CBCS SCHEME

Sahyadri College of Engineering & Management
CENTRAL LIBRARY
Adyar, Mangalore-7

USN

15ME45B/15MEB405

Fourth Semester B.E. Degree Examination, Aug./Sept.2020
Machine Tools and Operations

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. Define Machine tool. Give classification of machine tool with example. **(08 Marks)**
b. Mention the specification of lathe with a neat sketch. **(08 Marks)**

OR

2 a. Explain with neat sketch working principle of column and knee type milling machine. **(08 Marks)**
b. Explain the constructional feature of horizontal surface grinding machine with a neat sketch. **(08 Marks)**

Module-2

3 a. What are the types of motion in machining? Explain. **(02 Marks)**
b. With neat sketch, explain the following operations:
i) Turing ii) Boring iii) Slotting. **(09 Marks)**
c. Define machining and classify metal removal process with example. **(05 Marks)**

OR

4 a. List the machining process on Drilling machine. Explain with suitable sketch the following operations: i) Drilling ii) Reaming iii) Counter sinking. **(10 Marks)**
b. Discuss the related machining parameters. **(06 Marks)**

Module-3

5 a. Briefly explain the desirable properties of cutting tool material. **(06 Marks)**
b. With neat sketch, explain single point cutting tool Nomenclature. **(08 Marks)**
c. List the types of cutting tool materials. **(02 Marks)**

OR

6 a. With neat sketch explain cutting tool geometry. **(08 Marks)**
b. What are the functions of a cutting fluid? **(04 Marks)**
c. A workpiece of diameter 38mm and length 400mm was turned on a lathe using a suitable cutting tool. Determine the machining time to reduce the workpiece to 36.5mm diameter in one pass with cutting speed of 300mpm and feed 0.7mm/rev. **(04 Marks)**

Module-4

7 a. Explain the difference between orthogonal cutting and obligue cutting. **(04 Marks)**
b. Briefly explain the mechanism and types of chip formation. **(06 Marks)**
c. A seamless tubing 35mm outside diameter is turned orthogonally on a lathe. The following data is available rake angle = 35°, Current speed = 15m/min, Feed = 0.10mm/rev, Length of continuous chip in one revolution = 50.72mm, Cutting force = 200N, Feed force = 80N. Calculate the coefficient of friction shear plane angle and chip thickness. **(06 Marks)**

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OR

8 a. Derive an expression for shear plane angle with respect to orthogonal cutting. **(08 Marks)**

b. A twist drill of 32mm diameter is used to drill a hole in a mild steel plate. The vertical cutting force is 60kg cutting force at the lips 36kg. Feed rate 0.6mm/rev and speed of drill 50rpm. Taking constant C for mild steel as 0.36 and neglecting the effect of friction. Calculate the trust force and torque acting on the drill and also power required for drilling. **(08 Marks)**

Module-5

9 a. What are the reasons for tool failure? **(06 Marks)**

b. Write short notes on Taylor's tool life equation. **(04 Marks)**

c. A tool type of 80minutes is obtained at a speed of 30mpm and 8 minutes at 60mpm. Determine the tool life equation and cutting speed for 4min tool life. **(06 Marks)**

OR

10 a. What is Machinability? Explain various criteria for determining Machinability. **(06 Marks)**

b. What are the various costs associated in manufacturing a component? **(06 Marks)**

c. Calculate the optimum cutting speed and tool life for based on minimum cost criteria for the available data machine operating cost 40paise/min cost of tool change Rs.10 cutting speed 35mpm tool life 60 minutes index of Taylor's tool life equation = 0.22. **(04 Marks)**

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