Total No. of Questions – [06] Total No. of Printed Pages: 2

G.R. No.	

DECEMBER 2021-ENDSEM EXAM

T. Y. B. TECH. (MECHANICAL) (SEMESTER - I)

COURSE NAME: Kinematics and Theory of Machines

COURSE CODE: MEUA31185

(PATTERN 2018)

Time: [1 Hour] [Max. Marks: 30]

(*) Instructions to candidates:

1) **Answer Q.1 OR Q.2, Q.3 OR Q.4,Q.5 OR Q.6.**
2) **Figures to the right indicate full marks.**
3) **Use of scientific calculator is allowed**
4) **Use suitable data where ever required**

Q.1) a) Compare the main tooth profiles of gear teeth which fulfill the law of gearing? [4 marks]

b) Two spur gears with involute tooth profile have module of 10 mm. The addendum is equal to one module. The larger gear has 40 teeth while the pinion has 20 teeth. Estimate path of contact. Will the gear interfere with the pinion? [6 marks]

OR

Q.2) a) Discuss with neat sketch the phenomena 'undercutting' in involute gears. [4 marks]

b) The number of teeth on each of the two equal spur gears in mesh are 40. The teeth have 20°involute profile and the module is 6 mm. If the arc of contact is 1.75 times the circular pitch, estimate the addendum. [6 marks]

Q.3) a) How would you differentiate simple gear train and compound gear train. [4 marks]

b) An epicyclic gear train shown in Fig. 1. The number of teeth on 'A' and 'B' are 80 and 200 respectively. Estimate the speed and sense of rotation of arm 'a' if gear 'A' rotates at 100 rpm in clockwise and 'B' is stationary. [6 marks]

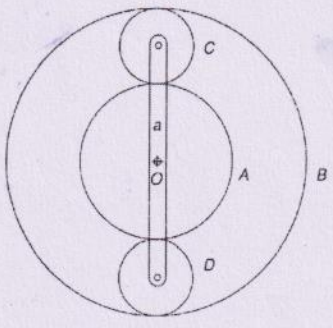

Fig. 1

OR

Q.4) a) Discuss the procedure to analyze the motion of simple epicyclic gear train. [4 marks]

b) Sketch the schematic of differential of automobile? Discuss its importance. [6 marks]

Q.5) a) How does a clutch differ from that of a brake? [4 marks]

b) A single plate clutch is required to transmit 8 kW at 1000 rpm. The axial pressure is limited to 70 kN/m^2. The mean radius of the plate is 4.5 time the radial width of friction surface. If both sides of the plate are effective and coefficient of friction is 0.25, Estimate (i) inner and outer radii of the plate and mean radius (ii) Width of friction lining. [6 marks]

OR

Q.6) a) Sketch and discuss the working of cone clutch. [4 marks]

b) Single block brake is shown in Fig. 2. The diameter of the drum is 250 mm and the angle of contact is 90°. If the operating force of 700 N is applied at the end of a lever and the coefficient of friction between the drum and the lining is 0.35, estimate the torque that may be transmitted by the block brake. [6 marks]

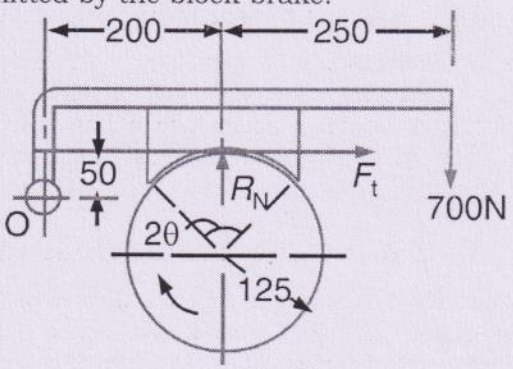

Fig. 2