Code No: R1931244   R19   SET - 1

III B. Tech I Semester Regular Examinations, February-2022
MACHINE TOOLS AND METROLOGY
(Automobile Engineering)

Time: 3 hours   Max. Marks: 75

Answer any **FIVE** Questions **ONE** Question from **Each unit**
All Questions Carry Equal Marks
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UNIT-I

1. a) Classify the chips formed in metal cutting. What factors are responsible for formation of different chips? [8M]
   b) In an orthogonal turning of a mild steel bar of 60 mm diameter on a lathe a feed of 0.8 mm was used. A continuous chip of 1.4 mm thickness was removed at a rotational speed of 80 rpm of work. Calculate the chip thickness ratio, chip reduction ratio and total length of the chip removed in one minute. [7M]

(OR)

2. a) Briefly discuss about geometry of single point cutting tool? Also, explain the following (i) rake angle (ii) Clearance angle (iii) cutting angle and (iv) lip angle with neat sketch. [9M]
   b) Explain Taylor's Tool life equation. [6M]

UNIT-II

3. a) Differentiate between Capstan and Turret lathe. [8M]
   b) What are the various attachments and accessories for the lathe? Briefly mention the importance of each one of them. [7M]

(OR)

4. a) List out different methods of taper turning in a lathe, and explain any one of them with a suitable diagram. [8M]
   b) Explain the working principle of engine lathe. [7M]

UNIT-III

5. a) What is grinding operation? Give the classification of grinding machines. [8M]
   b) With help of neat block diagram describe the main parts and working of the Jig boring machine. [7M]

(OR)

6. a) Write a short notes on lip, helix and rake angles in drilling. [8M]
   b) How is grinding different from other machining operations? Explain its applications in view of its capabilities. [7M]
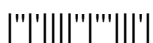
UNIT-IV

7. a) Explain hole-basis system and shaft-basis system. [8M]
    b) Briefly give a note on plug and ring gauges. [7M]

(OR)

8. a) What are slip gauges? What are their uses? [8M]

    b) Determine and sketch the limits of tolerance and allowance for a 50mm shaft and hole pair designated H_7-d_8. The basic size lies in the range of 30-50 mm. The multipliers for grades 7 and 8 are 16 and 25 respectively. The fundamental deviation for 'd' shaft is $(-16 D^{0.44})$ microns. [7M]

UNIT-V

9. a) Distinguish between mechanical comparator and electrical comparator. [8M]
    b) Describe with a neat sketch the principle of working of tool maker's microscope? State the applications of this instrument. [7M]

(OR)

10. a) Explain in brief the construction and working of a pneumatic comparator with the help of a neat sketch. [8M]
    b) What are the differences between surface roughness and surface waviness? Explain. [7M]

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