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Question Paper Code: 96701

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

Sixth Semester

Mechanical Engineering

		Mechanic	ar Engineering			
	19UME	601 - DESIGN OF	TRANSMISSION S	YSTEMS		
		(Regula	ations 2019)			
Dur	ation: Three hours		N	Maximum: 100 Ma	ırks	
		Answer A	ALL Questions			
		PART A - (1	$0 \times 1 = 10 \text{ Marks}$			
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.					
	(a) Roller chain	(b) Chordal actio	n (c) Slack Adjust	er (d) Sprocke	ets	
2.	2 drive design is more complicated and cannot be used for larger centre distance.					
	(a)Flat belt	(b) V-belt	(c) Wire rope	(d) Chain driv	/e	
3.	Spur gear design nor	mally begins with	selecting this:		CO1- R	
	(a) Rack size	(b) Tooth size	(c) Gear size	(d) Pitch d	iameter	
4.	Which of the follow friction?	ving type of driv	ves transmit power by	y	CO1- R	
	(a) spur gear drive	(b) chain drive	(c) worm gear drive	(d) belt dri	ve	
5.	In a concrete mixer, generally	the bevel gears	for rotating the drum	n are	CO1- U	
	(a) Casting (b)	forging	(c) hobbing	(d) shaping		
6.	The worm helix angl	e is the of t	he worm lead angle.		CO1- U	
	(a) Complement	(b) Half	(c) Double	(d) Supple	ement	
7.	In gear box design, for any stage should not	-	the speed ratio of		CO1- U	
	(a) 5	(b) 6	(c) 7	(d) 8		

8.	The	structural formula	CO1- U					
	(a) 3	3(3)*3(1)	(b) 3(1)* 3(3)	(c) 3(3)* 3(3)	(d) 3(1)* 3(1)			
9.	The	clutch used in truck	cs is		CO1- U			
	(a) r	nulti-plate clutch		(b)single plate clutch				
	(c) cone clutch (d) centrifugal clutch							
10.	The	CO1- U						
	(a) I	Knife edge follower		(b) Flat faced follower				
	(c) S	Spherical faced follo	ower	(d) Roller follower				
PART - B (5 x 2= 10 Marks)								
11.	Exp	lain the Law of Bel	ting.		CO1- U			
12.	Explain working depth of a gear-tooth							
13.	Explain the Herringbone gear. State its application							
14.	Explain the function of a speed reducer.							
15.	Exp	CO1- U						
			PART - C (5	x 16= 80 Marks)				
16.	(a)	of V- Belts. The d	iameters of pulley ace between the o	we a compressor by means are 220 mm and 750 mm; compressor and motor is				
	1440mm. Design and analyze a suitable drive. Or							
	(b)	compressor from	yze suitable a ca a 15 kW electric be run at a speed o	hain drive to operate a motor at 900 rpm; The	:			
17.	(a)	hardened steel. T with a gear ratio	he pinion is transr of 3.5; The Gear	e gears are made of case mitting 18 kW at 1200rpm is to work for 3 Years ases. Justify the result.	,			

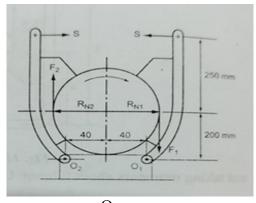
- (b) A helical gear with 30° helix angle has to transmit 35kW at CO2-App (16) 1500 rpm. With a speed reduction ratio 2.5. If the pinion has 24 teeth, determine the necessary module, pitch diameter and face width for 20° full depths the teeth. Assume 15Ni 2Cr 1 Mo 15 material for both pinion and wheel. Compare the design and induced stresses. Justify the result.
- 18. (a) Design a worm gear drive to transmit 20 HP from a worm at CO3- App (16) 1440 rpm to the worm wheel the speed of the worm wheel should 40 (+ or -) 2% rpm

Or

- (b) Design a Bevel gear drive to transmit 7.5 kW at 1440rpm. Gear CO3- App (16) ratio is 3; pinion and gear are made of C45 steel; Life of gear 10,000hrs.
- 19. (a) Design and analyzea12 speed gear box. The speed range CO5- Ana (16) required 100 to355 rpm. Draw the ray diagram, kinematic arrangement and calculate the number of teeth on each gear.

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- (b) Design and analyze anine speed gearbox for a milling machine CO4- Ana (16) with speeds ranging from 56–900 rpm. The output speed is 720 rpm; Make an neat sketch of the gearbox. Indicate the number of teeth on all the gears and their speeds.
- 20. (a) The block brake shown in fig. is set by a spring that produces CO5- App (16) 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/mm².



Or

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