

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)**

**CLASS: B. TECH
BRANCH: PRODUCTION**

**SEMESTER: VII
SESSION: MO/2022**

SUBJECT: PE406 NON-CONVENTIONAL MACHINING PROCESSES

TIME: 2 HOURS

FULL MARKS: 25

INSTRUCTIONS:

1. The total marks of the questions are 25.
 2. Candidates attempt for all 25 marks.
 3. Before attempting the question paper, be sure that you have got the correct question paper.
 4. The missing data, if any, may be assumed suitably.
 5. Tables/Data handbook/Graph paper etc. to be supplied to the candidates in the examination hall.
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| | | CO | BL |
|--------|--|---------|-----|
| Q1 | Considering the material removal rate in AJM of 1 mm ³ /s, calculate the MRR/impact if the mass flow rate of abrasive is 6 g/min, density is 6 g/cc and grit size is 90 microns. Also, calculate the indentation radius. | [5] CO2 | BL3 |
| Q2 | Derive an analytical model for calculating MRR in USM by considering mechanical abrasion caused by the throwing of abrasive particles against the workpiece surface. | [5] CO3 | BL3 |
| Q3 (a) | How may stepped and tapered shaft-like components be produced using the chemical machining process? | [3] CO2 | BL3 |
| Q3 (b) | Discuss the main requirements of electrolytes for use in ECM. | [2] CO1 | BL1 |
| Q4 | The composition of the Nimonic 75 alloy is given below: Proportion (% by weight): Ni (72.5%), Cr (19.5 %), Fe (5%), Ti (0.4 %), Si (1 %), Mn (1 %), Cu (0.6 %) Density (g/cm ³): Ni = 8.9, Cr = 7.19, Fe = 7.86, Ti = 4.51, Si = 2.33, Mn =7.43, Cu = 8.96 Gram atomic weight: Ni = 58.71, Cr = 51.99, Fe = 55.85, Ti = 47.9, Si = 28.9, Mn =54.94, Cu = 63.57 Valency of dissolution: Ni = 2/3, Cr = 2/3/6, Fe = 2/3, Ti = 3/4, Si = 4, Mn = 2/4/6/7, Cu = 1/2 Assume dissolution to take place at the lowest valency of the elements. A current of 1000 A is being passed through the cell. Calculate the MRR. | [5] CO2 | BL3 |
| Q5 | Explain the different input process parameters and their effects in EDM. | [5] CO3 | BL2 |

::: 26/09/2022 :::M