6E3051

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B.Tech. VI Semester (Main/Back) Examination, May/June - 2011

Mechanical Engineering

6ME3 Manufacturing Science & Technology

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 24

Instructions to Candidates:

*Attempt any **five questions,** selecting **one question** from **each unit**. All questions carry **equal marks**. (Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)*

Unit - I

1. a) What is jig and fixture? Define. Explain various design principles applicable for welding fixtures. **(8)**

   b) What do you mean by indexing? Explain various indexing jigs and fixtures with neat and clean diagrams. **(8)**

OR

   a) Explain the design principles common to jigs and fixtures. **(8)**

   b) Explain various types of milling fixtures with figures. **(8)**

Unit - II

2. a) Give the complete classification of Newer machining methods. Explain electric discharge machining with advantages and disadvantages. **(8)**

   b) Explain the electron beam machining in detail. What are the limitations of EBM? **(8)**

OR

   a) What is abrasive jet machining? Explain the mechanics of AJM and effects of nozzle tip distance on shape and size of cut. **(8)**

   b) Explain laser beam machining with figures. What are the advantages and limitations of LBM? **(8)**

Unit - III

3. a) What is principle of working of auto-collimator? Explain the working of auto-collimator in detail with suitable diagrams. **(8)**

   b) What is comparator? Explain an electrical comparator with diagram. **(8)**

OR

   a) What are various elements of screw threads? Explain the pitch measurement of the screw threads. **(8)**

   b) Explain various elements of surface roughness. What is surface gauge? Define. Explain the use of surface gauge with suitable diagrams. **(8)**

Unit - IV

4. a) What is the difference between machine tools and hand tools? Classify the cutting tools for machine tools. Explain the single point cutting tool in detail. **(8)**

   b) Explain the Ernst - merchant theory on mechanics of metal cutting and write the assumptions made. **(8)**

OR

   a) Explain the various parts and cutting angles of a twist drill with neat sketches. **(8)**

   b) A Seamless tubing 35mm outside diameter is turned orthogonally on a lathe. The following data available; rake angle = 35°, cutting speed = 15 m/min, feed = 0.10 mm/rev, length of continuous chip in one revolution = 50.72 mm, cutting force = 200 kg, feed force = 80 kg. Calculate the co-efficient of friction, shear plane angle, velocity of chip along tool face and chip thickness. **(8)**

Unit - V

5. Write short notes on any **four** of the following:- **(4×4=16)**

   a) Elements of machine body design

   b) Design procedure of guide ways

   c) Materials and construction of lathe bed and guide ways.

   d) Antifriction guide ways.

   e) Various lathe bed sections and their utility.

   f) Use of reinforcing stiffener in lathe bed.
