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

Question Paper Code: 96701

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2022

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. Sprocket with less number of teeth can affect the smooth running of a chain drive. This unsmooth running condition is termed as…….. of the chain. CO1- U

   (a) Roller chain (b) Chordal action (c) Slack Adjuster (d) Sprockets

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- R

   (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- R

   (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) A 30 kW, 1440 rpm, motor is to drive a compressor by means of V- Belts. The diameters of pulley are 220 mm and 750 mm; The centre distance between the compressor and motor is 1440mm. Design and analyze a suitable drive. CO5- Ana (16)

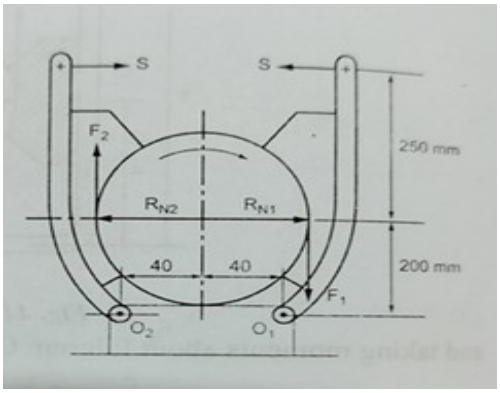
Or

(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) In a spur gear for rock crusher, the gears are made of case hardened steel. The pinion is transmitting 18 kW at 1200rpm, with a gear ratio of 3.5; The Gear is to work for 3 Years. Compare the design and induced stresses. Justify the result. CO4- E (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.	CO2-App	(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 each gear.	CO5- Ana	(16)
		Or		
	(b)	Design and analyze anine speed gearbox for a milling machine with speeds ranging from56–900rpm.The output speed is 720rpm; Make an neat sketch of the gearbox. Indicate the number of teeth on all the gears and their speeds.	CO4- Ana	(16)
20.	(a)	The block brake shown in fig. is set by a spring that produces force S on each arch equal to 3500N. the wheel diameter is 350mm and the angle of contact for each block is 120deg. Take coefficient of friction as 0.35, Determine the (i) the maximum torque that the brake is capable of absorbing, and (ii) the width of the brake shoes, if the bearing pressure on the lining material is not to exceed 0.3N/mm^2.	CO5- App	(16)



Or

(b) State about ABC analysis. Explain its significance in the inventory control with a suitable example. CO5- App (16)