

Roll No.

Total No. of Pages: 02
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B.TECH. (Sem.-6th)
DESIGN OF MACHINE ELEMENTS-II
Subject Code: BTME-601
Paper ID: [A2361]

Time: 3 Hrs.

Max. Marks: 60

INSTRUCTIONS TO CANDIDATE:

1. Section-A is compulsory.
2. Attempt any four questions from section-B

SECTION-A

- Q.1.(a)** What is the offset link of roller chain? **2x10=20**
- (b) How will you designate roller chain?
- (c) What is herringbone gear?
- (d) State two advantages of internal gears.
- (e) Why flywheels are used in presses?
- (f) What is 'back-stop' band brake?
- (g) What is meant by surging in springs?
- (h) What are main advantages of spiral springs?
- (i) What is the main purpose of using a clutch?
- (j) What are main advantages of cone clutch?

SECTION-B

(4x10=40)

Q.2. Explain the method of designing a worm and worm wheel.

Q.3. Explain the steps involved in slider bearing design.

Q.4. Toring moment diagram of a multi-cylinder engine is drawn with a scale of (1 mm = 2⁰) on abscissa and (1 mm = 1250 N-m) on ordinate. The intercepted areas between the torque developed by the engine and the mean resisting torque of a machine taken in order from one end are -30, +400, -270, +330, -310, +230, -380, +270, and -420 mm². Engine is

running at a mean speed of 240 rpm and the coefficient of speed fluctuation is limited to 0.02. A rimmed flywheel made up of grey cast iron with mass density 7100 kg/m^3 is provided, Rim contributes 90% of required moment of inertia. Rim has rectangular cross-section with width to thickness ratio of 1.5 Design the flywheel rim.

- Q.5.** Design a helical compression spring of a mechanism that is subjected to an initial pre-load of 50N and maximum force during the load cycle is 300 N Wire diameter is 5mm. Spring index is 5. Spring is made of oil-hardened and tempered steel wire of a grade SW with ultimate tensile strength of 1440MPa. Discuss the safety aspects of spring against fluctuating stresses.
- Q.6.** Design leather faced cone clutch that transmits power at 500 rpm. The semi-cone angle is 12.5° . Mean diameter of the clutch is 300 mm, while the face width of the contact surface of friction lining is 100 mm. Coefficient of friction is 0.2 and maximum intensity of pressure is 0.07 Mpa.
- Q.7.** A automobile vehicle weighing 13.5Kn is moving on a level road at a speed of 95 kmph. When the brakes are applied, it is subjected to a uniform deceleration of 6 m/s^2 . There are brakes on all four wheels. The tyre diameter is 750 mm. Kinetic energy of rotating parts is 10% of kinetic energy of moving vehicle. Mass of each brake drum assembly is 10 kg and specific heat capacity is $460 \text{ J/kg}^\circ \text{C}$. Calculate the braking time, braking distance, total energy absorbed by each brake, torque capacity of each brake, temperature rise of brake drum assembly.

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