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Reg No.: _____

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Sixth Semester B.Tech Degree Supplementary Examination May 2023 (2019 Scheme)



Course Code: MET306

Course Name: ADVANCED MANUFACTURING ENGINEERING

Max. Marks: 100

Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks.

Marks

- | | | |
|----|---|-----|
| 1 | Differentiate orthogonal and oblique cutting in machining. | (3) |
| 2 | Describe the need for powder metallurgy process. | (3) |
| 3 | Explain latching in PLC ladder logic with an example. | (3) |
| 4 | What is interpolation in NC machines? Describe the types of interpolation. | (3) |
| 5 | Write notes on the process parameters of abrasive jet machining. | (3) |
| 6 | Describe the advantages of laser beam machining over electron beam machining. | (3) |
| 7 | Explain the types of elastic body waves in high-velocity forming. | (3) |
| 8 | How the strain distribution in a high velocity forming process is different compared to the conventional forming process? | (3) |
| 9 | Define the term micromachining. State any two requirements of micromachining. | (3) |
| 10 | Write a note on material addition processes. | (3) |

PART B

Answer any one full question from each module, each carries 14 marks.

Module I

- 11 a) Explain the CIP and HIP techniques in powder metallurgy with neat sketches. (7)
- b) Write the main functions of cutting fluid in metal cutting. What are the desirable properties of good cutting fluid? (7)

OR

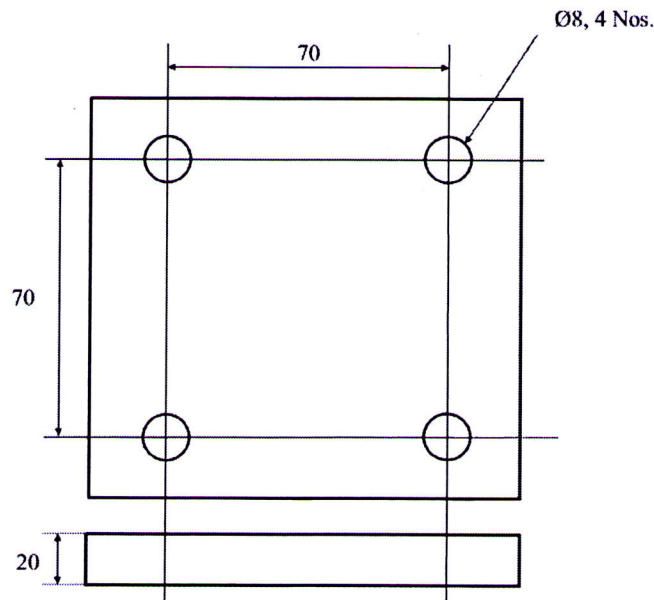
- 12 a) Describe the advantages, disadvantages and applications of powder metallurgy. (7)
- b) What are the assumptions made in Merchant's theory? Draw the Merchant's circle diagram for an orthogonal cutting and also write the procedure of construction. (7)

Module II

- 13 a) Write a PLC ladder logic program to obtain a continuous reciprocating motion for a plunger driven by an electric motor. Assume suitable switches and also draw the input and output diagrams. (7)
- b) What are the four basic types of statements in the APT language? Explain any two types with examples. (7)

OR

- 14 a) Describe the NC coordinate systems and axes in lathes and milling machines with neat sketches. (7)
- b) Write a manual part program for drilling holes in the work shown in the figure. (7)
Assume suitable cutting parameters.

**Module III**

- 15 a) Draw a neat diagram of the Ultra Sonic Machining setup. Explain the working and applications of the process. (7)
- b) Differentiate the processes of EDM and ECM. Describe the advantages and disadvantages of the wire EDM process. (7)

OR

- 16 a) Explain the Ion Beam Machining with a neat sketch. Also, describe the process parameters. (7)
- b) Describe the transferred and non-transferred modes in Plasma Arc Machining with a neat sketch. Write the features and applications of each model. (7)

Module IV

- 17 a) Explain the effects of high speeds on the stress-strain relationship of steel, and aluminium with sketches (7)
- b) Compare the deformation velocity, strain distribution and formability of high velocity forming with the conventional forming methods. Also, discuss the effects of high velocity in metal forming. (7)

OR

- 18 a) Differentiate the Electro-Hydraulic Forming and Electro-Magnetic Forming processes with neat sketches. (7)
- b) With a neat sketch explain the standoff explosive forming process. List out the advantages of the process. (7)

Module V

- 19 a) Describe the material removal mechanism in Diamond turning. List the applications of the process. (7)
- b) Compare the Magnetic Float Polishing and Elastic Emission Machining with simple sketches. (7)

OR

- 20 a) What is Laser engineered net-shaping? Explain the process with a neat sketch. (7)
- b) Explain the processing steps in the LIGA process with sketches. (7)
