle has a SHM defined by a = - 9 s and an amplitude of 250 mm. find the velocity and acceleration of the particle when it is 150 mm away from the centre of its path. | 2 | 5 | 2 |
| **j** | Define coefficient of restitution. | 2 | 5 | 2 |

**PART-B**

**Answer Any Five questions**.**(5X8M=40M)**

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| --- | --- | --- | --- | --- | --- |
| **Q.No.** |  | **Questions** | **Marks** | **CO** | **BTL** |
| **2.** | **a** | Because of the resistance exerted by the fluid, the rectilinear motion of a particle is given by a = – kv, where k is a constant. When t =0, s = 0, and v = v0. Determine the particle velocity as a function of (a) the time t and (b) its position s. (c) what is the maximum distance the particle will move? | **8** | **1** | **3** |
|  |  |  |  |  |
| **3.** | **a** | The pulleys in Fig. are frictionless and of negligible weight. Determine the tension in cable supporting body C. | **8** | **2** | **3** |
|  |  |  |  |  |
| **4.** | **a** | The 7 kg block shown in Fig. is released from rest, as it slides a distance “s” down the inclined plane. It strikes the spring, which it compresses 75 mm before the motion impends up the plane. Assuming the coefficient of friction is 0.25 and that the spring constant k = 2.8 N/mm, determine the value of “s” | **8** | **3** | **3** |
|  |  |  |  |  |
| **5.** | **a** | In an oblique central impact shown in Figure.1, the coefficient of restitution is 0.6. The flat discs slide on a smooth horizontal surface. Compute the final velocity of each disc directly after impact.    Figure.1 | **8** | **4** | **3** |
|  |  |  |  |  |
| **6.** | **a** | The amplitude of a particle moving with SHM is 20 m. when the particle is 10 m from the extreme left position; the acceleration is 160 m/s2. What is it velocity at that position? How many seconds are required to move 10 m from the extreme left position. | **8** | **5** | **3** |
|  |  |  |  |  |
| **7.** | **a** | The weights A and B are 15N and 55N respectively. Assume that the coefficient of friction between the planes is 0.25 and that of B and the surface is 0.1. What is the force between the two, as they slide down the incline? | **5** | **2** | **3** |
| **b** | A stiffness of30N/mm is pulled from an extension of2mm to an extension of 4 mm. Calculate the work done. | **2** | **3** | **2** |
|  |  |  |  |  |  |
| **8.** | **a** | The rectilinear motion of a particle is governed by a = – 8s-2 where a is in m/s2 and s is in m. When t = 1 sec, s = 1.2 m and v = 0.6 m/s. Determine the acceleration of the particle at t = 2 s | **5** | **1** | **3** |
| **b** | A body of weight 600 N moves on a level horizontal surface for a distance 7 of 30m with a force of 100 N applied to body at an angle of 30° to horizontal. Find the work done taking coefficient of kinetic friction as 0.2 | **3** | **4** | **2** |
| **9.** | **a** | A bullet weighing 0.3 N and moving at 670 m/s penetrates the 45N body as shown in Fig.3 emerges with a velocity of 180 m/s. How long and how far does the body move? | **8** | **5** | **3** |
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