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(Please write your Exam Roll No.)   Exam Roll No. ....

END TERM EXAMINATION

FOURTH SEMESTER [B. TECH.] MAY-JUNE 2007

Paper Code:ETME-202	Subject: Kinematics & Dynamics of Machine
Time : 3 Hours	Maximum Marks :75

Note: Attempt five questions in all including Q.1. which is compulsory.

(5x5=25)

Q1. (i) Explain grubler equation.

(ii) Deduce expression for frequency of free vibration.

(iii) Classify cams

(iv) Explain the law of gearing

(v) Explain balancing of multi cylinder engines

Q2. In a quick return slotted lever mechanism draw the velocity and acceleration diagram when the crank is rotating at 10 rad/s with an angular acceleration of 3 rad/s for an instantaneous position of 45° vertical. **(12.5)**

Q3. Draw the displacement time, velocity time and acceleration time diagrams for a follower in order to satisfy following conditions. The stroke of the follower is 25mm. Outword stroke takes place with simple harmonic motion during 90° of cam rotation, and the return stroke also with simple harmonic motion during 75° of Cam rotation. The follower is to dwell in the out position for 45° of Cam rotation and the cam turns with uniform speed of 800 rpm. **(12.5)**

Q4. A team of spur gears is required to give a total reduction of 250W in four steps. No pinion is to have less than 20 teeth and the module is 2 for first step, 4 for the second 5 for the third and 6 for the fourth. The center distances must not involve recurring decimals. Find the number of teeth, the pitch circle diameters and the center distances for a suitable team of gears. **(12.5)**

Q5. A shaft carries three rotating masses A, B and C of magnitude 10, 8 and 16 Kg with their center of gravity 100mm, 125 mm and 50mm respectively from the axis of rotation. The distance between planes of rotation of A&B is 1m and between B&C is 1.2m. The angular position of masses are B 60°, C 135° from A in same direction. Find magnitudes & position of balance weights required in passes L & m situated mid way between A&B and planes B &C respectively. Assume radius of gyration of balance weights to be 150 mm. **(12.5)**

Q6. The rotor of a turbojet engine has a mass of 100 Kg and a radius of gyration of 15cm. The engine rotates at 800 rpm in clockwise direction when viewed from front. The aeroplane turns with a radius of 1.5 Km to right. When moving at 900 Km/hr. Determine the gyroscopic couple the rotor exerts on plane structure. Derive the formula use. **(12.5)**

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