**Code No.ES202CE**

**METHODIST COLLEGE OF ENGINEERING & TECHNOLOGY**

**(An Autonomous Institution)**

**B.E. (CIVIL) II-Semester (AICTE) Examination, SEPTEMBER-2023**

**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)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Q.No.** | **Questions** | **Marks** | **CO** | **BTL** |
| **1. a** | Distinguish between kinematics and kinetics of a particle motion. | 2 | 1 | 2 |
| **b** | The motion of a particle is given by the equations, x = t3 -15t2 -20, where x is displacement in meters and t is in sec. Determine the acceleration of particle after 4 sec. | 2 | 1 | 2 |
| **c** | Recall Angle of Banking | 2 | 2 | 1 |
| **d** | Explain the concept of general plane motion. Enlist types of plane motion.  | 2 | 2 | 1 |
| **e** | State the work energy principle in translation. | 2 | 3 | 1 |
| **f** | State D-Alembert's principle. | 2 | 3 | 2 |
| **g** | Recall principle of linear momentum | 2 | 4 | 1 |
| h | Define coefficient of restitution. | 2 | 4 | 1 |
| **i** | Enlist types of vibrations | 2 | 5 | 1 |
| **j** | Write the expression for time period of a compound pendulum and the equivalent lengthof a compound pendulum. | 2 | 5 | 2 |

**PART-B**

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q.No.** |  | **Questions** | Marks | CO | BTL |
| **2.** | **a** | A projectile is fired from the top of a cliff 100 m high with a velocity of 430 m/s directed at 45° to the horizontal. Find the range on a horizontal plane through the base of the cliff. | 8 | 1 | 3 |
|  |  |  |  |  |
| **3.** | **a** | Referring to Fig. compute the acceleration of body B and the tension in the cord supporting body A. | 8 | 2 | 3 |
|  |  |  |  |  |
| **4.** | **a** | A sphere rolling with an initial velocity of 9 m/s, starts up a plane inclined at 300 with the horizontal as shown in Fig. How far will it roll up the plane. Use work energy theorem. | 8 | 3 | 3 |
|  |  |  |  |  |
| **5.** | **a** | A 12 kN hammer falling freely through 3 m drives a 6 kN pile by 6 m vertically into the ground. Assume the hammer and pile cling each other after impact, determine the average ground resistance to penetration by the pile. | 8 | 4 | 3 |
|  |  |  |  |  |
| **6.** | **a** | A particle moving with simple harmonic motion has a maximum velocity of 20 m/s and a maximum acceleration of 40m/s2. Determine the velocity and acceleration of the particle when it is mid way between the center and right end of its path. How long does it take to move from center to the specified position? | 8 | 5 | 3 |
|  |  |  |  |  |
| **7.** | **a** | A block A of mass 8 kg and is at rest on a frictionless surface. A 4 kg mass B is attached to a rope as shown in Fig. Determine the acceleration of the mass B and the tension in the cord. The pulley is frictionless. | 5 | 2 | 3 |
| **b** | A ball is thrown so that is just clears a 6 m wall 21 m away. If it left the hand l.50m above the ground and at an angle of 60° to horizontal, what was the initial velocity or the ball? | 3 | 1 | 2 |
| **8.** | **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. | 5 | 5 | 3 |
| **b** | A balloon rises from the ground with a constant acceleration 3m/s2, five seconds later a stone is thrown vertically up from the launching pad. Calculate the minimum velocity of stone for it to just touch the balloon. | 3 | 1 | 2 |
| **9.** | **a** | **Determine** the constant force P that will give the system of forces shown in Fig.4 a velocity of 3 m/s after moving 5 m from rest to the right. | 8 | 4 | 3 |
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