Total No. of Questions : 8]

SEAT No. :

PE2629

[Total No. of Pages : 3

[6583]-161
T.E. (Mechanical)
DESIGN OF TRANSMISSION SYSTEM
(2019 Pattern) (Semester-VI) (302051)

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

Instructions to the candidates:

1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q6, Q.7 or Q8.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figures to Right indicates full Marks.*
4) *Assume Suitable data wherever if necessary.*

Q1) a) A single-row deep groove ball bearing is subjected to a 30 second work cycle that consists of the following two parts: **[10]**

	Part 1	Part 2
Duration (S)	10	20
Radial load kN	45	15
Axial load kN	12.5	6.25
Speed rpm	720	1440

The static and dynamic load capacities of the ball bearing are 50 and 68 kN respectively. Calculate the expected life of the bearing in hours. X and Y factors for single row deep groove ball bearing

$[F_a/C_0]$	$[F_a/F_r] \le e$		$[F_a/F_r] > e$		e
	X	Y	X	Y	
0.025	1	0	0.56	2.0	0.22
0.040	1	0	0.56	1.8	0.24
0.070	1	0	0.56	1.6	0.27
0.130	1	0	0.56	1.4	0.31
0.250	1	0	0.56	1.2	0.37
0.500	1	0	0.56	1.0	0.44

b) Derive the Stribeck equation for the static capacity of bearings. State the assumption made. **[7]**

OR

P.T.O.

Q2) a) Explain with a neat sketch hydrodynarnic bearing and derive Petroff's equation for hydrodynamic bearing. **[9]**

b) Explain design variables and performance variables of hydrodynamic journal bearing. **[8]**

Q3) a) With the help of neat sketch, explain the working of cone clutch, state its advantages, limitations and applications. **[10]**

b) Draw a neat sketch and explain centrifugal clutch. **[7]**

OR

Q4) a) Draw a figure for the internal expanding shoe brake and write the assumptions on which its analysis depends. Also state the advantages and disadvantages of the internal expanding shoe brake. **[9]**

b) Explain the band brake with a neat sketch and find the effort applied at the end of the lever for Simple band brakes also state the advantages and disadvantages of band brakes. **[8]**

Q5) a) Draw the structure diagrams for the following structural formulae and identify the optimum structural formula out of them. Draw the gearing diagram for the structural formula. **[10]**

i) 2(1) 3(2)

ii) 2(3) 3(1)

iii) 3(2) 2(1)

iv) 3(1) 2(3)

b) Differentiate between structure diagram and speed diagram. **[8]**

OR

Q6) a) A six speed gear box is to be designed for a machine tool drive. The spindle speeds range between 200 rpm and 1200 rpm. If the gear box is driven by 8 KW, 1200 rpm electric motor through the belt drive **[10]**

i) Draw the speed diagram

ii) Draw the gearing diagram

b) Explain in detail Arithmetic Progression and Geometric Progression laws for stepped regulation of speeds in multi-speed gear boxes. **[8]**

Q7) a) Explain a hybrid electric vehicle with the help of a block diagram and state its advantages and disadvantages. **[10]**

b) Define Degree of Hybridization. Explain in details Micro Hybrid and Mild Hybrid. **[8]**

OR

Q8) a) Explain Power Split Device with neat sketch. **[10]**

b) Explain the sizing performance for HEV components. Explain the optimal sizing in HEV components. **[8]**