PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.TECH MID SEM EXAMINATION 2022-23

SUBJECT NAME (CODE): AMME (203101217) BRANCH: Aeronautical

DATE: 08/08/2022   TIME: 02:30 TO 04:00 PM   TOTAL MARKS: 40

Sr. No.		Marks
Q.1	(A) Compulsory Question (5 MCQ)	05

1. In which of the following mechanism the relative motions of the rigid bodies are in one plane or in parallel planes?
   a) spherical mechanism
   b) planar mechanism
   c) spatial mechanism
   d) flexure mechanism
2. If the shortest link is fixed, what type of mechanism is obtained?
   a) double crank mechanism
   b) double rocker mechanism
   c) crank rocker mechanism
   d) none of above
3. Which of the following mechanism is an approximately straight-line motion mechanism?
   a) Scott Russell's mechanism
   b) Watt's mechanism
   c) Gnome engine
   d) Oscillating engine
4. For a Whitworth quick return motion mechanism $\beta = 110°$. Find the ratio of time of cutting stroke to time of return stroke.
   a) 0.42
   b) 0.44
   c) 2.27
   d) 2.37
5. The number of inversions for a slider crank mechanism is
   a) 1
   b) 5
   c) 2
   d) 4

(B) Compulsory Question (5 Fill in the Blanks)   05

1. The motion between a pair which takes place in _____ is known as incompletely constrained motion.
2. Planar mechanisms are _____ dimensional whereas spatial mechanisms are _____ dimensional.

3. If a slider moves on a fixed link having curved surface, their instantaneous centre lies _____.

4. If the degrees of freedom of a mechanism is less zero, then it forms a _____.

5. The motion of a square bar in a square hole is an example of _____.

Q.2   **Attempt any four (Short Questions)**   12

(1) Describe briefly the Grashoff's law.

(2) Distinguish between lower and higher pair.

(3) Write a brief note on degrees of freedom.

(4) Define Absolute and relative motion

(5) Describe the velocity of rubbing.

Q.3   **Attempt any two**   08

(1) Describe Inversion IV of slider crank chain.

(2) Refer the following mechanism which is in static equilibrium. Find:
    1) Magnitude of F2
    2) Magnitude and direction of F2
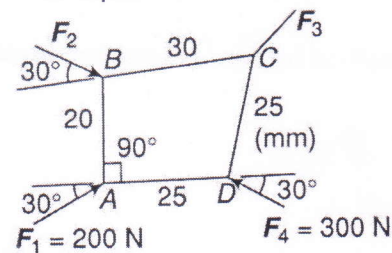
(3) Describe in details about the kinetics pairs on the basis of constraint motion with diagram and example.

Q.4   **(A) Explain Inversion I of double slider crank chain (Compulsory)**   05

(B) A Whitworth quick-return motion has been shown in fig. The dimensions of the links are crank OP = 240mm, OA = 150mm, AR = 165 mm and RS = 430 mm. The crank rotates at an angular velocity of 2.5 rad/s. At the moment when the crank makes an angle of 45^0 with the vertical, calculate the   05

    1) velocity of ram S
    2) velocity of slider P on slotted lever
    3) angular velocity the link RS
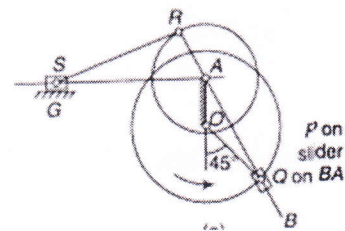
<div align="center">OR</div>

(B) A slider crank mechanism is as shown in fig. wherein the crank OA is 480mm long and rotates with a uniform angular velocity of 20 rad/s in anticlockwise sense. The connecting rod AB is 1.6m long. For the shown configuration, determine the velocity of the slider, the velocity of the point E located at a distance of 450mm and velocity of point F.   05