

GUJARAT TECHNOLOGICAL UNIVERSITY**BE SEM-VIII Examination May 2012****Subject code: 181903****Subject Name: Production Technology****Date: 14/05/2012****Time: 10.30 am – 01.00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Q.1 (a) The following observations were made during orthogonal turning of a mild steel tubing of 60 mm diameter on a lathe. **07**

- (1) Cutting speed24 m/min
- (2) Tool rake angle32°
- (3) Feed rate0.12 mm/rev
- (4) Tangential cutting force.....3000N
- (5) Feed force.....1200N
- (6) Length of continuous chip in one revolution...96 mm

Determine:

- (i) Co-efficient of friction
- (ii) Shear plane angle
- (iii) Velocity of chip tool face
- (iv) Chip thickness

(b) Compare hobbing and shaping as production methods of spur gear in large quantities with neat sketch giving expected degree of accuracy and surface finish. **07**

Q.2 (a) Describe Ultrasonic Machining (USM) process with neat sketch. Discuss how the following factors effects the material removal rate of USM. **07**

- | | |
|-----------------|-----------------------------|
| (i) Grain Size | (iv) Feed force |
| (ii) Frequency | (v) Hardness ratio |
| (iii) Amplitude | (vi) Abrasive concentration |

(b) List the various types of locating devices used for both Jigs and Fixture and Explain any three of them with neat sketch. **07**

OR

(b) Draw neat schematic diagram of a sectioned view of a blanking die and punch assembly and label on it. Explain the function of (i) Die Block (ii) Punch (iii) Knock out. **07**

Q.3 (a) Draw neat sketch of chip formation in metal cutting and derive following relation for the shear angle (ϕ) **07**

$$\phi = \tan^{-1} \left(\frac{r \cos \alpha}{1 - r \sin \alpha} \right)$$

Where r = chip thickness ratio, α = tool rake angle

(b) Discuss following thread manufacturing methods with neat sketch (i) Chasing (ii) Rolling (iii) Tapping **07**

OR

- Q.3 (a)** Draw neat sketch of single point cutting tool with label of six major angles and other terminology of it. Discuss essential characteristic and function of cutting fluids. **07**
- (b)** Enlist different types of gears and draw gear tooth terminology. **07**
With appropriate example discuss plain indexing and compound indexing methods of manufacturing a gear on milling machine.

- Q.4 (a)** Calculate the different speeds available on spindle of a lathe and show them on 1 x 2 x 3 (cross) and 1 x 2 x 3 (open) ray diagram using following data: **07**
(1) Max spindle speed RPM = 166
(2) Min spindle speed RPM = 30
(3) No of spindle speed = 6

- (b)** Describe principle of Electrical Discharge Machining (EDM) with figure and state its advantages, limitation and application. **07**

OR

- Q.4 (a)** Explain single spindle automates and transfer machines with suitable example. **07**
- (b)** How are unconventional machining methods classified? Compare LBM and EBM process with different factors which consider for classification of unconventional machining. **07**

- Q.5 (a)** Distinguish between a Jig and Fixture. Sketch different drill bushes useful in drill jigs. **07**
- (b)** Determine the material utilization factor for producing 60 mm equilateral triangle blank from a 4 mm thick. **07**
Assume bridge allowance is 1.5T and the blanks are arranged in straight line as showing in figure 1. $a = b$

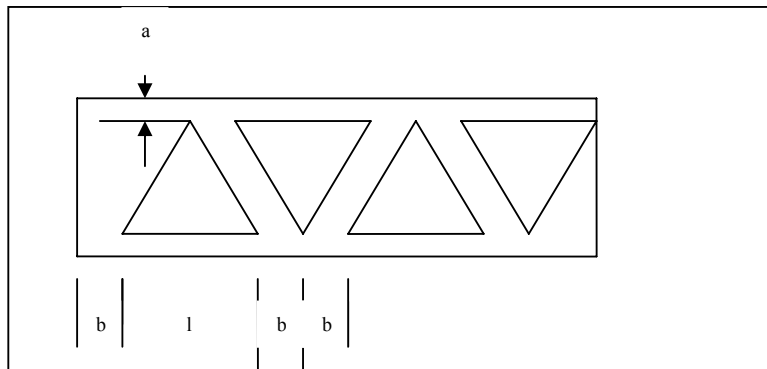


Figure 1.

OR

- Q.5 (a)** Draw and discuss following clamping devices **07**
(i) Hinged Clamp
(ii) Quick Action Nut
(iii) Hydraulic Clamp
- (b)** Differentiate Between **07**
(i) Capstan and Turret lathes
(ii) Piercing and Blanking operation
