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# Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)



## VI SEMESTER B.TECH (INDUSTRIAL AND PRODUCTION ENGINEERING)

### END SEMESTER EXAMINATIONS, MAY 2016

SUBJECT: INDUSTRIAL ROBOTICS [MME 316]

REVISED CREDIT SYSTEM

Time: 3 Hours

MAX. MARKS: 50

#### Instructions to Candidates:

- ❖ Answer **ANY FIVE FULL** the questions.
- ❖ Missing data may be suitable assumed.

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| <b>1A.</b> | What are the characteristics of future robot tasks? Explain  | 4 |
| <b>1B.</b> | Explain robot economic considerations  | 4 |
| <b>1C.</b> | Write a short note on robots and manufacturing   | 2 |
| <b>2A.</b> | Explain hazard analysis? What are the ways to prevent accidents and injuries in robotic environment        | 4 |
| <b>2B.</b> | Write a short note on robotic application in underground coal mining and defence                           | 4 |
| <b>2C.</b> | What are robot safety guide lines?   | 2 |
| <b>3A.</b> | Define the following terms:<br>a) Degree of freedom b) Work Volume c) Accuracy d) Repeatability e) Payload | 5 |
| <b>3B.</b> | What are the design considerations for gripper selection & gripper force?                                  | 3 |
| <b>3C.</b> | Explain the robotic programming languages  | 2 |
| <b>4A.</b> | Sketch and explain vacuum gripper and magnetic gripper   | 4 |
| <b>4B.</b> | Sketch and explain Harmonic drives and robot wrist mechanism   | 4 |
| <b>4C.</b> | What are the factors affecting accuracy & repeatability?   | 2 |
| <b>5A.</b> | Sketch and Explain different types of Encoders   | 4 |
| <b>5B.</b> | Sketch and Explain Resolver and Potentiometer  | 4 |
| <b>5C.</b> | Define robotics and state 3 basic laws of robotics.  | 2 |
| <b>6A.</b> | Write a note on LVDT and vidicon vision camera.  | 4 |
| <b>6B.</b> | Explain with sketch Inductive sensor and Ultrasonic sensor   | 4 |
| <b>6C.</b> | Write a note on pneumatic grippers   | 2 |