

29/6/2016

4E4142

Roll No. _____

Total No of Pages: **3**

4E4142

B.Tech. IV-Sem (Main & Back) Exam; June-July 2016

Automobile Engineering

4AE3A Machining & Machine Tools

AE, ME

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks (Main & Back): 26

Min. Passing Marks (Old Back): 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 suitably be assumed and stated clearly.*

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.

(Mentioned in form No.205)

1. _____

2. _____

UNIT-I

- Q.1 (a) Classified the metal removal processes. Sketch a single point cutting tool and explain the complete geometry of it. [8]
- (b) Identify the forces involved in a cutting operation. Show them on merchant circle diagram. Which force contributes to the power required? [8]

OR

- Q.1 (a) Explain the various types of Chips. [4]
- (b) Differentiate orthogonal cutting and oblique cutting. In an orthogonal cutting process, the following observations were made: Depth of cut = 0.25mm, width of cut = 4mm, chip thickness ratio = 0.45, cutting velocity = 40m/min. Cutting

force = 1150N, thrust force = 140N, rake angle = 10°. Determine Shear plane angle, friction angle and resultant force and force component parallel to shear plane. Also calculate power consumed during the cutting operations. [12]

UNIT-II

- Q.2 (a) What is machinability index? What are the parameters which affects machinability. [6]
- (b) Discuss the different mechanism of tool wear in machining. [6]
- (c) Mention the requirement of cutting fluids. [4]

OR

- Q.2 (a) Explain Taylor's tool life equation. A generalized Taylor's tool life equation was obtained for HSS tool;

$$V = \frac{C}{T^{0.13} f^{0.6} d^{0.3}}$$

A 60 min tool life was obtained using the following parameters $V = 40\text{m/min}$, $f = 0.25\text{ mm/rev}$, $d = 2\text{mm}$. Compute the tool life if cutting speed feed and depth of cut are increased by 25% individually. [10]

- (b) Explain the different types of tool materials and their applications [6]

UNIT-III

- Q.3 (a) Explain various parts of capstan & turret lathe machines. [8]
- (b) Describe the construction & working of Milling Machine. [8]

OR

- Q.3 (a) What is a 'Twist drill'? Make a neat sketch of a twist drill and show its different parts on it. [6]
- (b) Explain with the help of neat sketch the working principle of a shaper. [6]
- (c) Compare the merits & demerits of Broaching with other machining operations. [4]

UNIT-IV

- Q.4 (a) What materials are used in manufacturing of grinding wheels? What properties they impart to the wheel? [6]
- (b) Mention the marking system of grinding wheel having the specification: A60 K 5 V 18. [6]
- (c) Differentiate Honing Process and super finishing operation. [4]

OR

- Q.4 (a) What are the different methods of thread manufacturing? Explain any two methods. [4]
- (b) Write short notes of following [12]
- (i) Honing
 - (ii) Lapping
 - (iii) Polishing
 - (iv) Buffing

UNIT-V

- Q.5 (a) Elaborate the various gear finishing methods. [8]
- (b) Explain 'Gear hobbing process'. Also mention advantages and limitations of it. [8]

OR

- Q.5 (a) Differentiate gear generation method and gear forming method. Explain gear shaping process. [8]
- (b) What are the different high velocity methods? Explain any two methods. [8]
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