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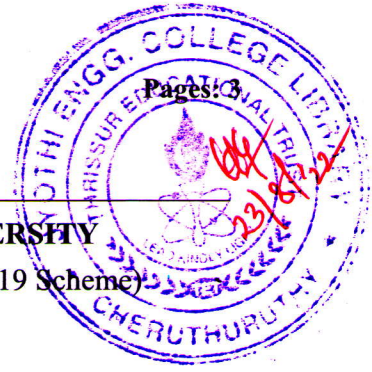
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Reg No.: _____

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Sixth Semester B.Tech Degree Examination June 2022 (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 | Define built up edges. Explain the need and purpose of chip breaking. | (3) |
| 2 | List and explain any three characteristics of fine powder. | (3) |
| 3 | Differentiate between point to point and straight cut NC system. | (3) |
| 4 | Explain the four modifiers used in APT language. | (3) |
| 5 | Explain the functions of dielectric fluid used in Electric Discharge Machining (EDM)? | (3) |
| 6 | Explain the process parameters of Laser Beam Machining (LBM). | (3) |
| 7 | With the help of neat sketch explain the effect of high speed on the stress strain relationship of Cu. | (3) |
| 8 | Define 'P' waves and 'S' waves. | (3) |
| 9 | List any 6 process parameters of Abrasive Flow Machining (AFM). | (3) |
| 10 | Explain Rapid Prototyping (RP) process. List any two advantages. | (3) |

PART B

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

Module I

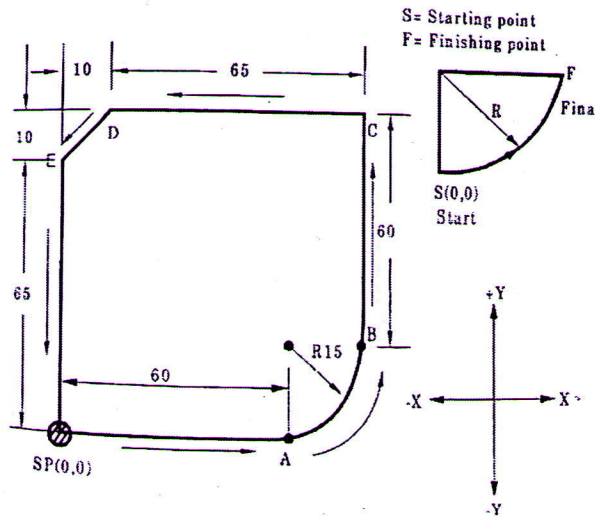
11. a) In an orthogonal cutting process, the following data has been observed: (7)
- Uncut chip thickness= 0.127 mm, width of cut= 6.35 mm, cutting speed= 2 m/s, rake angle= 10 degree, cutting force, $F_c = 567$ N, thrust force, $F_t = 227$ N, chip thickness= 0.228 mm.
- Determine the following: shear angle, friction angle, shear stress along shear plane, power for cutting operation, chip velocity and chip shear strain.
- b) Explain Merchant's theory with neat sketches. (7)

OR

- 12 a) Explain the mechanism of chip formation in machining ductile and brittle materials. (7)
- b) For turning a steel rod by a given cutting tool at a given machining condition under a given environment the tool life decreases from 80 min to 20 min. due to increase in cutting velocity, V_c from 60 m/min to 120 m/min., then at what cutting velocity the life of that tool under the same condition and environment will be 40 min.? (7)

Module II

- 13 Write a part program to give a finished job as shown in figure using milling operation. (Speed = 1200 rpm, Feed = 125 mm/min., Depth of cut = 3 mm, Thickness of plate = 3 mm.) (14)



OR

- 14 a) Define the three types of motion commands used in APT language with syntax and examples. (7)
- b) Draw relay ladder diagram for the following sequential operations. Start button pressed, table motor started, package moves to the position of the limit switch and stops. Auxiliary features required are emergency stop, red light to indicate stop condition and green light to indicate package moving condition. Draw input and output connection diagrams also. (7)

Module III

- 15 a) With a neat sketch explain Ion Beam Machining process. (7)
- b) List and explain the factors affecting Heat Affected Zone and Surface quality in Laser Beam Machining. (7)

OR

- 16 a) Describe Electron Beam Machining process with neat sketch. (7)
b) List and explain the factors affecting material removal rate and surface quality in electron beam machining. (7)

Module IV

- 17 a) Derive an expression for the velocity of an elastic wave travelling along a rod of infinite length. (7)
b) Explain the two types of explosive forming with neat sketches. (7)

OR

- 18 a) With the help of a neat sketch explain electro hydraulic forming. (7)
b) Compare high velocity forming with conventional forming process. (7)

Module V

- 19 a) With the help of a neat sketch explain Selective Laser Sintering. (7)
b) Explain the working of Fused Deposition Modelling with a neat sketch. (7)

OR

- 20 a) With a neat sketch explain Diamond turn machining process. (7)
b) Describe Laminated Object Manufacturing Process with a neat sketch. (7)
