

This question paper contains 5 printed pages.]

Your Roll No.

8466

A

B. Tech. (M)/IV

Paper EME-403

PRODUCTION TECHNOLOGY-II

Time : 3 Hours

Maximum Marks : 70

*(Write your Roll No. on the top immediately
on receipt of this question paper.)*

*Attempt five full questions, selecting at least two
full questions each from Part A and Part B.*

Assume missing data, if any.

PART-A

1. (a) Derive expressions for finding out mean shear stress, mean normal stress, and shear strain experienced by a chip during orthogonal cutting operation. 6
- (b) In an orthogonal turning of a 50 mm diameter mild steel bar on a lathe, the following data were obtained :
Rake angle = 15°
Cutting speed = 100 m/min
Feed = 0.2 mm/rev

[P.T.O.]

Cutting force = 1800 N

Feed force = 600 N

Chip thickness = 0.3 mm

Calculate :

- (a) Shear plane angle
- (b) Co-efficient of friction
- (c) Cutting power
- (d) Chip flow velocity

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2. (a) What are the common mechanisms causing wear on cutting tools ? Explain briefly. Also discuss crater wear and flank wear.

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- (b) The following data were recorded while turning a workpiece on a centre lathe :

Cutting Speed = 25 m/min

Feed = 0.3 mm/rev

Depth of cut = 2.0 mm

Tool life = 100 min

Tool life equation = $VT^{0.12}f^{0.7}d^{0.3} = C$

If the cutting speed, feed and depth of cut are increased by 25% each individually and also collectively, what will be their effect on the tool life ?

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3. (a) With the help of a suitable diagram, explain the working of a turret indexing and stop drum mechanisms used on a turret lathe. 7
- (b) Describe with neat sketches the following attachments used on turret and capstan lathes
- (a) Combined bar stop and centring tool
- (b) Slide tool holder 7
4. (a) Distinguish between alignment test and performance test of a machine tool. Also discuss with neat sketches how you would test the following for an engine lathe.
- (a) Spindle taper bore run out
- (b) Parallelism of tail stock sleeve to saddle movement 7
- (b) A machine tool possesses 5 spindle speeds in G.P. series. It is to work on a material at 24 m/min. If the spindle accommodates cutters ranging from 15 mm to 50 mm diameter, find out the spindle speeds. 7

PART-B

5. (a) Explain the concept of location. Discuss at least 6 principles to be considered while placing locators in different planes of a part. 7
- (b) What are jig bushes ? Briefly describe the following with neat sketches.
- (a) Spring type jack pin
- (b) Swinging leaf type jig 7

6. (a) How are fits classified ? Briefly explain different types of fits with suitable examples. 4
- (b) Determine the actual dimensions to be provided for a shaft and a hole of 25 mm size for H_7/f_8 fit. Size 25 mm falls in diameter steps of 18 and 30.
- Value of tolerance unit $i = 0.45 \sqrt[3]{D} + 0.001D$.
- Value of tolerance for IT7 and IT8 are $16i$ and $25i$ and value of fundamental deviation for f type shaft is $-5.5D^{0.41}$
- Also design the GO and NO-GO gauges as per the present British System. 10
7. (a) What are the 'Line Standards' and 'End Standards' ? How do they differ ? Compare their merits and demerits. 4
- (b) Select the sizes of angle gauges required to build the following angles :
- (a) $32^\circ 49' 24''$
- (b) $52^\circ 11' 21''$ 4

The slip gauge set M 38 consists of the following :

Range	Steps	Pieces
1.005	---	1
1.01-1.09	0.01	9
1.1-1.9	0.1	9
1.0-9.0	1.0	9
10.0-100	10	10

Choose the suitable slip gauges to give the following dimensions.

(a) 29.975 mm

(b) 16.07 mm

(c) 101.005 mm

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8. Write short notes on any *four*.

(a) Screw thread nomenclature

(b) Parkinson gear tester

(c) Wavelength standard

(d) Interferometry

(e) Up milling and Down milling

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