Roll No. | | | | | | | | | | | | |

Total No. of Pages : 02

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B.Tech.(Automation & Robotics) (2011 & Onwards) (Sem.–4)

INDUSTRIAL AUTOMATION AND ROBOTICS

Subject Code : PE-408

M.Code : 63018

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Answer briefly :

a) What is 'low cost' automation?

b) Define transducer.

c) Sketch a non-return type flow control valve.

d) Discuss the different Boolean operations.

e) What are the applications of feeders?

f) What are the functions of a servo valve?

g) What is 'Conda Effect'?

h) Explain 'Accuracy' and 'Repeatability' in relation to a robotic arm.

i) What is an end effector?

j) What is a teach pendent in relation to a robotic arm?

SECTION-B

2. Discuss the construction, working and performance characteristics of fluidic elements.

3. Discuss the construction, design and mountings for pneumatic cylinders.

4. With a neat sketch, discuss the working of a centrifugal hopper feeder.

5. With the neat line diagrams, discuss the classification of robots based upon their path movement.

6. Taking an example, discuss the working of any suitable physical configuration of robot for machine loading and unloading application in an industry.

SECTION-C

7. Discuss the different types of sensors that can be used for efficient working of a robotic arm.

8. At the input module of a PLC, a continuous voltage signal is to be converted into its digital counterpart using an analog-to-digital converter device 8 bit ADC. The maximum voltage range is ±10V. Determine the following :

   a) Number of quantization levels,

   b) Resolution,

   c) The spacing of each quantization level,

   d) Quantization error for this ADC,

   e) Digital binary equivalent value of+7.875 V.

9. Discuss the construction and working of following types of valves:

   a) Hydraulic pressure control valve

   b) Pneumatic flow control valve

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.