B.E. (Computer) (Sem - VII) (CBS)

Paper / Subject Code: 42156 / Robotics (DLOC - III) Date - 22/11/19

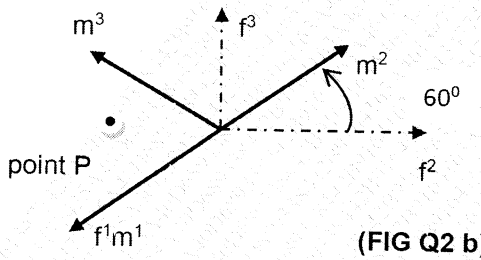
(3 Hours) **[Total Marks: 80]**

Instruction to students:

- **Question Number 1 is Compulsory, Solve any Three questions from remaining Questions.**
- **Please specify your answers with neat diagram and examples wherever necessary.**
- **Assume any suitable data if required.**

1. a) Explain the Classification of Robots based on the work envelope with neat sketches. **12**
   b) Explain in brief Point to point and Continuous Motion Control **4**
   c) List and Explain in brief various Applications of Robots **4**

2. a) Differentiate between Hard Automation and Soft automation, specify atleast 2 examples of each. **10**
   b) A Mobile Co-ordinate Frame 'M' is rotated about F^1 axis of a fixed Coordinate Frame F let the angle of Rotation is 60 Degrees, a point P on Mobile Co-ordinate frame is having co-ordinates $[P]^M = [2,0,3]^T$ identify the resultant co-ordinates of P. **10**



(FIG Q2 b)

3. a) Explain the terms reach and Stroke, Operation Environment, Repeatability, Precision and Accuracy for the Robot. **10**
   b) Explain steps to Implement an expert system in Detail. **10**

4. a) Explain Different Image Representation Techniques in detail **10**
   b) Define Direct Kinematics and Inverse Kinematics Problem, why Solution to Inverse Kinematics problem is not unique? **10**

5. a) Differentiate Between Shrink and Swell Operator **10**
   b) How a robotic Manipulator will be avoiding the obstacle and reach destination using **BUG-2 Algorithm**? Explain. **10**

6. Write Short Note on ANY FOUR of the following. **20**
   a) Sensors and Actuators
   b) Fuzzification and Defuzzification
   c) Tangent Bug Algorithm
   d) Reactive Paradigm
   e) Robotic Manipulator SCARA.

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