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(Pages : 2)

Name.....

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**SEVENTH SEMESTER B.TECH. (ENGINEERING)
EXAMINATION, JUNE 2013**

**ME/PTME 09 701—MACHINE DESIGN—II
(2009 Admissions)**



Time : Three Hours

Maximum : 70 Marks

Part A

Answer all questions.

1. List any two advantages of V belt drive.
2. What is the normal drive ratio for roller chain drive and silent chain drive ?
3. Define the term bearing characteristics number.
4. What do you mean by backlash in gears ?
5. What is the need for preparing working drawings ?

(5 × 2 = 10 marks)

Part B

Answer any four questions.

6. Explain the principle of hydrodynamic lubrication.
7. State and prove law of gearing.
8. Determine the minimum number of teeth required on a pinion in order to avoid interference when it is geared with a wheel such that gear ratio is 3 to 1. The pressure angle is 20 degree and the modules is 1.
9. What are the procedures involved in designing a block brake ?
10. A compressor is actuated by a motor. The speed of the motor shaft is 900 r.p.m. and that of compressor is 300 r.p.m. Calculate the velocity of a suitable chain drive if the minimum centre distance is 500 mm.
11. What are the basic elements of working drawing ?

(4 × 5 = 20 marks)

Part C

12. A multiple disc clutch has radial width of the friction material as $1/5^{\text{th}}$ of the maximum radius. The coefficient of friction is 0.30. Find the total number of discs required to transmit 60 kW at 3000 r.p.m. The maximum diameter of the clutch is 250 mm and the axial force is limited to 600 N. Also find the mean unit pressure on each contact surface.

Or

Turn over

13. A V belt drive is to transmit 14.7 kW to a compressor. The motor speed is 1150 r.p.m. and the compressor pulley runs at 400 r.p.m. Determine the size and number of belts required.
14. Design a suitable journal bearing for centrifugal pump : Load on the bearing = 15 kN. Diameter of the journal = 85 mm : Speed = 1500 r.p.m. : Bearing characteristics number at the working temperature (75 C) = 30 : Permissible bearing pressure intensity = 0.7 N/mm² to 1.4 N/mm² : Average atmospheric temperature = 30 C. Calculate the cooling requirements.

Or

15. A bearing is required to carry 4500N stationary radial load. The shaft rotates at 1000 r.p.m. and the life desired is 30000 hours. The running conditions are steady without shock loading. Select a suitable bearing.
16. Design the teeth for a pair of out-teeth spur gears with 20 degree full depth teeth to be made of nicked chromium steel. The gears are to transmit 45kW at 3000 r.p.m. of the pinion. The pinion has 21 teeth and the gear has 25 teeth. Find the module face and diameter for continuous service.

Or

17. Design 20 degree involute worm and gear to transmit 10 kW with worm rotating at 1400 r.p.m. and to obtain a speed reduction of 12 : 1 The distance between the shafts is 225 mm.
18. Briefly explain the general design considerations for casting process.

Or

19. Discuss the design recommendations for screw machines products.

(4 × 10 = 40 marks)