

**ADVANCED MANUFACTURING PROCESSES***Time Allowed: 3 Hours**Full Marks: 70***Answer the following questions from Group A, B & C as directed.****GROUP-A****1. Choose the correct answer from the given alternatives (any ten):****1x10**

- i. Non-Traditional machining is recommended when we need which of the following features?
  - a) Complex shapes
  - b) High surface quality
  - c) Low-rigidity structures
  - d) All of the mentioned
- ii. Non-Traditional machining can also be called as \_\_\_\_\_.
  - a) Contact Machining
  - b) Non-contact machining
  - c) Partial contact machining
  - d) Half contact machining
- iii. In which of the following industries, Non-traditional machining methods play an important role?
  - a) Automobile
  - b) Aerospace
  - c) Medical
  - d) All of the mentioned
- iv. Different classifications of Non-traditional machining based on source of energy are \_\_\_\_\_.
  - a) Mechanical
  - b) Thermal
  - c) Chemical and electro-chemical.
  - d) All of the mentioned
- v. In mechanical machining, material is removed by \_\_\_\_\_.
  - a) Erosion
  - b) Corrosion
  - c) Abrasion
  - d) Vaporization
- vi. Material in thermal machining is removed by which of the following means?
  - a) Vaporization
  - b) Melting
  - c) Electro-plating
  - d) All of the mentioned
- vii. Which of the following process comes under mechanical machining?
  - a) USM
  - b) EDM
  - c) LBM
  - d) PAM
- viii. Surface defects that may be occurred during thermal machining are \_\_\_\_\_.
  - a) Micro cracking
  - b) Heat affected zones
  - c) Striations
  - d) All of the mentioned

- ix. Sources used in thermal machining are \_\_\_\_\_.
- Ions
  - Plasma
  - Electrons
  - All of the mentioned
- x. Vacuum is the machining medium for \_\_\_\_\_.
- LBM
  - WJM
  - EBM
  - None of the mentioned
- xi. In chemical machining is material removal takes by?
- Chemical reaction
  - Erosion
  - Electron removal
  - None of the mentioned
- xii. With the use of Jigs and fixture total cost of production-
- Increases
  - Decreases
  - Remains same
  - Jigs are not used in any production process
- xiii. In which of the following operation jigs are preferred over fixture?
- Drilling
  - Turning
  - Milling
  - Grinding
- xiv. Number of degree of freedom of a work piece in space is equal to-
- 10
  - 12
  - 14
  - 16
- xv. CNC machining centres do not include operations like \_\_\_\_\_.
- milling
  - boring
  - welding
  - tapping

2. Fill in the blanks (any ten):

1x10

- USM removes materials using the \_\_\_\_\_ tool.
- Frequency of tool's oscillation in USM ranges between \_\_\_\_\_.
- Amplitude of oscillation of tool in USM ranges between \_\_\_\_\_.
- \_\_\_\_\_ discovered USM.
- \_\_\_\_\_ is softer material in USM.
- In \_\_\_\_\_ year, discovery of USM took place.
- Full form of CNC is \_\_\_\_\_.
- By motion control type, CNC system is classified into \_\_\_\_\_ types.
- By control loop, CNC system is classified into \_\_\_\_\_ types.
- Punched tape was used in \_\_\_\_\_ system machines.
- CNC Lathe is generally termed as \_\_\_\_\_.
- By motion control type, CNC system is classified into \_\_\_\_\_ types.
- By control loop, CNC system is classified into \_\_\_\_\_ types.
- Punched tape was used in \_\_\_\_\_ system machines.
- Colour of light used to triggered Ruby rod is \_\_\_\_\_.

3. Answer the following questions in one or two sentences (any ten):

1x10

- i. The machining system of USM contains which components?
- ii. In Ultrasonic Machining, how Magnetostrictor is energized?
- iii. Who discovered magnetostrictor effect?
- iv. In Ultrasonic Machining, magnetostrictor converts magnetic energy into which type of energy?
- v. What is the value of the amplitude obtained without mechanical amplifier?
- vi. What is the value of the amplitude obtained when we use mechanical amplifier?
- vii. At what rate slurry is pumped through nozzle in USM?
- viii. By which means, material is removed in USM?
- ix. For the term no wear in EDM occurs what will be the electrode-to-work piece wear ratio?
- x. What is the material removal mechanism of Laser beam machining process?
- xi. Physics of laser is very complex due to which reasons?
- xii. What is the value of gap voltage maintained in ECG process?
- xiii. For Milling process, what should use we use to hold and locate work-piece?
- xiv. In which mode CNC systems multiple microprocessors and programmable logic controllers work? In how many ways CNC machine tool systems can be classified?

#### GROUP-B

4. Answer the following questions (any five):

2x5

- i. Write down FOUR advantages of NTM over TM.
- ii. Write down FOUR disadvantages or limitations of NTM over TM.
- iii. Write down FOUR advantages of EDM.
- iv. Write down FOUR disadvantages EDM.
- v. Write down FOUR advantages of ECM.
- vi. Write down FOUR disadvantages LBM.
- vii. Write down FOUR differences between jigs and fixtures.
- viii. Write down FOUR disadvantages NC.
- ix. What is the application of Tool Magazine?
- x. Why we use stepper motor in CNC system?

#### GROUP-C

5. Answer the following question (any one):

- i. a) Draw schematic diagram of WEDM and mark it accordingly.  
b) Write down Disadvantages of EDM. 7+3
- ii. a) Draw schematic diagram of USM and Mark it accordingly.  
b) What are the application areas of Non-Traditional Machining processes? 7+3
- iii. a) What is Spontaneous radiation?  
b) How Stimulated radiation is occurred?  
c) Why LASER is called Stimulated Emission of Radiation? 3+4+3

6. Answer the following question (any one):

- i. Discuss with neat sketch 3-2-1 Principle of Location. 10
- ii. Write down Five different types of Locking devices used in Jigs and Fixtures. 10
- iii. a) Draw a neat sketch of Re-circulating Ball Screw used in CNC.  
b) Short Note: Automatic Tool Changer 5+5