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 **REG NO:**

**SIR ISSAC NEWTON COLLEGE OF ENGINEERING AND TECHNOLOGY**
Mechanical Engineering
**ME 6601 — DESIGN OF TRANSMISSION SYSTEMS**
Time: Three hours Maximum: 100 Marks

**SINCET/III MECH/ MODEL/ME6601 DTS**

Answer ALL questions

**PART A — (10 × 2 = 20 Marks)**

1. Distinguish between open drive &cross drive of a belt drive .Which is better?
2. Give any 3 applications of chain drives. What are their limitations?
3. Define module.
4. What are the common forms of gear tooth profile?
5. Under what situation, bevel gears are used?
6. In worm gear drive, only the wheel is designed .Why?
7. What are preferred numbers?
8. What are the possible arrangements to achieve 12 speeds from a gear box?
9. Name few commonly used friction materials.
10. What is a self-locking brake?

**PART B — (5 × 16 = 80 Marks)**

 11.(a) Select a flat belt to drive a mill at 250 rpm from a 10 kW, 730 rpm motor. Center distance is to

 be around 2 m. The mill shaft pulley is of 1 m diameter.

**(OR)**

(b) A truck equipped with a 9.5 kW engine uses a roller chain as the final drive to the rear axle. The driving sprocket runs at 900 rpm and the driven sprocket at 400 rpm with a centre distance of approximate 600 mm. Select the roller chain.

12. (a) In a spur gear drive for a stone crusher, the gears are made of C40 steel. The pinion is transmitting 20 kW at 1200 rpm. The gear ratio is 3. Gear is to work 8 hrs per day, six days a week and 3 years. Design the drive.

**(OR)**

(b) Design a pair of helical gears to transmit 10 kW at 1000 rpm of the pinion . Reduction ration of 5 is required.

13. (a) Design a bevel gear drive to transmit 7.36kW at 1440 rpm for the following data. Gear ratio = 3. Material for pinion and gear C45 surface hardened.

**(OR)**

(b) Design a worm drive for a speed reducer to transmit 15 kW at 1440 rpm of the worm shaft. The desired wheel speed is 60 rpm. Select suitable worm and wheel materials.

14. (a) The minimum and maximum speed of a six speed of a gear box are to be 160 and 500 rpm. Construct the kinematic arrangement and the ray diagram of the gear box. Also find the number of teeth on all gears.

**(OR)**

(b) Design a 12 speed gear box for an all geared head shock of a lathe. maximum and minimum speeds are 600 rpm and 25 rpm respectively. The drive is from an electric motor giving 2.25 kW at 1440 rpm.

15. (a) A multi-disc clutch has 3 discs on the driving shaft and 2 on the driven shaft is to be designed for a machine tool, driven by an electric motor of 22 kW running at 1440 rpm . The inside diameter of the contact surface is 130 mm. The maximum pressure between the surfaces is limited to 0.1 N/mm2. Design the clutch. Take µ= 0.3; n1 = 3; n2 = 2.

**(OR)**

(b) Determine the capacity and the main dimensions of a double block brake for the following data:

The brake sheave is mounted on the drum shaft. The hoist with its load weights 45 kN and moves downwards with a velocity of 1.15 m/s . The pitch diameter of 3.25 m. The kinetic energy of the drum may be neglected.

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