



Name :
Roll No. :
Invigilator's Signature :

CS/B.TECH(ME)/SEP.SUPPLE/SEM-7/ME-701/2012

2012

ADVANCED MANUFACTURING TECHNOLOGY

Time Allotted : 3 Hours

Full Marks : 70

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. Choose the correct alternatives for the following : $10 \times 1 = 10$
- i) Mechanics of material removal in EDM is
 - a) melting and evaporation aided by cavitation
 - b) mechanical cutting action
 - c) melting
 - d) electrolysis.
 - ii) Which one of the following is a binary sensor ?
 - a) Accelerometer
 - b) DC Tachometer
 - c) Proximity switch
 - d) Thermistor.
 - iii) Diamond tools should be used for high speed machining of
 - a) cast iron jobs
 - b) mild steel jobs
 - c) aluminium jobs
 - d) carbide jobs.



- iv) CAPP is fully integrated with
- a) CAD and CAM
 - b) only CAD
 - c) only CAM
 - d) none of these.
- v) The hardest manufactured cutting tool material is
- a) diamond
 - b) ceramic
 - c) carbon boron nitride
 - d) tungsten carbide.
- vi) The fundamental philosophy of Computer Integrated Manufacturing is
- a) Sequential Engineering
 - b) Concurrent Engineering
 - c) Reserve Engineering
 - d) Value Engineering.
- vii) The mechanism of AGV is based on the principle of
- a) acoustic emission
 - b) embedded wire guided method
 - c) interferometry
 - d) triangulation.
- viii) The dielectric fluid is used in
- a) ECM
 - b) USM
 - c) AJM
 - d) EDM.
- ix) In EBM process, the maximum material removal rate is
- a) $20 \text{ mm}^3/\text{min}$
 - b) $30 \text{ mm}^3/\text{min}$
 - c) $10 \text{ mm}^3/\text{min}$
 - d) $40 \text{ mm}^3/\text{min}$.
- x) Lower machining accuracy is obtained in
- a) PAM
 - b) LBM
 - c) EBM
 - d) EDM.



GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. With a simple diagram explain the working of Plasma Arc Machining.
3. a) What do you mean by flexible manufacturing system ?
b) Define rapid prototyping. $3 + 2$
4. Use successive approximation method to convert an input signal of 6.8 V from analog to digital signal for a 6-bit Register of an ADC with a full scale range of 10 V.
5. Write down the benefits of FMs.

GROUP – C

(Long Answer Type Questions)

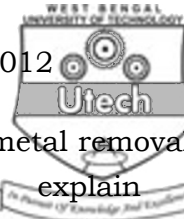
Answer any *three* of the following. $3 \times 15 = 45$

6. a) Draw the resistance-capacitance relaxation circuit used in EDM. Show the variation of instantaneous voltage across the tool-workpiece gap along with the time. Prove

that $V = V_0 \left\{ 1 - e^{-\frac{t}{RC}} \right\}$. Notations have their usual

meanings.

- b) During an electric discharge drilling of a 10 mm square hole in a low carbon steel plate of 5 mm thickness, brass tool and kerosene are used. The resistance and the capacitance in the relaxation circuit are 50 Ω and 10 μF , respectively. the supply voltage is 200 volts and the gap is maintained at such a value that the discharge (sparking) takes place at 150 volts. Estimate the time required to complete the drilling operation. Use the correlation $Q = 27.7 W^{1.54}$. $(2 + 2 + 4) + 7$



7. a) Describe the fundamental principles of metal removal in Electro-chemical Machining. Briefly explain the significance of Electrolyte used in ECM and also the importance of 'Tool-work gap'.
b) Discuss the mechanism of material removal for Abrasive Jet Machining. How to select the best possible abrasive and nozzle material to be used in this process ?
c) Write a note on the special features of the equipments used in Water Jet Machining. 4 + 2 + 4 + 2 + 3
8. a) Explain the main factors that affect the AJM removal rate.
b) Explain LBM and show using a line sketch, the material removal mechanism of the process.
c) State three commonly used graphics standards and mention their advantages with reference to specific application. 3 + 7 + 5
9. a) Explain the selective layer sintering process.
b) Under what circumstances is Reverse Engineering recommended ?
c) Explain with a neat sketch the geometry of a drilled hole using LBM. 5 + 5 + 5
10. a) Explain detail integration of CAD with CAM.
b) Describe the basic principle of operation of AGV.
c) List application of AGV in CIM. 6 + 5 + 4

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