15923

BRAINWARE UNIVERSITY

Term End Examination 2025-2026
Programme – Dip.ME-2023
Course Name – Advanced Manufacturing Process
Course Code - DMEPC501
(Semester V)

Full Marks : 60 **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Identify the following parameters which govern the value of the shear angle in continuous chip formation.
a) true feed b) chip thickness
c) the rake angle of the cutting d) all of the mentioned

(ii) Identify the geometric objects that is generated using a generatrix and directrix.
a) A cube b) A cone
c) A circle d) A rectangle

(iii) Identify the importance of nose radius in single point turning tool.
a) Tool feed rate b) Surface finish and tool life
c) Depth of cut d) Spindle speed

(iv) Select the process which is the most appropriate for machining a part with intricate and fine details made of brittle materials.
a) Ultrasonic Machining (USM) b) Chemical Machining
c) Water Jet Machining d) Laser Beam Machining

(v) Select the materials that cannot be efficiently cut by Water Jet Machining (WJM) alone.
a) Soft materials like rubber b) Thin metals
c) Brittle materials like glass d) Hard metals like titanium

(vi) Recall the charge of tool used in ECM.
a) Anode b) Cathode
c) Neutral d) Dielectric

(vii) Identify the factor that significantly affect material removal in ECM.
a) Electrolyte concentration b) Cutting speed
c) Tool thermal conductivity d) Workpiece magnetic properties

(viii) Predict pulse width if the resistance in an RC pulse generator is doubled while maintaining the same capacitance.
a) It becomes half b) It becomes double

c) It remains unchanged
d) It increases by four times

(ix) Select the primary energy source used in Laser Beam Machining.

a) Electrical Energy
b) Thermal Energy
c) Optical Energy
d) Chemical Energy

(x) Choose the primary principle of Plasma Arc Machining.

a) Ionization of gas to create a plasma that melts and removes material
b) Abrasive action of a high-speed jet
c) Chemical reaction between gas and workpiece
d) Electrolysis of the workpiece

(xi) Explain the process by which laser energy is generated in LBM.

a) By nuclear fission
b) By chemical reaction
c) By stimulating emission of radiation
d) By mechanical rotation

(xii) Interpret the type of laser that is most suitable for cutting metals.

a) HeNe Laser
b) CO_2 Laser
c) Dye Laser
d) Excimer Laser

(xiii) Predict the influence of insufficient power density of the laser.

a) The material will vaporize instantly
b) The laser will diffuse into multiple colors
c) The material may not melt or be machined
d) The laser will stop working

(xiv) List the major industrial applications of Laser Beam Machining.

a) Engraving, cutting, and drilling
b) Polishing and grinding
c) Electroplating and anodizing
d) Sanding and painting

(xv) Identify the G code that is used for rapid movement of the tool.

a) G00
b) G01
c) G02
d) G90

Group-B

(Short Answer Type Questions) 3 x 5=15

2. List the types of materials that are commonly machined using EDM. (3)
3. List the major components of an Abrasive Jet Machining setup. (3)
4. Distinguish between up milling and down milling. (3)
5. Describe the different type of rake angle. (3)
6. Assess the suitability of USM for machining brittle materials, such as ceramics and glass. (3)

OR

Assess the advantages of ultrasonic machining over electrochemical machining in terms of surface finish and precision. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Calculate the material removal rate if the discharge current and on-time are known. (5)
8. Differentiate between the EDM process and Electrochemical Machining (ECM) in terms of working principles. (5)
9. Summarize the energy transformation process involved in laser beam machining. (5)
10. Evaluate the effectiveness of Abrasive Jet Finishing for internal surfaces compared to conventional grinding. (5)
11. Describe the mechanism used for changing the cutting tool position in a planning machine, and explain the role of the tool post in this context. (5)
12. Assess the advantages and limitations of using EDM for intricate part geometries. (5)

OR

Evaluate the impact of different dielectric fluids (e.g., kerosene vs. deionized water) on the overall machining performance. (5)

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