B.TECH SEM – V (2007 COURSE) (MECHANICAL ENGG.) :
SUMMER - 2018
SUBJECT:THEORY OF MACHINE-II

Day: **Monday** | **S-2018-2679** | Time: **10.00 AM TO 01.00 PM**
Date: **21/05/2018** | Max. Marks: 80

N.B.:

1) **Q.No.1** and **Q.No.5** are **COMPULSORY.** Out of remaining attempt **ANY TWO** questions from each section
2) Figures to the right indicate FULL marks.
3) Answer to the both section should be written in **SEPARATE** answer book.
4) Assume sutaible data, if necessary.

SECTION-I

Q.1 **a)** What is meant by the expression 'friction circle'? **(05)**

b) State the characteristics of materials for Brake Lining. **(05)**

c) Explain the terminology of Helical gear. **(04)**

Q.2 **a)** A flat belt of mass 2.5 kg/m is used to connect two pulleys of equal diameter mounted on parallel shafts.The greatest permissible stress in the belt is 1.6 MN/m^2. The belt has across section 250 mm wide and 10 mm thick. The coefficient of friction of the belt material is 0.3. Assuming that the belt is trasmitting maximum power, find i) Speed of belt ii) Power transmitted iii) Stress in slack side of belt. **(13)**

Q.3 **a)** A single dry plate clutch transmits 7.5 kW at 900 rpm. The axial pressure is limited to 0.07 N/mm^2. The coefficient of friction is 0.25, find i) Mean radius and face width of the friction lining assuming the ratio of the mean radius to the face width as 4, and ii) Outer and inner radii of the clutch plate. **(13)**

Q.4 Two spur gear wheels of pitch circle diameter of 100 mm and 350 mm have involute teeth of 5 mm module, and 20^0 angle of obliquity. The addenda are equal and it is as large as possible while avoiding the interferance. If pinion rotates at 100 rpm, find i) The addendum ii) The contact ratio iii) The sliding velocities – a) at the beginning of point of contact b) at the end of point of contact **(13)**

SECTION-II

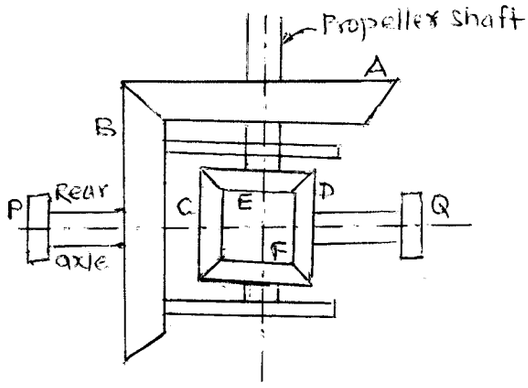
Q.5 **a)** What are the different types of motion with which a follower can move? **(05)**

b) Explain with neat sketch reverted gear train. **(05)**

c) Explain the term function of enegry as applied in flywheel. **(04)**

P.T.O.

Q.6 In a differential gear box used for an automobile, has pinion on the propeller shaft has 12 teeth and gear has 60 teeth. The shaft 'P' and 'Q' from the rear axle to which the road wheel are attached. If the propeller shaft rotates at 1000 rpm and the load wheel attached to axle 'Q' has a speed of 210 rpm. While taking the turn find the speed of road wheel attached to the axle 'P'. **(13)**



Q.7 A cam rotating at 150 rpm operates a reciprocating roller follower of radius 2.5 cm. The follower axis is offset by 2.5 cm to the right. The least radius of the cam is 5 cm and the stroke of the follower is 5 cm. Asent and descent both takes place by uniform acceleration and retardation. Ascent takes place during 75^0 and descent during 90^0 of cam rotation. Dwell between ascent and descent is 60^0. Draw the cam profile. **(13)**

Q.8 An engine develop 200 kw at a mean speed of 100 rpm. The coefficient of fluctuation of speed is $\pm 2\%$ of mean speed and the coefficient of fluctuation of energy is 0.10. Knowing the mean diameter of flywheel rim as 2.0 meters, density of flywheel material as 7200 kg/m^3 and the hub and spokes provide 5% of the rotational area of the flywheel rim. **(13)**

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