Hall Ticket No | | | | | | | | | | | Question Paper Code: AMEB16

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

MODEL QUESTION PAPER-II

B.Tech V Semester End Examinations, November 2020

Regulations: IARE - R18

MANUFACTURING TECHNOLOGY

MECHANICAL ENGINEERING

Time: 3 hour Maximum Marks: 70

Answer ONE Question from each MODULE
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

MODULE-I

1. (a) Explain briefly about formation of chip with built up edge and its disadvantages. [**7m**]

   (b) In an Orthogonal turning operation, cutting speed is 80 m/min, cutting force 20kg, feed force 8 kg, back rake angle 150, feed 0.2 mm/rev and chip thickness 0.4mm. Determine the following (i) shear angle (ii) Work done in shear (iii) Shear strain [**7m**]

2. (a) Explain various cutting tool materials, also List the properties of cutting tool materials. [**7m**]

   (b) An HSS tool is used for turning operation. The tool life is 1 hr. When turning is carried at 30m/min. The tool life will be reduced to 2.0 min if the cutting speed is double. Find the suitable speed in RPM for turning 300 mm diameter so that life is 30 min. [**7m**]

MODULE-II

3. (a) What are the different types of operations done on a central lathe? [**7m**]

   (b) Estimate the machine time to turn a MS bar of 30mm diameter down to 25mm for a length of 100mm in a single cut. Assume cutting as 30 m/min and feed as 0.4 mm/rev. [**7m**]

4. (a) Explain with a diagram of whit worth quick return mechanism used in a slotting machine? [**7m**]

   (b) Differentiate between a planning and shaping machine. [**7m**]

MODULE-III

5. (a) Explain with a neat sketch the nomenclature of a milling cutter and label the required units. [**7m**]

   (b) What is indexing? Discuss any two types of indexing methods used in milling. [**7m**]

6. (a) Name various work holding devices of drilling machine. Describe one with neat sketch. [**7m**]

   (b) Find the time required to drill 4 holes in a CI flange of 20mm depth, if the hole diameter is 20mm. Assume cutting speed as 21.9 m/min and feed as 0.02 cm/rev.diameter is 30mm. Assume cutting speed as 24.9 m/min and feed as.06 cm/rev. [**7m**]

MODULE-IV

7. (a) Distinguish between measuring instrument and a gauge. [**7m**]

   (b) Between mating parts of 100mm basic size, the actual interference fit is to be from 0.05mm to 0.12mm. tolerance for the hole is the same as the tolerance for the shaft. Find the size of both the shaft and the hole on a) hole basis unilateral system and b) shaft basis unilateral system [**7m**]

8. (a) Explain the use of sine bar for measuring angle of a taper plug gauges with the help of neat diagrams [**7m**]

   (b) Calculate the cone angle of the taper plug gauge from the following data: Height of slip gauges, $h_1 = 50.667, h_2 = 38.667$ Length of sine bar $= 125mm$. [**7m**]

MODULE-V

9. (a) Explain the working principal and applications of Tools makers microscope. [**7m**]

   (b) It is not possible to produce perfectly smooth surface. Justify the statement. [**7m**]

10. (a) Explain any one method of measuring effective diameter of internal threads. [**7m**]

    (b) How Tomlinson surface recorded and Talysurf machine work? What are their relative merits? [**7m**]

****END OF EXAMINATION****

COURSE OBJECTIVES:

The course should enable the students to:

1	The fundamental concepts of the metal cutting principles to study the behavior of various machining processes.
2	The importance of tool materials, cutting parameters, cutting fluids and tool wear mechanisms for optimized machining
3	The principles of linear and angular measuring instruments for accurate measurement of a given component.
4	The mechanics of machining process and optimization of various significant parameters in order to yield the optimum machining.

COURSE OUTCOMES:

After successful completion of the course, students should be able to:

