Final Assessment Test (FAT) - APRIL/MAY 2023

Programme	**B.Tech**	Semester	**Winter Semester 2022-23**
Course Title	**KINEMATICS AND DYNAMICS OF MACHINES**	Course Code	**BMEE207L**
Faculty Name	**Prof. Christo Michael T**	Slot	**C1+TC1**
		Class Nbr	**CH2022235001306**
Time	**3 Hours**	Max. Marks	**100**

Section:A (2 X 20 Marks)
Answer All questions

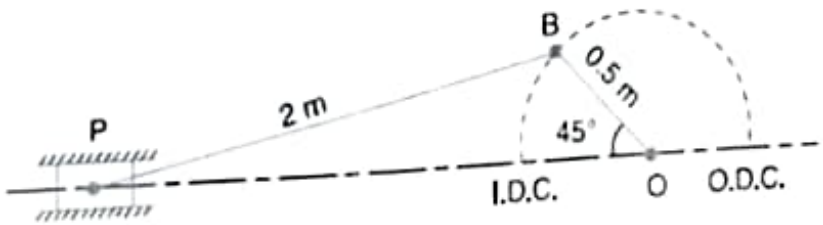
01. A cam is to give the following motion to a knife-edged follower: outstroke during 60° of cam rotation, dwell for the next 30° of cam rotation, return stroke during next 60° of cam rotation, and dwell for the remaining 210° of cam rotation. The stroke of the follower is 40 mm and the minimum radius of the cam is 50 mm. The follower moves with uniform velocity during both the outstroke and return strokes. Draw the profile of the cam when, the axis of the follower is offset by 20 mm from the axis of the cam shaft. [20]

02. Four masses A, B, C and D carried by a rotating shaft at radii 80 mm, 100 mm, 160 mm and 120 mm respectively are completely balanced. Mass B, C and D are 8 kg, 4kg and 3 kg respectively. Determine the mass A and relative angular positions of the four masses if the planes are spaced 500 mm apart. [20]

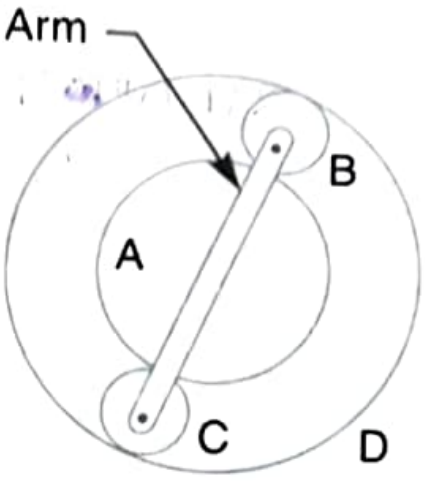
Section:B (5 X 12 Marks)
Answer any 5 questions

03. Describe the quick return motion mechanism with the sketch. [12]

04. The crank and connecting rod of a theoretical steam engine are 0.5 m and 2 m long respectively. The crank makes 180 r.p.m. in the clockwise direction. When it has turned 45° from the inner dead centre position, determine velocity of the piston. [12]



05. An epicyclic train of gears is arranged as shown in the below figure. The number of teeth on the gears A and D are 40 and 90 respectively. How many revolutions does the arm, to which the pinions B and C are attached, when A makes 10 revolution clockwise and D is stationary. [12]



06. The crank-pin circle radius of a horizontal engine is 300 mm. The mass of the reciprocating parts is 250 kg. When the crank has travelled 60° from I.D.C., the difference between the driving and the back pressures is 0.35 N/mm^2. The connecting rod length between centres is 1.2 m and the cylinder bore is 0.5 m. If the engine runs at 250 r.p.m. and if the effect of piston rod diameter is neglected, calculate: 1. pressure on slide bars, 2. thrust in the connecting rod, 3. tangential force on the crank-pin, and 4. turning moment on the crank shaft. [12]

07. In a single degree damped vibrating system, a suspended mass of 8 kg makes 30 oscillations in 18 seconds. The amplitude decreases to 0.25 of the initial value after five oscillations. Determine the stiffness of the spring, logarithmic decrement, damping factor, and damping coefficient. [12

08. Each arm of a porter is 250 mm long. The upper and lower arms are pivoted to link of 40 mm and 50 mm respectively from the axis of rotation. Each ball has a mass of 5 kg and sleeve mass is 50 kg. The force of friction on the sleeve of the mechanism is 40 N. Determine the range of speed of the governor for extreme radii of rotation of 125 mm and 150 mm. [12

⇔⇔⇔