ME-702

ADVANCED MANUFACTURING TECHNOLOGY

Time Allotted: 3 Hours | Full Marks: 70

The questions are of equal value.
The figures in the margin indicate full marks
Candidates are required to give their answers in their own words as far as practicable

GROUP A
(Multiple Choice Type Questions)

1 Answer any *ten* questions. 10×1 = 10

(i) Flexible automation is economically justified for
(A) batch production (B) mass production
(C) flow production (D) none of these

(ii) Following is an attractive feature of CNC Machining Center
(A) slant bed construction
(B) short as well as long jobs can be machined
(C) automatic tool changer with tool magazine
(D) all of these

(iii) The error associated with the several times execution of a linear displacement command in CNC machine tools, all under equal environmental condition, refers to as
(A) system precision (B) system accuracy
(C) system resolution (D) system repeatability

(iv) The motion of a drill while carrying out numbers of drilling in a plate is characterized by
(A) paraxial control (B) point-to-point control
(C) contour control (D) all of these

(v) Motion commands pertaining to cutting tools are specified under
(A) auxiliary code (B) preparatory code
(C) miscellaneous code (D) none of these

(vi) Which of the following command is non-modal ?
(A) G01 (B) G02 (C) G03 (D) G04

(vii) Material removal rate in ECM is governed by
(A) Fleming's rule (B) Newton's law (C) Faraday's law (D) none of these

(viii) AJM is used for
(A) plastics only (B) ductile materials only
(C) brittle materials only (D) all of these

(ix) In EDM the required property of the tool is
(A) resistivity (B) dielectric strength
(C) conductivity (D) none of these

(x) In USM, the rate of penetration is dependent on
(A) action of slurry (B) action of the abrasive grains
(C) reduction of a chemical (D) all of these

(xi) In LBM material removal takes place by
(A) melting and erosion (B) vaporisation and dissolution
(C) melting and vaporisation (D) erosion and shear

GROUP B
(Short Answer Type Questions)

Answer any *three* questions. 3×5 = 15

2. Define the following 1+1+1+1
Flexible manufacturing system, Transfer lines, project shop, Job shop, Cellular Manufacturing.

3. Differentiate between 2.5+2.5
(a) Open loop and closed loop control system
(b) Absolute and Incremental dimensioning.

4 Write down the advantages of Wire EDM over Conventional EDM. 5

5 Explain the term "LASER". State the application of this process. 2+3

6 Differentiate between Hard, programmable and Flexible automation along with examples. 5

GROUP C
(Long Answer Type Questions)

Answer any *three* questions. 3×15 = 45

7. (a) Describe with neat sketch the working principal of Electro discharge machining (EDM). Why polarity reversal is sometime necessary in EDM operation? 7

(b) Describe Laser Beam machining (LBM) process with the aid of neat sketch. What are the major applications of LBM? 8

8. (a) Draw the schematic diagram of Abrasive jet machining (AJM) setup and label its various components. 5

(b) Discuss the mechanism of material removal for AJM. State the limitations of AJM process. 5

(c) Explain the Ultrasonic machining (USM) process with its various components. 5

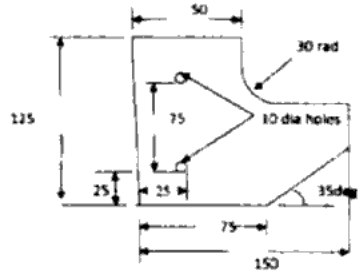
9. (a) State Faraday's law of electrolysis. Show the chemical reactions that take place in electrolyte, anode and cathode during electro-chemical machining (ECM) operation. 5

(b) Write short notes on any *two* of the following 5+5

(i) Dielectric in EDM
(ii) EDM gap flushing technique
(iii) Working princip of plasma arc machining (PAM)
(iv) Working princip with machine setup in EBM.
(v) Princip and given setup of water jet machining (WJM)

CS/B.Tech/ME/odd/Sem-7th/ME-702/2014-15

10 The outline of the part is given in the Figure 1. It is to be profiled milled with a 20 mm end mill with two teeth. Cutting speed = 125 mm/min. Feed rate = 0.10 mm/tooth. Two holes have been drilled and will be used for clamping during milling. Write a part program in APT. 15



10 mm thick plate (All dimensions are in mm)

Figure 1

11.(a) Explain with a neat sketch the operation of the canned cycle G81 as per ISO. 5

(b) For the component shown in Figure 2 make a part program on a machining centre equipped with the ISO controller. Clearly show the set point and axis on the sketch of the part. Show all the necessary calculations. 10

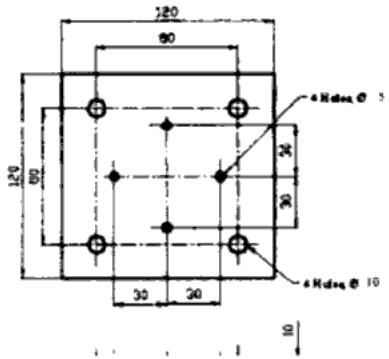


Figure 2

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