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GIET MAIN CAMPUS AUTONOMOUS GUNUPUR – 765022

B. Tech Degree Examinations, December – 2020

(Seventh Semester)

**BMEPE7023 – Modern Manufacturing Processes**

(Mechanical Engineering)

Time: 2 hrs

Maximum: 50 Marks

**The figures in the right hand margin indicate marks.****PART – A: (Multiple Choice Questions)****(1 x 10 = 10 Marks)****Q.1. Answer ALL questions**

- a. In ECM, the material removal is due to
- |                        |                |
|------------------------|----------------|
| (i) Erosion            | (ii) Corrosion |
| (iii) Ion displacement | (iv) Fusion    |
- b. In abrasive jet machining, as the distance between the nozzle tip and work surface increases the material removal rate
- |                                       |                            |
|---------------------------------------|----------------------------|
| (i) Stereolithography Apparatus       | (ii) Five axis CNC Milling |
| (iii) Selective laser sintering (SLS) | (iv) Multi-jet modelling   |
- c. Which of the following gas, should never be used as the carrier of abrasives?
- |              |          |
|--------------|----------|
| (i) Nitrogen | (ii) CO  |
| (iii) Oxygen | (iv) Air |
- d. In electrodischarge machining (EDM), if the thermal conductivity of tool is high and the specific heat of work piece is low, then the tool wear rate and material removal rate are expected to be respectively
- |                    |                   |
|--------------------|-------------------|
| (i) High and high  | (ii) Low and low  |
| (iii) High and low | (iv) Low and high |
- e. The following four unconventional machining processes are available in a shop floor. The most appropriate one to drill a hole of square cross section of 6 mm × 6 mm and 25 mm deep is
- |                            |                                  |
|----------------------------|----------------------------------|
| (i) Abrasive jet machining | (ii) Plasma arc machining        |
| (iii) Laser beam machining | (iv) Electro discharge machining |
- f. The process utilizing mainly thermal energy for removing material is
- |                              |                                |
|------------------------------|--------------------------------|
| (i) Ultrasonic machining     | (ii) Electrochemical machining |
| (iii) Abrasive jet machining | (iv) Laser beam machining      |
- g. The non-traditional machining process that essentially required vacuum is
- |  |                                  |
|--|----------------------------------|
| (i) electron beam machining                | (ii) electro chemical machining  |
| (iii) electro chemical discharge machining | (iv) electro discharge machining |
- h. In an ultrasonic machining (USM) process, the material removal rate (MRR) is plotted as a function of the feed force of the USM tool. With increasing feed force, the MRR exhibits the following behaviour:
- |                        |   |
|------------------------|---|
| (i) Increases linearly | (ii) Decreases linearly                 |
| (iii) Does not change  | (iv) First increases and then decreases |
- i. In a wire-cut EDM process the necessary conditions that have to be met for making a successful cut are that
- |   |  |
|---|--|
| (i) wire and sample are electrically non-conducting | (ii) wire and sample are electrically conducting |
|---|--|

- (iii) wire is electrically conducting and sample is electrically non-conducting
- (iv) sample is electrically conducting and wire is electrically non-conducting

- j. Name the source from below which is NOT used for PVD:
- (i) Combustion flame heating                      (ii) Electron beam heating
- (iii) Resistance boat heating                      (iv) Arc source evaporation

**PART – B: (Short Answer Questions)**

**(2 x 5 = 10 Marks)**

Q.2. Answer ALL questions

- What factors should be considered in selecting the tool materials in ECM?
- Describe the factors that should be considered in selecting the abrasive in AWJM
- Give the applications of electron beam machining
- Classify the types of laser used in LBM process.
- Differentiate between conventional grinding and ECG.

**PART – C: (Long Answer Questions)**

**(6 x 5 = 30 Marks)**

Answer ANY FIVE questions

Marks

- |   |   |
|---|---|
| 3. Explain the working principle, application and advantages of WJM   | 8 |
| 4. During machining of ceramics, a MRR of $8 \text{ mm}^3/\text{min}$ is achieved by $\text{Al}_2\text{O}_3$ abrasive grits having a grit diameter of $80 \mu\text{m}$ . If $120 \mu\text{m}$ grits were used, what would be the MRR? For the same problem, the feed force is increased by 50% along with a reduction in concentration by 70%. What would be the effect on MRR. | 7 |
| 5. Differentiate between sinker EDM and wire EDM.   | 8 |
| 6. If in a RC type generator, to get an idle time of $500 \mu\text{s}$ for open circuit voltage of 100 V and maximum charging voltage of 70 V, determine charging resistance. Assume $C = 100 \mu\text{F}$ .  | 7 |
| 7. With a neat sketch explain the working principle of LBM.   | 7 |
| 8. Explain the working principle, application and advantages of PAM.  | 8 |
| 9. Explain different types of Physical vapour deposition method with neat sketch.   | 8 |
| 10. Explain about reverse engineering and mention its advantages, disadvantages and applications.   | 8 |

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