A   Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code: R4703

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2025

Fourth Semester

Mechanical Engineering

R21UME403 – MANUFACTURING TECHNOLOGY

(Regulations R2021)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Oblique cutting is ___ dimensional metal cutting   CO1- U

   (a) one   (b) two   (c) three   (d) none of the above

2. Following is (are) types of single point cutting tool(s)   CO1- U

   (a) solid type   (b) tipped type

   (c) indexable insert type   (d) all of the above

3. Knurling operation in a lathe is used for producing   CO1- U

   (a) A plane surface   (b) A cylindrical surface

   (c) A serrated surface   (d) A tapered surface

4. The preferred option for holding an odd work piece in a centre lathe is

   (a) live and dead centres   (b) four jaw chuck

   (c) lathe dog   (d) three jaw chuck

5. The standard clamping devices in planer machine is (are)   CO1- U

   (a) planer jack   (b) angle plate   (c) T. holders   (d) all of the above

6. Which of the following shapes can be machined by broaching?   CO1- U

   (a) the shaft of gears   (b) grooved components

   (c) flat surfaces   (d) all of the above

7. Cutting tool in a milling machine is fitted on   CO1- U

   (a) Spindle   (b) Knee   (c) Column   (d) Arbor

8. Numerical control is   CO2- U

    (a) Used only for milling operations

    (b) used to produce exact number of parts per hour

    (c) control by means of set of instructions

    (d) only used for lathe operations

9. Non-Traditional machining can also be called as?   CO2- U

    (a) Contact Machining   (b) Non-Contact Machining

    (c) Half contact machining   (d) Partial contact machining

10. The effect of using a glazed or loaded wheel is   CO2- U

    (a) more heat generation

    (b) poor surface finish

    (c) excessive cutting pressure between wheel face and work surface

    (d) All of the above

<div align="center">PART – B (5 x 2= 10 Marks)</div>

11. Explain tool wear and tool life.   CO1- U

12. Illustrate the specification of lathe.   CO1- U

13. Differentiate jig and fixture   CO1- U

14. Describe the classifications of NC machines   CO1- U

15. Describe a situation where laser beam machining would be the preferred   CO1- U
    method for machining a workpiece.

<div align="center">PART – C (5 x 16= 80 Marks)</div>

16. (a) The Taylor tool-life equation for machining C-40 steel with a   CO4 - App   (16)
         18:4:1 H.S.S cutting tool at a feed of 0.2 mm/min and a depth of
         cut of 2 mm is given by $VT^n = C$, where n and C are constants.
         The following V and T observations have been noted.

V_1 m/min	25	35
T_1 min	90	20

         Calculate:
         (i) n and C;
         (ii) Hence recommends the cutting speed for a desired tool
         life of 60 minutes.

<div align="center">2</div>

R4703

(b) The following equation for tool life was obtained for HSS tool $VT^{0.13} f^{0.13} d^{0.3} = C$.   CO1 - U   (16)
A 60 min tool life was obtained using the following cutting condition. Cutting peed (V) = 40 m/min; feed (f) = 0.25 mm, depth of cut (d) = 2 mm.
Calculate the effect of tool life if speed (V), feed (f) , and depth of cut (d) are together increased by 25 % and also if they are increased individually by 25 %.

17. (a) Explain with a neat sketches various types operations performed in lathe.   CO1 - U   (16)

(b) Explain the turret indexing mechanism used in semi-automatic lathe with neat sketch.   CO1 - U   (16)

18. (a) Explain the automatic feed mechanism used in shaper with neat diagram.   CO1 - U   (16)

(b) With the aid of neat sketches, describe the following machining operations related to drilling: CO1 - U   (16)
   (i) reaming
   (ii) tapping
   (iii) counter boring
   (iv) countersinking

19. (a) With a neat sketch explain the column and knee type vertical milling machine and name its main parts.   CO1 - U   (16)

(b) Write the part program for the lathe operation for the following job   CO2 - U   (16)
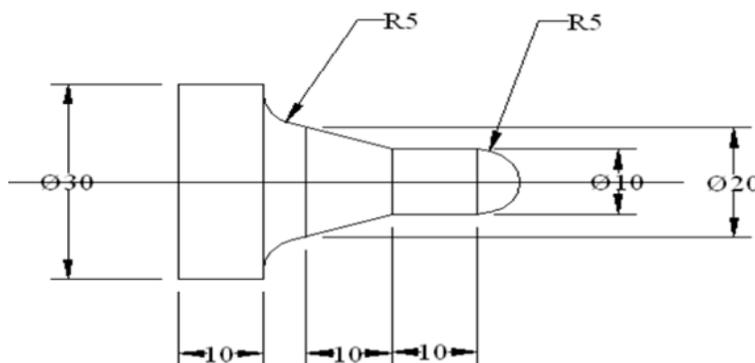
All dimensions are in mm

R4703

20. (a) Explain the with neat sketch of surface grinding machines   CO2 - U   (16)

(b) Explain the working principles, applications of laser beam   CO2 - U   (16) machining with a neat sketch.

R4703