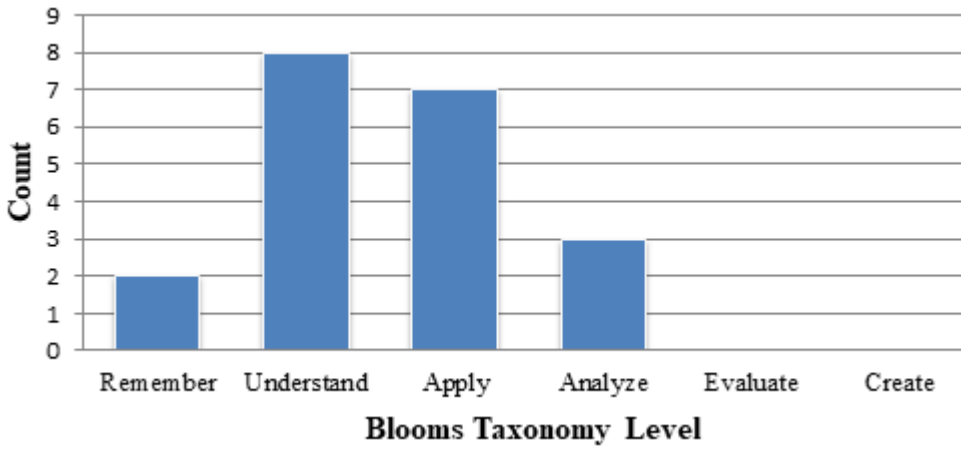
CO 1	Recognize the importance of geometry of cutting tools, coolants and tool materials for the analysis of material behavior during manufacturing processes.
CO 2	Illustrate mechanism of orthogonal and oblique cutting along with developed cutting forces.
CO 3	Explain the chip formation mechanism by measuring the cutting forces during the chip formation process.
CO 4	Apply the operational principles of different lathe machines and various reciprocating machines for quality machining.
CO 5	Select a machining operation, corresponding machine tool for a specific application in real time.
CO 6	Identify most significant process parameters in machine tool for optimal machining.
CO 7	Explain the working principles of Milling, drilling and surface grinding machines for manufacturing the components of their requirement.
CO 8	Estimate machining times for machining operations at specified levels of cutting parameters of machine tools.
CO 9	Apply the principles of limits, fits and tolerance while designing and manufacturing the components of their requirement
CO 10	Choose an appropriate measuring instrument for accurate inspection of the dimensional and geometric features of a given component.
CO 11	Apply various methods for the measurements of screw threads, surface roughness parameters and the working of optical measuring instruments.
CO 12	Analyze the results of various measuring systems and instruments for motion and dimensional measurements

MAPPING OF SEMESTER END EXAMINATION QUESTIONS TO COURSE OUTCOMES

Q.No		All Questions carry equal marks	Taxonomy	CO's	PO's
1	a	Explain briefly about formation of chip with built up edge and its disadvantages.	Understand	CO 3	PO 1
	b	In an Orthogonal turning operation, cutting speed is 80 m/min, cutting force 20kg, feed force 8 kg, back rake angle 150, feed 0.2 mm/rev and chip thickness 0.4mm. Determine the following (i) shear angle (ii) Work done in shear (iii) Shear strain	Apply	CO 2	PO 1,2
2	a	Explain various cutting tool materials, also List the properties of cutting tool materials.	Understand	CO 1	PO 1
	b	An HSS tool is used for turning operation. The tool life is 1 hr. When turning is carried at 30m/min. The tool life will be reduced to 2.0 min if the cutting speed is double. Find the suitable speed in RPM for turning 300 mm diameter so that life is 30 min.	Apply	CO 1	PO 1,2
3	a	What are the different types of operations done on a central lathe?	Remember	CO 4	PO 1
	b	Estimate the machine time to turn a MS bar of 30mm diameter down to 25mm for a length of 100mm in a single cut. Assume cutting as 30 m/min and feed as 0.4 mm/rev.	Apply	CO 8	PO 1,2
4	a	Explain with a diagram of whit worth quick return mechanism used in a slotting machine?	Understand	CO 4	PO 1
	b	Differentiate between a planning and shaping machine.	Analyze	CO 4	PO 1,2
5	a	Explain with a neat sketch the nomenclature of a milling cutter and label the required units.	Understand	CO 7	PO 1
	b	What is indexing? Discuss any two types of indexing methods used in milling.	Understand	CO 7	PO 1
6	a	Name various work holding devices of drilling machine. Describe one with neat sketch.	Remember	CO 7	PO 1,2
	b	Find the time required to drill 4 holes in a CI flange of 20mm depth, if the hole diameter is 20mm. Assume cutting speed as 21.9 m/min and feed as 0.02 cm/rev.diameter is 30mm. Assume cutting speed as 24.9 m/min and feed as.06 cm/rev.	Apply	CO 8	PO 1,2

7	a	Distinguish between measuring instrument and a gauge.	Analyze	CO 10	PO 1,2
	b	Between mating parts of 100mm basic size, the actual interference fit is to be from 0.05mm to 0.12mm. tolerance for the hole is the same as the tolerance for the shaft. Find the size of both the shaft and the hole on a) hole basis unilateral system and b) shaft basis unilateral system	Apply	CO 9	PO 1,2
8	a	Explain the use of sine bar for measuring angle of a taper plug gauges with the help of neat diagrams	Understand	CO 10	PO 1
	b	Calculate the cone angle of the taper plug gauge from the following data: Height of slip gauges, $h_1 = 50.667, h_2 = 38.667$ Length of sine bar $= 125mm$.	Apply	CO 9	PO 1
9	a	Explain the working principal and applications of Tools makers microscope.	Understand	CO 11	PO 1
	b	It is not possible to produce perfectly smooth surface. Justify the statement.	Analyze	CO 12	PO 1,2
10	a	Explain any one method of measuring effective diameter of internal threads.	Understand	CO 11	PO 1,2
	b	How Tomlinson surface recorded and Talysurf machine work? What are their relative merits?	Apply	CO 12	PO 1,2

KNOWLEDGE COMPETENCY LEVELS OF MODEL QUESTION PAPER



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Signature of Course Coordinator **HOD, ME**
Dr. K CH Apparao, Associate Professor