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M.Tech. 3rd Semester (Mechanical Engg.) CBCS Scheme

Examination, December-2018

ROBOTICS AND AUTOMATION

Paper- 16MME 23C2

Time allowed : 3 hours]

[Maximum marks : 100

- Note:**
- *There are Nine questions in this paper. All questions carry equal marks.*
 - *Attempt five questions in all.*
 - *Question No. 1 is compulsory.*
 - *Attempt remaining four questions by selecting only one question from each unit.*

1. Explain the following:- 20

- (a) Artificial Intelligence.
- (b) Description of VAN
- (c) Non- servo manipulator
- (d) Robot programming languages and systems.
- (e) Pneumatic safety

Unit-I

2. (a) Explain the Hydraulic and Electrical actuators and their characteristics and control systems. 10
- (b) Explain the Encoders and other feedback systems, vision, ranging systems and textile sensors. 10

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3. (a) Explain the constructional features, advantages and disadvantages of various kinematic structures, servo and Non- servo manipulator. 10
- (b) Describe the Robot Physical configuration and basic Robot motions. 10

Unit-II

4. (a) Describe the concept of automation in Industry. Also describe the mechanisation and automation in detail. 10
- (b) Explain the concept of spatial description and transformations, manipulator kinematics and Inverse manipulator in detail. 10
5. (a) Explain position control of manipulators and force control of manipulators. 10
- (b) Describe the Logged Locomotion and Export system. Also explain the Kinematics Jacobians. 10

Unit-III

6. Explain the pneumatic and hydraulic valves, flow control valves, metering valves and direction control valves in detail. 20
7. (a) Explain Air Cylinders - their design and mountings in detail. 10
- (b) Explain the hydraulic servo systems, pneumatic safety and remote control circuits. 10

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Unit-IV

8. Explain the basis of Automated work piece handling with their working principles and techniques. Also explain the Transfer mechanisms automated feed out of components. 20
9. Explain the following: 20
- (a) Assembly automation
- (b) Automatic packaging
- (c) Automatic Inspection
- (d) Job orienting and feeding devices.

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