# NETTUR TECHNICAL TRAINING FOUNDATION

## DIPLOMA IN MECHATRONICS ENGINEERING & SMART FACTORY-CP15

## III SEMESTER REGULAR & SUPPLEMENTARY EXAMINATION-JAN 2023

**Subject: Control System** **Total Time: 2 Hr.**
**Subject Code: CP15302T** **Total Marks: 50 Marks**

**PART B**

**1.0 ANSWER ANY EIGHT OF THE FOLLOWING** **2*8=16**

1.1 Give Practical examples of Open loop & closed loop control systems.
1.2 Name the two control modes in which D.C. motors are used
1.3 Define transfer function of a control system.
1.4 What are the basic components of a control system?
1.5 What is mean by Potentiometer? Mention its types.
1.6 List out any four time-domain specifications.
1.7 Define transient response of a system.
1.8 Define Stability. Classify the systems based on stability.
1.9 What is Index of performance (IP)?
1.10 What is meant by Boiler and mention its two main parts?

**2.0 ANSWER ANY SIX OF THE FOLLOWING** **3*6=18**

2.1 Distinguish between Open loop and closed loop control system with neat diagram.
2.2 Write down the Procedure to draw free body diagram in translational mechanical system.
2.3 What is the stability of the control system based on the relation between gain margin and phase margin?
2.4 Explain Translational (Linear) Potentiometers with neat sketch
2.5 Explain Proportional Integral derivative Controller with block diagram
2.6 How a control system is classified depending on the value of damping?
2.7 What are the advantages of Computer in Measurement and Control?
2.8 Write down the difference between Conventional system and mechatronics system.

**3.0 ANSWER ANY FOUR OF THE FOLLOWING** **4*4=16**

3.1 Draw the building block of mechatronics system and explain.
3.2 Explain adaptive control system with neat sketch
3.3 Explain boiler combustion control process.
3.4 Find the transfer function of armature controlled D.C. Motor.
3.5 With neat Circuit diagram explain Potentiometer as an Error Detector.
3.6 Explain the various standard test inputs used in control system

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## DIPLOMA IN MECHATRONICS ENGINEERING & SMART FACTORY-CP15

## III SEMESTER SUPPLEMENTARY EXAMINATION-JAN 2023

**Subject: Applied Mechanics** **Total Time: 2 Hr.**

**Subject Code: CP15 03 03** **Total Marks: 50 Marks**

**PART B**

**1.0 ANSWER ANY EIGHT OF THE FOLLOWING** **2*8=16**

1. 1 Name the Springs shown in the fig: 1.1(a, b, c & d).

fig: 1.1

(a) (b) (c) (d)

1. 2 What do you mean by Factor of Safety?
1. 3 Define Kinematics.
1. 4 Brief on Compressive Strength.
1. 5 State Hook's law.
1. 6 Differentiate machine and mechanism.
1. 7 What is Moment of Inertia?
1. 8 Mention the type of loads acting when the beam is subjected to bending:
   a) above the neutral axis b) below the neutral axis of the beam.
1. 9 What do you mean by a Crank in four bar mechanism?
1. 10 What is gear? Write two daily life applications of Gear.

**2.0 ANSWER ANY SIX OF THE FOLLOWING** **3*6=18**

2. 1 A rod of 1000 mm long and diameter of 30 mm is subjected to an axial pull of 40 KN. If the modulus of elasticity of the material of the rod is $2X10^5$ N/mm², determine: (a) Stress (b) Strain.
2. 2 Draw a schematic diagram of worm and worm wheel.
2. 3 Differentiate strut and column.
2. 4 Write about Flexible Link? Give Example
2. 5 State Theorem of Parallel Axis.
2. 6 Define Uniformly distributed load with neat diagram.
2. 7 Draw the sign convention for Bending moment.
2. 8 Explain about slip and creep in the Belt drive.

**3.0 ANSWER ANY FOUR OF THE FOLLOWING** **4*4=16**

3. 1 Write the assumptions made in the theory of simple bending.
3. 2 Write the classification of beams with simple sketches. Explain anyone in brief.
3. 3 Explain the classification of kinematic pairs.
3. 4 Explain Open Belt drive with neat diagram.
3. 5 Write the assumptions made in the Euler's column theory.
3. 6 Write a short note about the Principle of Simple Gear train.