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Total Number of Pages : 02

B.Tech
RME6C002

6th Semester Regular/Back Examination: 2022-23

SUBJECT: Machining Science and Technology

BRANCH(S): Mechanical Engineering

Time : 3 Hour

Max Marks : 100

Q. Code : M065

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.

The figures in the right hand margin indicate marks.

Part-I

Q1 Answer the following questions: (2 x 10)

- Give few examples of pure orthogonal turning.
- Show all the tool signature of ASA system.
- What symbol is used for denotation of Surface Roughness?
- What is Flank Wear and how it is formed?
- What is Degree of Freedom (DOF)? What is its value in taper turning?
- State suitable machining parameters for forming ductile chips.
- Explain Faraday's second law.
- State two examples of quick return mechanism.
- A hole is to be made on a Si_3N_4 plate. Specify the best machining process.
- Write three types of LASER materials.

Part-II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (6 x 8)

- A steel rod is turned in a lathe by a tool of geometry $-10^\circ, 5^\circ, 6^\circ, 7^\circ, 10^\circ, 75^\circ, 0.8$ mm. Show all the angles in proper planes in ORS system.
- Explain the terms R_a, R_z, R_{max} . Waviness of a surface roughness measurement system.
- Show the possible speed transmission mechanism from motor to spindle of a lathe.
- The value of tool life decreased from 80 minutes to 20 minutes due to increase in cutting velocity from 40 m/min. to 80 m/min. in turning low carbon steel. Find the constant and index.
- Explain the Merchant circle diagram show $\frac{P_{\eta}}{P_s} = \tan(\eta + \beta - \gamma_0)$.
- Compare the appropriate Flank Wear, Crater Wear for machining of medium carbon steel with a Velocity of 400 m/min., feed 0.5 mm/rev. and depth of cut 0.5 mm after machining for 2 minutes, 5 minutes respectively for a length of 400 mm.
- Show the velocity vector diagram among (Cutting Velocity) V_c , (Feed Velocity) V_f and (Shear Velocity) V_s .
- Show a complete set of fixture and jig with drawings for a milling/drilling operation.
- Show the difference among Conventional, Semi-automatic and Automatic lathe.

- j) State Machinability and Economics of Machining with few examples.
- k) Show an EDM machining process. What are the types of pulse are generated? Show with neat sketches.
- l) What are the advantages of a LBM process compared to other systems?

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

- Q3 State the principle of Dynamometer. How many types of dynamometer are available? Show the mechanism of Force Dynamometer used in turning operation with clear sketches. (16)
- Q4 Explain Gear Hobbing and how it is different compared to Gear Milling operation with clear drawings? (16)
- Q5 Compare the mechanism of material removal by ECM and EDM processes with suitable sketches. (16)
- Q6 How materials are removed by an AJM and USM processes? Compare all the advantages and disadvantages with sketches. (16)