**(M-504) INDUSTRIAL AUTOMATION & 3D PRINTING**
**MODEL BLUE PRINT OF THE QUESTION PAPER**

| Sl. No | Chapter Name | Periods Allocated | Weightage Allocated | Question Wise Distribution of Weightage | | | Marks Wise Distribution of Weightage | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | R | U | Ap | R | U | Ap |
| 1 | Industrial Automation | 10 | 21 | 1 | 1 | 1 ½ | 3 | 3 | 15 |
| 2 | Computer Integrated Manufacturing Systems | 12 | 21 | 1 | 1 | 1 ½ | 3 | 3 | 15 |
| 3 | CNC Programming | 12 | 21 | 1 | 1 | 1 ½ | 3 | 3 | 15 |
| 4 | Industrial Robotics | 12 | 21 | 1 | 1 | 1 ½ | 3 | 3 | 15 |
| 5 | 3D Printing | 14 | 26 | 1 | 1 | 2 | 3 | 3 | 20 |
| | TOTAL | 60 | 110 | 5 | 5 | 08 | 15 | 15 | 80 |

**Note:   R-Remembering;        U-Understanding;        Ap -Applying;**

**Unit Test - 1**

| Q.No | Question from the Chapter | Bloom's category | Marks allocated | CO addressed |
|---|---|---|---|---|
| Part - A (16 marks) | | | | |
| 1 | Industrial automation,CIM,CNC | R,U | 4 | CO1,CO2,CO3 |
| 2 | Industrial Automation | U | 3 | CO1 |
| 3 | Industrial Automation | U | 3 | CO1 |
| 4 | Computer Integrated Manufacturing Systems | U | 3 | CO2 |
| 5 | CNC Programming | U | 3 | CO3 |
| Part - B (24 marks) | | | | |
| 6 | Industrial Automation | Ap | 8 | CO1 |
| 7 | Computer Integrated Manufacturing Systems | Ap | 8 | CO2 |
| 8 | CNC Programming | Ap | 8 | CO3 |

**Unit Test - 2**

| Q.No | Question from the topic | Bloom's category | Marks allocated | CO addressed |
|---|---|---|---|---|

| Part - A (16 marks) | | | | |
|---|---|---|---|---|
| 1 | Robotics& 3D printing | R,U | 4 | CO4, CO5 |
| 2 | Industrial Robotics | U | 3 | CO4 |
| 3 | Industrial Robotics | U | 3 | CO4 |
| 4 | 3D Printing | U | 3 | CO5 |
| 5 | 3D Printing | U | 3 | CO5 |
| Part - B (24 marks) | | | | |
| 6 | Industrial Robotics | Ap | 8 | CO4 |
| 7 | 3D Printing | Ap | 8 | CO5 |
| 8 | 3D Printing | Ap | 8 | CO5 |

R-Remembering; U-Understanding; Ap-Applying; An- Analylising

**MODEL PAPER**
**Unit Test - I**
**INDUSTRIAL AUTOMATION & 3D PRINTING (M-504)**

Time: 90 Minutes                                          Total Marks: **40**

PART – A                                          (4x1+4x3=16M)

*Instructions: 1st Question having 4 one mark questions, and remaining 4 Questions carry 3 marks each*

1) (a) There are 5 industrial revolutions till now (TRUE/FALSE)
   (b)IIoT means _____
   (c) A _____ in an NC system is a set of instructions which informs the machine tool what is to be done and when.
   (d) Point to point NC system is also called as_____

2) Define group Technology
3) List out six benefits of CAM
4) Write the meaning of the following G & M – Codes  i) G-71   ii) G-94
5) List any three applications of CNC.

PART B                                          3 x 8 = 24 M

*Instructions: Part B consists of 3 Units. Answer any one full question from each unit. Each questioncarries 8 marks and may have sub questions.*

135

**6)** (a) Explain the emerging need for industrial 4.0

**(OR)**

(b)Explain the Features and Benefits of IIoT.

