A **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 96701

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2024

Sixth Semester

Mechanical Engineering

19UME601 - DESIGN OF TRANSMISSION SYSTEMS

(Regulations 2019)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. …….. is a movable bearing to regulate the chain slag and maintain required tension in the drive.. CO1-U

   (a) Slack adjuster (b) Chain Housing

   (c) Sprockets (d) None of these

2. …….. drive design is more complicated and cannot be used for larger centre distance. CO1- U

   (a)Flat belt (b) V-belt (c) Wire rope (d)Chain drive

3. Spur gear design normally begins with selecting this: CO1- U

   (a) Rack size (b)Tooth size (c)Gear size (d) Pitch diameter

4. Which of the following type of drives transmit power by friction? CO1- U

   (a) spur gear drive (b)chain drive (c)worm gear drive (d) belt drive

5. In a concrete mixer, the bevel gears for rotating the drum are generally CO1- U

   (a) Casting (b)forging (c)hobbing (d) shaping

6. The worm helix angle is the _____ of the worm lead angle. CO1- U

   (a) Complement (b) Half (c) Double (d) Supplement

7. In gear box design, for stable operation the speed ratio of any stage should not be greater than CO1- U

   (a) 5 (b)6 (c)7 (d) 8

8. The structural formula for a 9 speed gear box is CO1- U

(a) 3(3)*3(1) (b) 3(1)* 3(3) (c) 3(3)* 3(3) (d) 3(1)* 3(1)

9. The clutch used in trucks is CO1- U

(a) multi-plate clutch (b)single plate clutch

(c)cone clutch (d) centrifugal clutch

10. The cam follower extensively used in air-craft engines is CO1- U

(a) Knife edge follower (b)Flat faced follower

(c) Spherical faced follower (d) Roller follower

PART – B (5 x 2= 10 Marks)

11. Explain the Law of Belting. CO1- U

12. Explain working depth of a gear-tooth ? CO1- U

13. Explain the Herringbone gear? State its application CO1- U

14. Explain the function of a speed reducer? CO1- U

15. Explain the function of a clutch? CO1- U

PART – C (5 x 16= 80 Marks)

16. (a) Design and analyze a suitable flat belt drive to transmit 10 kW at 1500 rpm to a line shaft to run at 500 rpm. Approximate centre distance is 2 m. The diameter of larger pulley is around 750 mm. CO5- Ana (16)

Or

(b) Design and analyze suitable a chain drive to operate a compressor from a 15 kW electric motor at 900 rpm; The compressor is to be run at a speed of 300 rpm; The minimum centre distance should be 550mm. CO5- Ana (16)

17. (a) Design a spur gear to transmit 22.5 kW at 900 rpm; speed reduction is 2.5; Material for pinion and wheel are C15 steel and Cast-iron Gr 30 respectively. Take pressure angle of 20deg and working life of the gears as 10000 hrs. Compare the design and induced stresses. Justify the result. CO4- U (16)

Or

	(b)	A helical gear with 30° helix angle has to transmit 35kW at 1500 rpm. With a speed reduction ratio 2.5. If the pinion has 24 teeth, determine the necessary module, pitch diameter and face width for 20° full depths the teeth. Assume 15Ni 2Cr 1 Mo 15 material for both pinion and wheel. Compare the design and induced stresses. Justify the result.	CO4- U	(16)
18.	(a)	Design a worm gear drive to transmit 20 HP from a worm at 1440 rpm to the worm wheel the speed of the worm wheel should 40 (+ or -) 2% rpm	CO3- App	(16)
		Or		
	(b)	Design a Bevel gear drive to transmit 7.5 kW at 1440rpm. Gear ratio is 3; pinion and gear are made of C45 steel; Life of gear 10,000hrs.	CO3- App	(16)
19.	(a)	Design and analyzea12 speed gear box. The speed range required 100 to355 rpm. Draw the ray diagram, kinematic arrangement and calculate the number of teeth on eachgear.	CO4- Ana	(16)
		Or		
	(b)	Design and analyze anine speed gearbox for a milling machine with speeds ranging from56–900rpm.The output speedis720rpm;Make an neat sketch of the gearbox. Indicate the number of teeth on all the gears and their speeds.	CO4- Ana	(16)
20.	(a)	Classify the types of inventories and explain the about the purpose of holding stack.	CO5- App	(16)
		Or		
	(b)	State about ABC analysis. Explain its significance in the inventory control with a suitable example.	CO5- App	(16)