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CBCS SCHEME

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18AU52

Fifth Semester B.E. Degree Examination, July/August 2021
Dynamics of Machines

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions.***

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

1 a. Explain briefly with neat figure equilibrium of two forces, three and four forces. **(10 Marks)**

b. A slider crank mechanism is shown is Fig.Q1(b). The force applied to the piston is 1000N when the crank is at 60° from IDC. Calculate the driving torque T_2.

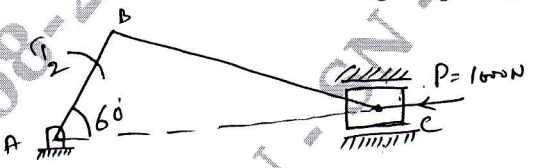

Fig.Q1(b) **(10 Marks)**

2 a. Explain briefly four body mechanism with free body diagram. **(10 Marks)**

b. List and explain the important forces acting on the reciprocating parts of an engine. **(10 Marks)**

3 Four masses of magnitude 5, 6 M and 8kg revolve in planes A, B, C and D respectively. The planes B, C, D are placed at a distance 0.3m, 1.2m and 2.0m respectively from A. the masses are at same radii of 0.3m. Find magnitude of M and relative angular position of all masses for complete balance. **(20 Marks)**

4 The pistons of a 4 cylinder vertical inline engine reach their uppermost position at 90° interval in order of their axial position. Pitch of cylinder = 0.35m. Crank radium = 0.12m, length of C.R = 0.42m. The engine runs at 600rpm. If he reciprocating parts of each engine has a mass of 2.5kg. Find the unbalanced primary and secondary forces and couples. Take central plane of engine as reference plane. Use Analytical method. **(20 Marks)**

5 a. Write the classification of governors and compare between functions of flywheel and governors. **(10 Marks)**

b. Explain briefly with figure working principle of a simple centrifugal governor. **(10 Marks)**

6 a. Define and explain the following term :
i) Sensitiveness
ii) Hunting
iii) Stability
iv) Unstable Governor
v) Controlling force. **(10 Marks)**

b. With neat figure explain Porter governor. **(10 Marks)**

7 a. A flat foot step bearing 300mm in diameter supports a load of 10kN. If the coefficient of friction is 0.1 and speed of the shaft is 60 rpm, find power lost in friction, assuming : i) Uniform pressure ii) Uniform wear. **(10 Marks)**

b. A conical pivot supports a load of 20 kN. The cone angle is 120°. The intensity of uniform pressure is to be 300 kN/m^2 and coefficient of friction = 0.03. The external radius is 2 times the internal radius. The speed of the shaft is 120 rpm. Determine the power lost in working against the friction. **(10 Marks)**

8 A shaft rotating at 300 rpm transmitting 5KW power to drive another shaft at 500 rpm through a belt. The belt is 120mm wide and 15mm thick. The distance between the centre of the shafts is 3m. The effective diameter of smaller pulley is 0.75m. Calculate the stress in the belt, if it is : i) An open belt drive ii) A cross belt drive
Take coefficient of friction between the belt and pulley material as 0.3. **(20 Marks)**

9 Explain briefly the following terms :
i) Gyroscopic couple
ii) Effect of gyroscopic couple of bearings
iii) Stability of two and four wheelers. **(20 Marks)**

10 Explain briefly with neat figure :
i) Tangent cam with roller follower
ii) Circular arc cam with flat faced follower. **(20 Marks)**

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