

Code No: 09A51404

R09

SET-1

B. Tech III Year I Semester Examinations, December-2011

MACHINE TOOLS

(MECHANICAL ENGINEERING(MECHATRONICS))

Time: 3 hours

Max. Marks: 75

Answer any five questions

All questions carry equal marks

1. Explain about Discontinuous chip, Continuous chip, and continuous chip with built up edge? Explain the conditions favoring their formation. [15]
- 2.a) Discuss about tool holders of lathe machine.
b) List and describe commonly used attachments on lathe with suitable sketches. [7+8]
3. What is indexing? Explain some common methods of indexing in milling machines? [15]
4. Explain the theory of grinding. What is the principle of metal removal? Discuss the elements of grinding. [15]
- 5.a) What is a deviation? Explain its importance in the system of limits.
b) Explain the disadvantages associated with trail and error method of assembly. [7+8]
- 6.a) Write a detailed note on the manufacture of slip gauges.
b) Explain the different methods of getting magnification in dial indicators. [7+8]
- 7.a) What is a straight edge? Explain how it can be used to test straightness?
b) Explain the importance of sampling length in surface roughness measurement? [7+8]
- 8.a) Sketch and explain Taylor-Hobson Talysurf surface roughness measuring instrument?
b) The heights of peak and valleys of 22 Successive points on a surface are 32, 28, 41, 24, 35, 19, 31, 21, 40, 18, 44, 24, 41, 25, 40, 26,35,18, 40, 18, 39, 21 microns respectively, measured over a length of 20mm. Determine CLA and RMS values of roughness surface? [7+8]

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SET-2

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MACHINE TOOLS

(MECHANICAL ENGINEERING(MECHATRONICS))

Time: 3 hours

Max. Marks: 75

Answer any five questions

All questions carry equal marks

1. Define the various tool parts of a single point cutting tool. What are the standard angles of cutting tool? Describe them with neat sketches. [15]
- 2.a) Differentiate between capstan lathe, Turret lathe and Engine lathe.
b) How do you classify automatic machines? Briefly explain about turret lathe. [7+8]
3. Make a neat sketch of universal milling machine indicating the various controls and constructional features. Give brief description. [15]
4. Discuss the selection of grinding wheel according to I.S. specification and specify the precautions to be taken before mounting of grinding wheel. [15]
5. Give the complete classification of clearance fit. Explain them with the help of suitable examples. [15]
6. A hole and shaft system had the following dimensions:
60 H 8 / c 8
The multiplier of grade 8 is 25. The fundamental deviation for 'C' shaft is $-(9.5 + 0.8 D)$. The diameter slip is $50 - 80$. Design the suitable 'GO' and 'NO-GO' gauges for shaft and hole. [15]
- 7.a) Describe a method to find out the flatness of surface plate?
b) Discuss the method of testing the straightness by spirit level and auto collimator? [7+8]
- 8.a) With the help of a neat diagram explain the components of a surface texture?
b) Discuss what you understand by the following terms in connection with surface finish measurement:
i) Waviness ii) Lay iii) Envelope method iv) Crest line method. [7+8]

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SET-3

B. Tech III Year I Semester Examinations, December-2011

MACHINE TOOLS

(MECHANICAL ENGINEERING(MECHATRONICS))

Time: 3 hours

Max. Marks: 75

Answer any five questions

All questions carry equal marks

- 1.a) Show with a neat sketch the forces acting on a chip in orthogonal machining. Derive an expression to calculate the coefficient of friction between tool chip interfaces.
- b) During an orthogonal machining operation on mild steel, the results obtained are: uncut chip thickness=0.285mm, chip thickness=0.65mm, width of the cut=2.5mm, rake angle= 0° , horizontal cutting force=800N, thrust force=400N. Compute the coefficient of friction between the tool and chip interface. Determine also the ultimate shear stress of the work material. [7+8]
2. With the help of neat sketches explain the different work holding methods of jobs on turret lathe. [15]
3. What is a milling machine? How do you classify the milling machine? Give the working principle of milling machine with a neat sketch? Mention the size and specification of milling machine? [15]
4. Make a comparison of grinding machine with lapping, honing and broaching machines with regard to the construction, working and applications. [15]
- 5.a) A hole and shaft pair has a basic of size 25mm and are to have a clearance fit with maximum clearance of 0.02mm and a minimum clearance of 0.01mm. The hole tolerance is to be 1.5 times the shaft tolerance. Determine limits for both hole and shaft (i) using a hole basis system (ii) using a shaft basis system.
- b) What are the advantages of interchangeable assembly? [8+7]
- 6.a) Sketch and discuss the features of various snap gauges.
- b) Explain the constructional features of an inside micrometer. [8+7]
7. Explain the working principle of tool maker's microscope. What are the uses and specific applications of tool maker's microscope? Explain? [15]
- 8.a) Calculate the R_a value of a surface for which the sampling length was 8.0mm, the graph was drawn to a vertical magnification of 1000 and the areas above and below the datum line were
Above: 180 90 155 55mm^2
Below: 70 90 170 150mm^2
- b) What are roughness comparison specimens and how they assess surface roughness? What are the limitations? [8+7]

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SET-4

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MACHINE TOOLS

(MECHANICAL ENGINEERING(MECHATRONICS))

Time: 3 hours

Max. Marks: 75

Answer any five questions

All questions carry equal marks

- 1.a) For a single point tool the following angles are given in degrees: front relief angle= 5° , side relief angle= 6° , back rake angle= 9° , side rake angle= 14° , end cutting edge angle= 12° , side cutting edge angle= 0° , nose radius =2mm, determine lip angle, cutting angle, nose radius?
- b) Explain about Ceramics, Diamonds, and cemented carbides tool material in detail. [8+7]
- 2.a) Make a comparative analysis of various tool holders of lathe machine.
- b) Draw and explain the features of locating elements of lathe machine. [7+8]
3. Differentiate between shaping, planning and slotting machines with regard to construction, working, application, advantages and disadvantages. [15]
- 4.a) What are different working motions of a honing tool? Give the kinematic scheme to obtain them.
- b) Explain the constructional features of speed and feed units of lapping tool. [7+8]
- 5.a) Calculate the fundamental deviation and tolerances and hence the limit of size for shaft and hole for the fit designated as 60 mm H8- f7. The diameter steps are 50 mm and 80 mm
- b) Why is it impossible to obtain an exact dimension on manufactured component. [7+8]
- 6.a) Discuss Taylors principle of gauge design.
- b) Explain how slip gauges can be calibrated by brook level comparator. [7+8]
7. What is optical flat? Explain its construction, working principle. What are its uses? [15]
- 8.a) In the measurement of surface roughness, heights of 10 successive peaks and valleys were measured from a datum as follows:
- | | | | | | |
|----------|----|----|----|----|--------------------|
| Peaks: | 45 | 42 | 40 | 35 | 35 μm |
| Valleys: | 30 | 25 | 25 | 24 | 18 μm . |
- Determine the R_z value of the surface.
- b) Write short note on grades for specifying the surface texture. [7+8]

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