*Total No. of Questions : 8]* *[Total No. of Printed Pages : 3*

**Roll No** .....

# ME-5004 (CBGS)

## B.E. V Semester

Examination, November 2018

## Choice Based Grading System (CBGS)

## Dynamics of Machines

***Time : Three Hours***

***Maximum Marks : 70***

*Note:* i) Attempt any five questions.

ii) All questions carry equal marks.

1. A petrol engine 100mm in diameter and 120mm stroke has a connecting rod 250mm long. The piston has a mass of 1kg and the speed is 1800rpm. The gas pressure is 0.5MPa at 30°from top dead centre during the explosion stroke. Find: 14

   a) The resultant load in gudgeon pin

   b) The thrust on the cylinder walls

   c) The speed above which the gudgeon pin load will be reversed

   d) The crank effort at this position

2. A porter Governor has all four arms 240mm long. The upper arm are attached on the axis of rotation and lower arm are attached to the sleeve at a distance of 25mm from the axis. The weight of each ball is 50N and the sleeve weighs 500N. The extreme radii of rotation are 160mm and 220mm. Determine the range of speed of the Governor. 14





3. A,B,C and D are four masses carried by a rotating shaft at radii 100, 125, 200 and 150mm respectively. The planes in which the masses revolve are spaced 600mm apart and mass of B, C and D are 10kg, 5kg and 4kg respectively.

   Find the required mass A and the relative angular setting of the four masses so that the shaft shall be in complete balance. 14

4. An effort of 1500N is required to just move a certain up an inclined plane of angle 12°, force acting parallel to the plane. If the angle of inclination is increased to 15°, then the effort required is 1720N. Find the weight of the body and the coefficient of friction. 14

5. In a winch, the rope supports a load W and is wound round a barrel 450mm diameter. A differential band brake acts on a drum 800mm diameter which is keyed to the same shaft as the barrel. The two ends of the bands are attached to pins on opposite sides of the fulcrum of the break lever and at distances of 25mm and 100mm from the fulcrum. The angle of lap of the brake band is 250°and the coefficient of friction is 0.25. What is the maximum load W which can be supported by the brake when a force of 750N is applied to the lever at a distance of 3000mm from the fulcrum. 14

6. The turning moment diagram for a multicylinder engine has been drawn to a scale 1mm=600N-m vertically and 1mm=3° horizontally. The intercepted areas between the output torque curve and the mean resistance line, taken in to order from one end, are as follows:

   +52, –124, +92, –140, +85, –72 and 107mm$^2$, when the engines is running at a speed of 600rpm. If the total fluctuations of speed is not to exceed ±1.5% of the mean. Find the necessary mass of the flywheel of radius 0.5m. 14

7. a) Explain working of multi plate clutch. 7

   b) A conical Pivot bearing supports a vertical shaft of 200mm diameter. It is subjected to a load of 30kN. The angle of the cone is 120° and co-efficient of friction is 0.025. Find the power lost in friction when the speed is 140rpm. Assuming. 7

      i) Uniform pressure and

      ii) Uniform wear

8. Write short notes (any two) 14

   a) Lanchester technique of Engine Balancing

   b) Inertia Governor

   c) Dynamometer

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