TME-503   80   **Printed Pages : 5**

Paper Code & Roll No. to be filled in your Answer Book

Roll No. | | | | | | | | | | |

Odd Semester Examination-2016

B.Tech. (Semester-V)

DYNAMICS OF MACHINES

[Time : 3 Hours]   [Maximum Marks :100]

Note : Attempt **All** questions. All questions carry **equal** marks. Assume missing data suitably.

1. Attempt **any four** :   [5×4=20]

   (a) What is the difference between absorption and transmission dynamometer?

   (b) Explain the effect of gyroscopic couple on the reaction of four wheels of a vehicle negotiating a curve.

   (c) What are the effects of friction and of adding a central weight to the sleeve of a watt governor?

   (d) Write a short note on collar friction.

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(e) Write a short note on insensitiveness of governors.

(f) In what way a mechanism differ from a machine?

2. Attempt **any four** :

[5×4=20]

(a) Explain the application of gyroscopic principles to aircrafts.

(b) Prove that the sensitiveness of a proell governor is greater than that of a porter governor.

(c) Describe the construction and operation of pony brake dynamometer.

(d) Derive the condition for transmitting the maximum power in a flat belt drive.

(e) Explain the fluctuation of energy.

(f) Describe the principles of operation of an internal expanding shoe brake.

3. Attempt **any two** :

[10×2=20]

(a) In a crank and slotted lever quick return mechanism, the distance between the fixed centers is 150mm and driving crank is 75mm long. Determine ratio of time taken on cutting and return strokes.

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(b) Each paddle wheel of a streamer has a mass of 1600kg and a radius of gyration of 1.2m. The streamer turns to port in a circle of 160mm radius at 24km/h, the speed of paddles being 90rpm. Find the magnitude and effect of gyroscopic couple acting on streamer.

(c) A loaded governor of porter type has equal arms and links each 250mm long. The mass of each ball is 2kg and central mass is 12kg. When the ball radius is 150mm, the valve is fully open and when radius is 185mm, the valve is closed.. Find maximum speed and range of speed. If maximum speed is to be increased by 20% by an addition of mass to central load, find what additional mass is required.

Attempt **any two** :   [10×2=20]

(a) Explain the term height of governor. Derive an expression for the height in case of a watt governor. What are limitations of watt governor?

(b) A conical pivot bearing 150mm in diameter has a cone angle of 120°. If the shaft supports an axial load of 20KN and coefficient of friction is 0.03,

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find the power lost in friction when shaft rotates at 200rpm, assuming (i) Uniform pressure and (ii) uniform wear.

(c) Two parallel shafts 6 m apart are provided with 300mm and 400mm diameter pulleys and are connected by means of a cross belt. The direction of rotation of follower pulleys is to be reversed by changing over to an open belt drive. How much length of belt has to be reduced?

5. Attempt **any two:**   [10×2=20]

(a) A flywheel of a steam engine has a radius of gyration of 1m and mass 2500kg. The starting torque of the steam engine is 1500N-m and may be assumed constant. Determine: 1. Angular acceleration of the flywheel 2. The kinetic energy of flywheel after 10seconds from the start.

(b) An aeroplane makes a complete half circle of 50m radius towards left when flying at 200km/h. The rotary engine and propeller of plane has a mass of 400kg and a radius of gyration of 0.3m. The engine rotates at 2400rpm clockwise when viewed from

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rear. Find the gyroscopic couple on aircraft and state its effect on it.

(c) Describe with sketches one form of torsion dynamometer and explain with detail the calculations involved in finding the power transmitted.

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