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Question Paper Code: 96701

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2023

Sixth Semester

Mechanical Engineering

19UME601 - DESIGN OF TRANSMISSION SYSTEMS

(Regulations 2019)

Duration: Three hours

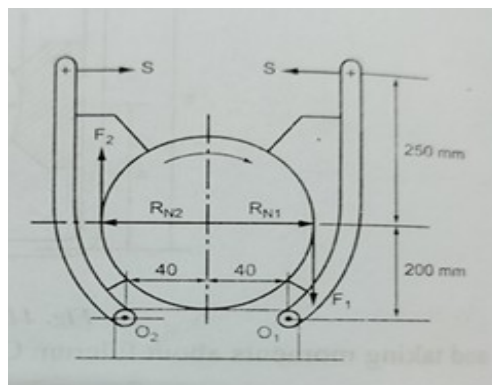
Maximum: 100 Marks

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

- (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 analyze a 12 speed gear box. The speed range required 100 to 355 rpm. Draw the ray diagram, kinematic arrangement and calculate the number of teeth on each gear. CO5- Ana (16)
- Or
- (b) Design and analyze a nine speed gearbox for a milling machine with speeds ranging from 56–900rpm. The output speed is 720rpm; Make a 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 120° . 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 CO5- App (16) inventory control with a suitable example.