d) Select a V belt drive to transmit a power of 6kW from a shaft rotating at 1500 rpm to a parallel shaft to be run at 375rpm. The distance between the shaft centres is 500mm. The pitch diameter of the smaller grooved pulley can be taken to be 150mm. The factor of application is to be taken as 1.2.

OR

Write short note on following:

i) Jump and cross-over shock

ii) Internal and external shoe brakes

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Roll No ....

ME - 505
B.E. V Semester
Examination, December 2015
Dynamics of Machines

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

ii) All parts of each questions are to be attempted at one place.

iii) All questions carry equal marks, out of which part A and B (Max.50 words) carry 2 marks, part C (Max.100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.

iv) Except numericals, Derivation, Design and Drawing etc.

1. a) Discuss turning moment of crank shaft.

b) Prove that if the external moment is applied to a link, the constraint forces form a couple.

c) State the function of flywheel. State forces acting on it.

d) Deduce the expression for the inertia force in the reciprocating force neglecting the weight of the connecting rod.

OR

The torque delivered by a two stroke engine is represented by $T = (1000+300 \sin^2\theta - 500\cos^2\theta)$ N-m where θ is the angle turned by the crank from the IDC. The engine speed is 250 rpm. The mass of the flywheel is 400kg and radius of gyration 400mm. Determine:

i) The power developed

ii) The total percentage fluctuation of speed.

2. a) What is the function of governor? What is meant by hunting?

b) Define:

   i) Sensitiveness of a governor.

   ii) Coefficient of sensitiveness

c) How governors are classified? Explain the effect of Gyroscopic couple on an Aeroplane.

d) Explain the following:

   i) Effect of friction on the governor

   ii) Isochronous conditions of governor

   iii) Gyroscopic torque

   iv) Expression for gyroscopic couple

OR

Calculate the rage of speed of a porter governor which has equal arms of each 200mm long and pivoted on the axis of rotation. The mass of each ball is 5kg and the central load of the sleeve is 20kg. The radius of rotation of the ball is 100mm when the governor being to lift and 130mm when the governor is at maximum speed.

3. a) What is meant by balancing of rotating masses? List the effects of partial balancing of locomotives.

b) Discuss the effects of hammer blow.

c) Differentiate between the unbalanced forces caused due to rotating and reciprocating masses.

d) Discuss the following:

   i) Static balancing and dynamic balancing.

   ii) Swaying couple

   iii) Can a single cylinder engine be fully balanced? Why?

   iv) Why are the cranks of a locomotive, with two cylinders, placed at 90° to each other?

OR

Four masses A, B, C and D revolves at equal radii and equally spaced along a shaft. The mass B is 7kg and the radii of C and D make angles of 90° and 240° respectively with the radius of B. Find the magnitude of masses A, C and D and Angular position of A. So that the system may be completely balanced.

4. a) Define the friction and friction circle. State types of friction.

b) Compare single plate and multi-plate clutches.

c) Discuss the concept of boundary and film lubrication.

d) Find the power lost in friction at its operating temperature if. A 180 mm diameter shaft runs at 1800 rpm, supporting a load of 18kN. The shaft runs in a bearing of length 1.5 times the shaft diameter. The clearing ratio is 0.015. The absolute viscosity of the oil is 11 cp.

OR

A shaft running at 600rpm is supported in a bearing of 60mm diameter and 60mm long. The viscosity of oil is 0.014 Pa S and the temperature of oil is 110°C. The radial clearance is 0.03mm. Determine temperature of still air in the bearing if there is no external cooling is provided. The temperature of still air in the room is 20°C.

5. a) Discuss selection of V-belts, ropes and chains for different applications.

b) Compare band break and block break.

c) Discuss centrifugal effect on belts.