Code : 021514

B.Tech 5th Semester Examination, 2016

Machine Tools and Machining

Time : 3 hours *Full Marks : 70*

Instructions :

(i) The marks are indicated in the right-hand margin.

(ii) There are Nine questions in this paper.

(iii) Attempt five questions in all.

*(iii) **Question No. 1 is Compulsory.***

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1. Choose the correct/best answer from the following (any seven): 7×2=14

(a) A left hand tool on a lathe cuts most efficiently when:

(i) It travels from right to left

(ii) It travels from left to right

(iii) It travels across the bed

(iv) It is operated by compound slide

(v) It is connected with automatic feed

(b) The process or removing metal by a cutter which is rotated in the same direction of travel of workpiece, is called:

(i) Up milling

(ii) Down milling

(iii) Face milling

(iv) End milling

(c) Lapping is an operation of :

(i) Making a cone-shaped enlargement of the end of a hole

(ii) Smoothing and squaring the surface around a hole

(iii) Sizing and finishing a small diameter hole

(iv) Producing a hole by removing metal along the circumference of a hollow cutting tool

(d) In oblique cutting system, the cutting edge of the tool:

(i) May clear the width of the workpiece

(ii) May or may not clear the width of the workpiece

(iii) Should always clear the width of the workpiece

(iv) May not clear the width of the workpiece

(e) The purpose of jigs and fixtures is to

(i) Increase machining accuracy

(ii) Facilitate interchangeability

(iii) Decrease expenditure on quality control

(iv) All of these

(f) In order to have interference fit, it is essential that the lower limit of the shaft should be :

(i) Greater than the upper limit of the hole

(ii) Lesser than the upper limit of the hole

(iii) Greater than the lower limit of the hole

(iv) Lesser than the lower limit of the hole

(g) In a single point turning operation with a cemented carbide and steel combination having a Taylor exponent of 0.25, if the cutting speed is halved, then tool life will become:

(i) Half

(ii) Two times

(iii) Eight times

(iv) Sixteen times

(h) NC contouring is an example of:

(i) Continuous path positioning

(ii) Point-to-point positioning

(iii) Absolute positioning

(iv) Incremental positioning

(i) The difference between CAD and CAM is that CAD software is directed at product design while CAM software is:

(i) concerned with management design

(ii) Concerned with production and control of tool design

(iii) designed for communication

(iv) all of the above

(j) It is required to cut screw threads of 2 mm pitch on a lathe. The lead screw has a pitch of 6 mm. If the spindle speed is 60 r.p.m., then the speed of lead screw will be:

(i) 10 r.p.m.

(ii) 20 r.p.m.

(iii) 120 r.p.m.

(iv) 180 r.p.m.

2. (a) Differentiate between orthogonal cutting and oblique cutting. 7

(b) Explain the construction and use of Merchant's circle diagram. 7

3. (a) Discuss the reasons responsible for tool failure. How it can be improved ? 7

(b) While drilling holes in steel plate by a 20 mm diameter HSS drill at a given feed, the tool life decreased from 40 min. to 24 min. when speed was raised from 250 rpm to 320 rpm. At what speed (rpm) the life of that drill under the same condition would be 30 min.? 07

4. (a) What are the difference between an automatic and a capstan lathe? Give an example of a component suitable for a capstan lathe with dimensions. 7

(b) Derive an expression for the area of cross-section of the chip in slab milling. Ignore the direction of cut. 7

5. (a) Explain briefly the construction of a radial drilling machine with emphasis on how the requisite motions are obtained. 7

(b) Compare a shaper and planer in terms of their operation and type of workpieces. 7

6. (a) Describe in detail the various arrangements of centreless grinding with neat sketches. Mention the applications in each case. 7

(b) In a metal cutting experimentation the tool life was found to vary with the cutting speed in the following manner:

Cutting speed V, m/min	Tool life, T/mm
100	120
130	50

Derive Taylor's tool life equation for this operation and estimate the tool life at a speed of 2.5 m/s. 7

7. (a) Discuss the elements of Computer Numerical Control system and also state the advantages of CNC system. 7

(b) Describe with neat sketch various steps in computer assisted part programming. 7

8. (a) What are the difference between an automatic and a capstan lathe? Give an example of a component suitable for a capstan lathe with dimensions. 7

(b) Explain the concept of post processor as used in computer assisted part programming systems such as APT. 7

9. (a) What is meant by V location ? What error is caused by improper orientation of a V locator ? 7

(b) A limit gauge is required to check the hole $50^{+0.339}$ mm (50 H8). The depth of hole is 200 mm. Design the gauge and sketch it with dimensions. 7

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