Ref. No. : Ex/ME/5/T/314/2024(S)

B.E. MECHANICAL ENGINEERING THIRD YEAR FIRST SEMESTER SUPPLEMENTARY EXAM - 2024

MACHINING TECHNOLOGY AND METROLOGY

Time: 3 Hrs. **Full Marks: 100**

Answer any five questions from the following

1. a) Discuss diamond and carbide as tool material.
   b) A single point turning tool is designated as: (-7^0)-(-7^0)-10^0-10^0-75^0-75^0- 1.2 in (ORS). Sketch the views of the tool to show all the relevant features of it. **10+10**

2. a) Discuss the working principle of EDM.
   b) An alloy contains Ni (72.5%), Cr (19.5%), Fe (5.0%), Ti (0.4%), Si (1.0%), Mn (1.0%) and Cu (0.6%). The related information about the metals is given below:

Metal	Gram atomic weight	Valency of dissolution	Density (g/cc)
Ni	58.71	2	8.90
Cr	51.99	2	7.19
Fe	55.85	2	7.86
Ti	47.90	3	4.51
Si	28.09	4	2.33
Mn	54.94	2	7.43
Cu	63.57	1	8.96

   Calculate the MRR in cm^3/min when a current of 1000 A is passed in ECM process. **10+10**

3. a) Write down specifications of a lathe.
   b) Discuss different taper turning methods. **6+14**

4. a) Explain quick return mechanism of shaper.
   b) Compare between reciprocating types machine tools: shaper, slotter and planner. **8+12**

5. a) Discuss the difference between up milling and down milling.
   b) Discuss the different modes of tool failure and essential characteristics of tool material.
   c) Write the specification of a grinding wheel. **6+8+6**

6. a) Explain five different types of machining operations with diagram that can be Performed in drilling.
   b) Write the specification of grinding wheel.
   c) What is meant by loading and glazing of grinding wheel? **10+6+4**

7. a) State the different components of a surface texture.
   b) Show different types of flat surface and smooth surface.
   c) What are reasons for controlling surface roughness?
   d) Discuss the different types of surface roughness assessment. **3+4+5+8**