Total No. of Questions : 8]

SEAT No. :

P7662

[Total No. of Pages : 3

[6180]-186

T.E. (Mechanical)

DESIGN OF TRANSMISSION SYSTEMS

(2019 Pattern) (Semester-II) (302051)

Time : 3Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Four questions from the following.***
2) ***Draw neat labeled diagrams wherever necessary***
3) ***Figures to the right side indicate full marks.***
4) ***Use of non-programmable electronic calculator is permitted.***
5) ***Assume Suitable/Standard data jf necessary.***

Q1) a) State the Advantages and limitations of Hydrodynamic Bearing? **[4]**

b) Derive the Stribecks equation for basic static capacity of bearings. State the assumption made **[6]**

c) A ball bearing is subjected to F_r = 3 kN, N = 720 rpm having expected life 10000 hrs. at 95% reliability. Calculate the dynamic load carrying capacity of the bearing at 90% of reliability. Also find System reliability for such 4 bearings. **[7]**

OR

Q2) a) State the assumptions and write the Reynold's equation for 2-D flow and explain the significance of each term in it? **[6]**

b) Explain with neat sketch hydrodynamic bearing. State the advantages, limitations and applications of the same. **[4]**

c) Derive the Petroff's equation for hydrodynamic bearing. Also state its limitation? **[7]**

Q3) a) State different types of brakes and give at least one practical application of each. What are the advantages and disadvantages of band brake? **[4]**

b) What is the condition of self-locking in differential band brake? Why should it be avoided in speed-control brakes? Explain self-energizing block brake and self locking block brake. **[6]**

c) Draw a figure for is internal expanding shoe brake and write the assumptions on which its analysis depends? State the observations made when the vehicle will be travelling in 'reverse' for anti-clockwise rotation of brake drum? **[7]**

OR

P.T.O.

Q4) a) Draw neat sketch diagram of Multi plate clutch and explain construction and working. What are the advantages, disadvantages and applications of Multi plate clutch? **[4]**

b) What are the two theories applied to friction plates? Why clutches are usually designed on the basis of uniform wear? **[6]**

c) Draw neat sketch diagram of Centrifugal plate clutch and explain construction and working. State the advantages, disadvantages and practical applications of Centrifugal clutch? **[7]**

Q5) a) State and Explain Basic Considerations in design of multi-speed gear box? **[6]**

b) What is structural formula? Write any three structural formulae for twelve speed gear box. **[6]**

c) Find the RPM values and Diameter range served by each rpm in Geometric, Harmonic and Arithmetic Progressions and compare them on the following conditions:

Maximum Speed = 385 rpm Minimum speed = 30 rpm Number of speed steps = 12 Cutting speed 20m/min **[6]**

OR

Q6) a) What are the various laws for stepped regulation of speeds in multi-speed gear boxes? State the advantages and disadvantages for them.**[6]**

b) Explain the significance of geometric progression ratio. **[6]**

c) Draw speed diagram and layout for a six speed gear box having the following structural formula: (1) 2 (3) 3 (1)); 2) 2 (1)3 (2). The output speeds are 160 rpm minimum and 1000 rpm maximum. The motor shaft speed is 1440 rpm. **[6]**

Q7) a) What is hybrid Vehicle? What are the advantages and disadvantages of Hybrid Vehicles? **[6]**

b) Define Degree of Hybridization. Explain in details Micro Hybrid and MildHybrid. **[6]**

c) Explain Power Split Device with neat sketch? **[6]**

OR

Q8) a) Explain the Sizing performance for HEV Components? Explain the optimalsizing in HEV components? **[6]**

b) Explain Series Configuration of Hybrid Electric Vehicles with the help of Block diagram? **[6]**

c) Explain how the performance analysis carried in Series and parallel of Hybrid Electric Vehicles? **[6]**