CBCS SCHEME

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15ME82

Eighth Semester B.E. Degree Examination, July/August 2021
Additive Manufacturing

Time: 3 hrs. Max. Marks: 80

Note: ***Answer any FIVE full questions.***

1 a. Explain the need for Additive Manufacturing. **(06 Marks)**
b. Explain with a neat sketch, the working principle , merits and demerits and applications of Discrete Particle Additive Manufacturing System. **(10 Marks)**

2 a. Distinguish between Additive Manufacturing and CNC Machining. **(06 Marks)**
b. Explain with a neat sketch, the working principle , advantages , disadvantages and applications of Solid Sheet additive manufacturing system. **(10 Marks)**

3 a. Explain with neat sketches, the salient features of DC motors with field coil. **(10 Marks)**
b. Explain with neat diagrams, the salient features and characteristics of Thyristor and Triac. **(06 Marks)**

4 a. Explain with neat sketches, the working principle of following hydraulic motors :
i) Vane motor ii) Gear motor. **(08 Marks)**
b. Write a note on the following :
i) Shape memory alloys ii) Piezo electric actuators. **(08 Marks)**

5 a. Explain the main steps in powder metallurgy. **(08 Marks)**
b. Explain with neat sketches the following :
i) Tape casting ii) Slip casting. **(08 Marks)**

6 a. Explain with a neat sketch, the working principle of polymer processing by wet spinning. What are its advantages and disadvantages? **(08 Marks)**
b. Explain in detail Liquid Phase Sintering. **(08 Marks)**

7 a. Explain with neat sketches, Top-down and Bottom-up approaches pertaining to Nanotechnology. **(06 Marks)**
b. Explain with a neat sketch, the working principle, uses and applications of Scanning Electron Microscopy (SEM). **(10 Marks)**

8 a. Explain with a neat sketch, production of Ultrafine powers by Mechanical grinding. **(06 Marks)**
b. Explain with a neat sketch, the working principle, merits , demerits and application of Atomic Force Microscopy (AFM). **(10 Marks)**

9 a. Explain the various Automation principles and Strategies. **(10 Marks)**
b. Distinguish between NC, CNC and DNC systems, with neat block diagrams. **(06 Marks)**

10 a. Explain with a block diagram the various levels of Automation. **(08 Marks)**

b. Write an NC part program for the part shown in Fig. Q10(b) depicting drilling operation. Use the following data :
Spindle speed = 1000 rpm.
Feed = 0.05mm/rev.
Starting point of tool is at X = 0 , Y = -50mm , Z = 10mm.
Diameter of drill = 7mm.
Consider absolute positioning system. **(08 Marks)**

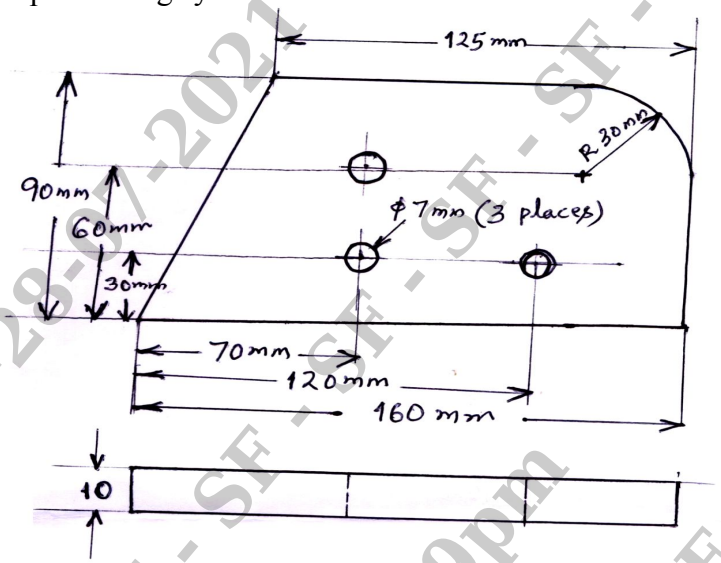

Fig. Q10(b) : A simple part depicting drilling operation

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