

JK LAKSHMIPAT UNIVERSITY, JAIPUR

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Regular/Backlog), **NOV. - 2017**

B. Tech in Mechanical Engineering, Semester Vth

Roll No.....

ME508: Production Technology - II

Time: 3 hours

Max. Marks: 100

Instructions to students:

1. Do not write anything other than your roll number on question paper.
 2. Assume suitable data wherever required and mention it clearly.
 3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.
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Q.1A Objective type multiple choice questions (10 questions @ 1 mark) 10

- i. Continuous chip can form during the cutting of
 - (a) Soft material
 - (b) Hard material
 - (c) Ductile material
 - (d) Brittle material
- ii. What is the relationship between surface roughness and nose radius?
 - (a) Surface roughness is proportional to nose radius
 - (b) Surface roughness is inversely proportional to nose radius
 - (c) Surface roughness is proportional to the square of nose radius
 - (d) Surface roughness is inversely proportional to the square of nose radius.
- iii. Effect of rack angle of cutting tool on machinability
 - (a) No effect
 - (b) Increases machinability up to a certain limit
 - (c) Decrease machinability
 - (d) Very little effect on machinability
- iv. The cold working of metal is accomplished at
 - (a) Below re-crystallization temperature
 - (b) Above re-crystallization temperature
 - (c) Re-crystallization temperature
 - (d) None of the above
- v. Which of the following is not improved by cold working of metals?
 - (a) Hardness
 - (b) Toughness
 - (c) Surface finish
 - (d) Corrosion resistance
- vi. Which of the following forming operation can be performed on lathe machine?
 - (a) Spinning
 - (b) Drawing
 - (c) Coining
 - (d) Swaging
- vii. Medals and ornamental wares are made by
 - (a) Spinning
 - (b) Coining
 - (c) Embossing
 - (d) Bending
- viii. Good surface finish and better dimensional accuracy can be achieved in
 - (a) Cold working process
 - (b) Hot working process
 - (c) Warm working process
 - (d) None of the above
- ix. Which characteristic of material is used in forging process?
 - (a) Elasticity
 - (b) Ductility
 - (c) Plasticity
 - (d) None of the above

- x. In a single point turning operation, a cutting tool having a Taylor exponent of 0.5, if the Tool life is Double, then the cutting speed will become
 (a) Half (b) Double (c) $\sqrt{2}$ times (d) $1/\sqrt{2}$ times

Q.2	Short answer type questions (4 questions @ 2.5 marks)	10
(A)	Differentiate between orthogonal cutting and oblique cutting. (Any 5)	
(B)	Derive the relationship between cutting velocity, chip velocity and shear velocity.	
(C)	Derive the expression for friction force (F) in terms of cutting force (Fc) and thrust force (Ft) using merchant circle analysis.	
(D)	Calculate the indexing requirement for 188 division.	
Q.3A	Discuss the various angle involve in single point cutting tool geometry with their neat sketch (Top view, Side view, Front view).	05
Q.3B	What are the characteristics of tool material? Derive the expression for shear strain for single point cutting tool.	2.5+2.5
Q.4A	Define the tool life and derive the suitable expression for tool life valid for minimum cost per piece in single pass turning operation.	1+4
Q.4B	Derive the suitable expression of cutting force (Fc) based on merchant shear plane model following the minimum energy consumption criteria.	05
Q.5A	Differentiate between up-milling and down-milling operation. Explain their application and mention most commonly used method.	2.5+2.5
Q.5B	What are the grinding process parameter? Explain their effect on the grinding performance and wear rate.	05
Q.6A	Define the grinding? What is the need of grinding operation? How grinding is differ from other machining operation?	1+2+2
Q.6B	What is sieve number? Discuss the various types of bond material used in grinding.	1+4
OR		
Q.6B	How metal forming is differ from machining? Discuss the advantages and disadvantage of Centerless grinding in detail.	1+4
Q.7A	What is the strain rate in metal forming process? Discuss the importance of strain rate in sheet metal forming and bulk forming.	2+3
Q.7B	Discuss the working principle of lapping operation with neat sketch.	05
OR		
Q.7B	How super finishing operation is differ from grinding operation? Discuss the advantage and disadvantages of honing operation in details.	1+4
Q.8A	Explain the following forming process in detail with neat sketch. (a) Forging (b) Extrusion	5×2
Q.9A	Discuss the hot working, cold working and warm working of material in detail with neat sketch.	10

Q.9B Write short notes on following sheet metal operation

2.5×4

- (a) Shearing operation (b) Drawing operation
(c) Spinning operation (d) Stretch forming operation

OR

Q.9B Using Merchant's cutting mechanics analysis, derive a relationship between W_S and W_F in terms of rake angle, shear angle and friction angle. Where W_S is the amount of energy consumed due to shear deformation and W_F is the amount of energy consumed due to friction between chip and tool rake face.

10

$$\frac{W_F}{W_S} = \frac{\sin \beta \cdot \tan \alpha}{\cos(\phi + \beta - \alpha)}$$