

Roll No.

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Marine Engg.) / (Mechanical Engg.) (Sem.-3)

THEORY OF MACHINES-I

Subject Code : BTME-302

M.Code : 59112

Date of Examination : 14-01-23

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- a. Differentiate between a Machine and a Structure?
- b. What is the difference between ideal mechanical advantage and actual mechanical advantage?
- c. Define degree of freedom of body and a mechanism.
- d. What is Polar diagram?
- e. Define slip of belt.
- f. Enumerate any four different types of follower motions of a cam?
- g. Define the term "Limiting Friction".
- h. Why single cylinder needs large size flywheel?
- i. Define hunting of governors.
- j. Write the basic requirements for high speed cams.

SECTION-B

2. Draw a neat sketch and explain working of pantograph.
3. A leather belt is required to transmit 7.5 k/w from a pulley 1.2 m in diameter, running at 250 r.p.m. The angle embraced is 165° and the coefficient of friction between the belt and pulley is 0.3. If the safe working stress for the leather belt is 1.5 MPa. density of leather Mg/m^3 and thickness of belt is 10 mm. Determine the width of the belt taking centrifugal tension into account.
4. What is the difference between a shoe brake and band brake? Describe them and state their applications.
5. A horizontal cross compound steam engine develops 300 KW at 90 r.p.m. The coefficient of fluctuation of energy as found from the turning moment diagram is to be 0.1 and the fluctuation of speed is to be kept within $\pm 0.5\%$ of the mean speed. Find the weight of the flywheel required, if the radius of gyration is 2 meters.
6. Name various inversions of single slider crank chain. Explain any one with diagram.

SECTION-C

7. State the condition under which two shafts connected together by a double Hooke's joint shall have the same angular velocities. Discuss the advantage and give practical application for the same.
8. A cam operates a roller, in line reciprocating follower, while rotating at 300 r.p.m. The further specifications are: Minimum radius of cam = 25 mm. Lift of follower = 30 mm. Diameter of roller = 15 mm. Angle of lift = 120° . Nature of lift is S.H.M. Outer dwell angle = 30° . Angle of return = 150° . Nature of return is uniform acceleration and retardation where acceleration is equal to retardation in magnitude. Draw the cam profile. Find the maximum velocity and acceleration of the follower during lift as well as return.
9. a) Explain the following terms as applied to flywheel:
 - (i) Fluctuation of energy
 - (ii) Coefficient of fluctuation of energy
 - (iii) Fluctuation of speed
 - (iv) Coefficient of Fluctuation of speed
- b) Explain the importance and use of Turning Moment Diagram of reciprocating engines.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.