

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP/2025)**

**CLASS: BTECH
BRANCH: MECH. /PROD.**

**SEMESTER : IV
SESSION : SP/2025**

SUBJECT: ME207 KINEMATICS & DYNAMICS OF MACHINES

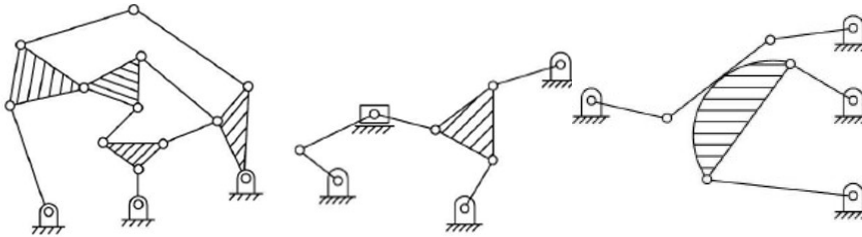
TIME: 02 Hours

FULL MARKS: 25

INSTRUCTIONS:

1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

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|--|-----|---------|------------|
| Q.1(a) Differentiate between | [2] | CO
1 | BL
BL-4 |
| i) Lower and higher pairs | | | |
| ii) Mechanism and machine | | | |
| Q.1(b) Find the degree of freedom of the following mechanisms. | [3] | 1 | BL-3 |



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|--|-----|---|------|
| Q.2 In a four bar chain ABCD, AD is fixed and is 15 cm long. The crank AB is 4 cm long and rotates at 120 rpm clockwise, while the link CD (whose length is 8 cm) oscillates about D. BC and AD are of equal length. Find the angular velocity of link CD when angle BAD = 60°. | [5] | 1 | BL-3 |
| Q.3 A flywheel is used to give up 18 kJ of energy in reducing its speed from 100 rpm to 98 rpm. Determine its kinetic energy at 140 rpm. | [5] | 2 | BL-3 |
| Q.4 Derive an expression for the rotational speed of a Porter governor. | [5] | 2 | BL-4 |
| Q.5 A circular disc mounted on a shaft carries three attached masses of 4 kg, 3 kg and 2.5 kg at radial distance of 75 mm, 85 mm and 50 mm and at the angular positions of 45°, 135° and 240° respectively. The angular positions are measured counter clockwise from the reference line along the x-axis. Determine the amount of the counter mass at a radial distance of 75 mm required for the static balance. | [5] | 3 | BL-3 |

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