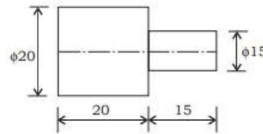**7)** (a) Explain the functions of components of a CNC with a neat diagram.

(OR)

(b) Write six differences between NC and CNC machines.

**8)** (a) Write six differences between Manual part programming and Computer Aided Part programming.

(OR)

(b) Write a part program for the component shown in the fig. The machining parameters are given cutting speed= 600 rpm; feed 150mm/min.



**MODEL PAPER**

**Unit Test - II**

**INDUSTRIAL AUTOMATION & 3D PRINTING (M-504)**

Time: 90 Minutes                                                                                    Total Marks: **40**

**PART – A**                                                        **(4x1+4x3=16M)**

*Instructions: 1st Question having 4 one mark questions, and remaining 4Questions carry 3 marks each*

**1.(**a) ---------- is used in difficult and hazardous areas to replace humans.

(b) The three degrees of freedom of a robot are _____, _____, _____

 (c) Expand SLA --------------------------- in 3D printing process.

 (d) Laminated Object Manufacturing (LOM) is a Rapid Prototyping Technique.(True/False)

2. List three applications of industrial Robots.

3. State important Robot programming methods and Languages.

4. What is Principle of Additive Manufacturing Process?

5. List important 3D Printing Methods.

*Instructions: Part B consists of 3 Units. Answer any one full question from each unit. Each questioncarries 8 marks and may have sub questions.*

6. (a) Describe the functions of components of a robot with a line diagram.

**(OR)**

  (b) Explain different degrees of freedom of an industrial robot.

7. (a) Write Advantages, Disadvantages and Industrial applications of Robots.

**(OR)**

(b) Explanation of Steps in the 3D Printing Process with a Flow chart.

8. (a) Explain FDM 3D Printing Process.

    **(OR)**

(b) Explain Selective Laser Sintering (SLS) Process **.**


**MODEL PAPER**
**DME - FIFTH SEMESTER END EXAMINATION**
**INDUSTRIAL AUTOMATION & 3D PRINTING (M-504)**

*Time* **: 3 hours**                                             *Total Marks* **: 80**

              PART-A                       3x10=30

*Instructions:(1) Answer **all** questions.*

        *(2) Each question carries **three** marks.*

        *(3) Answer should be brief and straight to the point and shallnot*

          *exceed five simple sentences.*

1. Why Industry 4.0 is important in the manufacturing sectors?
2. List Applications of IIoT .
3. List Benefits of CAD.
4. How CNC machines are specified.
5. Write NC Part Programming Languages.
6. Write three different preparatory functions
7. Give classification of Robots.
8. Define (a) Yaw (b) Pitch related to robotic motion.
9. Define Rapid Prototyping and 3D Printing.
10. List three advantages of SLS 3D Printing Process.

*Instructions:* (1) *Answer any five questions.*

(2) *Each question carries ten marks.*

(3) *Answers should be comprehensive and criterion for valuation is the content*

*but not the length of the answer.*

11. Explain Briefly the Features of Industrial Revolutions from First Industrial Revolution to Fourth Industrial Revolution

12. Explain the functions of components of a CNC with a neat diagram.

13. (a) Explain the key features of IIoT .

(b)  Write five differences between NC and CNC machines.

14. Write a part program for the component shown in the fig. The machining parameters are given cutting speed=
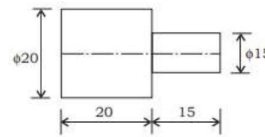


600 rpm; feed 150mm/min.

15. Describe the functions of components of a robot with a line diagram.

16. (a) Write Five differences between Manual part programming and Computer Aided Part programming.

(b) Write Advantages, Disadvantages and Industrial applications of Robots.

17. Explain FDM 3D Printing Process with advantages and applications.

18. Explain SLA 3D Printing Process with advantages and applications.