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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute Affiliated to AKTU, Lucknow)

M.Tech

SEM: II - THEORY EXAMINATION (2025 - 2026)

Subject: Digital Manufacturing and Automation

Time: 3 Hours

Max. Marks: 70

General Instructions:

IMP: Verify that you have received the question paper with the correct course, code, branch etc.

1. This Question paper comprises of **three Sections -A, B, & C**. It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.
2. Maximum marks for each question are indicated on right -hand side of each question.
3. Illustrate your answers with neat sketches wherever necessary.
4. Assume suitable data if necessary.
5. Preferably, write the answers in sequential order.
6. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION-A

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1. Attempt all parts:-

- (1.1) When did the 'digital manufacturing' concept became prominent? [CO1, K1] 1
- (a) Early 1950's
 - (b) Early 1970's
 - (c) Late 1940's
 - (d) Late 1960's
- (1.2) In Automatically Programmed Tool (APT) language, which command is used to move the tool from its current location to an absolute point? [CO2, K1] 1
- (a) GODLTA
 - (b) GOTO
 - (c) GOFWD
 - (d) GOLFT
- (1.3) Which of the following material can be used for coating on tools? [CO3, K1] 1
- (a) HSS
 - (b) TiCN
 - (c) WC
 - (d) CBN
- (1.4) Which of the following statements concerning the implementation of robotic systems is correct? [CO4, K1] 1
- (a) Implementation of robots CAN save existing jobs
 - (b) Implementation of robots CAN create new jobs
 - (c) Robotics could prevent a business from closing
 - (d) All of the above

- (1.5) Which system has the least flexibility? [CO5, K1] 1
- (a) Job shop
 - (b) Batch
 - (c) Assembly
 - (d) Continuous

2. Attempt all parts:-

- (2.1) State the advantages of CNC over conventional machines. [CO1, K2] 2
- (2.2) What do you mean by fixed origin versus floating origin in CNC? [CO2, K2] 2
- (2.3) What are the different types of tool holders and tool assemblies used in CNC machines? [CO3, K2] 2
- (2.4) What is end effector? Mention its types. [CO4, K2] 2
- (2.5) List the major benefits of Group Technology. [CO5, K2] 2

SECTION-B

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Answer any one of the following:-

- (3.1) Explain linear and circular interpolation with examples. [CO1, K2] 4
- (3.2) Differentiate between NC, CNC and DNC machines. [CO1, K2] 4

Answer any one of the following:-

- (3.3) Discuss advantages and limitations of 3D printing. [CO2, K2] 4
- (3.4) What is the difference between absolute and incremental coordinate systems? [CO2, K2] 4

Answer any one of the following:-

- (3.5) What is the Z offset value? Explain how it can be determined for each tool to be used. [CO3, K2] 4
- (3.6) Write different M-codes used in CNC programming and their functions. [CO3, K2] 4

Answer any one of the following:-

- (3.7) What are the benefits and applications of industrial robots? Explain in brief. [CO4, K2] 4
- (3.8) What are the different types of actuators used in robots? Explain any one in brief. [CO4, K2] 4

Answer any one of the following:-

- (3.9) Differentiate between conventional and intelligent manufacturing systems. [CO5, K2] 4
- (3.10) What are the different methods of grouping parts into part families in group technology? [CO5, K2] 4

SECTION-C

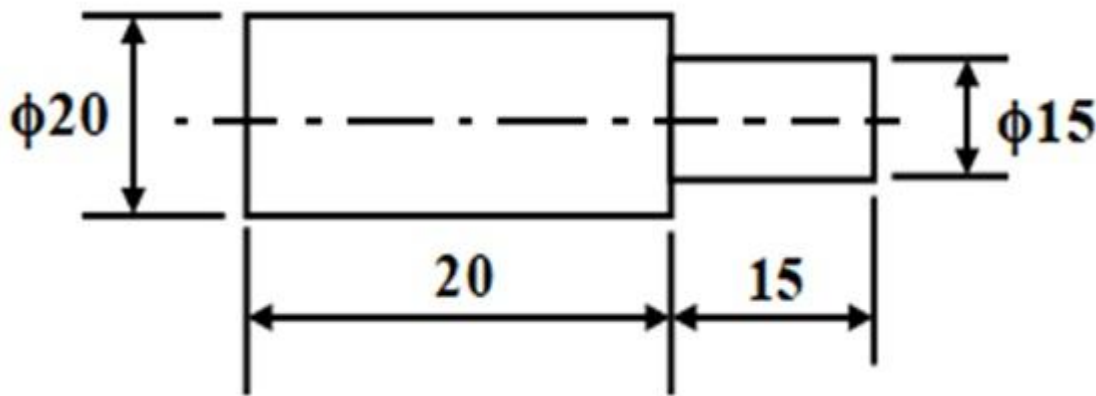
35

4. Answer any one of the following:-

- (4.1) Explain various types of control systems used in CNC machines with neat sketches. [CO1, K2] 7
- (4.2) Explain in detail the principles of CNC machines and their classification. [CO1, K2] 7

5. Answer any one of the following:-

- (5.1) Write NC part program for the shaft of diameter 25 mm to make a stepped turning with dimensions are in mm as shown in figure. Take speed = 250 rpm and feed = 20 mm/min. [CO2, K3] 7



- (5.2) What are the different 3D printing technologies? Explain the working principle of SLA technology with neat sketch. [CO2, K3] 7

6. Answer any one of the following:-

- (6.1) Define smart manufacturing. How does smart manufacturing improve CNC productivity? [CO3, K2] 7
- (6.2) Compare traditional manufacturing and Smart Manufacturing with reference to tooling and tool monitoring. [CO3, K2] 7

7. Answer any one of the following:-

- (7.1) Explain the material handling function in manufacturing. List various types of material handling equipment. [CO4, K2] 7
- (7.2) What is an Automated Storage and Retrieval Systems (AS/RS)? Explain in brief. [CO4, K2] 7

8. Answer any one of the following:-

- (8.1) Define Computer Integrated Manufacturing (CIM). What are the components of a CIM? [CO5, K2] 7
- (8.2) What factors should be considered while planning for FMS? Explain in brief. [CO5, K2] 7