

III B.Tech. I Semester Supplementary Examinations, May -2005
PRODUCTION TECHNOLOGY
(Mechanical Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Explain the importance of using metal as pattern material.
(b) Why is coarser sand is better for steel castings than fine grained sand? Why is it that as castings increase in size, it is often better to use increasingly coarser sand?
2. (a) Illustrate and describe the process of semi-centrifugal casting.
(b) How are the ingate position and size determined? Discuss.
3. (a) Classify the different regions of Oxy-acetylene flame and with the help of neat sketches explain their Characteristics?
(b) What is flux generally used in gas welding? What Characteristics are required for a flux?
4. (a) Why is cleaning of metal important for successful resistance welding? Explain.
(b) State the purpose of Thermit welding. Where would you recommend it and why?
5. (a) Explain the term HAZ in welding and its role in the success of a weldment.
(b) How is Brazing different from Welding and soldering?
6. (a) What is meant by stretch forming? Explain the process with limitation.
(b) Sketch a forming die? And discuss its features.
7. (a) Discuss the following with the help of neat sketches.
 - i. Wire drawing
 - ii. Tube drawing.
(b) Write the expression for determining the force required to produce an extrusion and discuss the effect of various parameters on the extruding force.
8. (a) Classify the hammers used in forging process and explain their applications.
(b) What are the various forging defects? Discuss briefly.

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1. (a) Explain the steps involved in making a casting.
(b) How does clay content affect the surface finish of the casting?
(c) Explain the following terms :
 - i. Parting Sand
 - ii. Fineness number.
2. (a) Discuss the shell molding with the help of neat sketch.
(b) Give the relevance of the following with reference to a casting
 - i. Sprue
 - ii. Runner
 - iii. Ingate
3. (a) Classify the different regions of Oxy-acetylene flame and with the help of neat sketches explain their Characteristics?
(b) What is flux generally used in gas welding? What Characteristics are required for a flux?
4. Explain the following types of welding techniques:
 - (a) MIG welding
 - (b) Friction welding
 - (c) Laser Beam welding.
5. (a) Explain the term HAZ in welding and its role in the success of a weldment.
(b) How is Brazing different from Welding and soldering?
6. (a) Sketch and explain a deep drawing setup and label its parts.
(b) Sketch and explain a wire drawing die.
7. (a) With the help of neat sketches briefly discuss about forward extrusion and backward extrusion.
(b) With the help of neat sketches, explain the effect of semi cone angles on extruding force and discuss the mode of flow of material.
8. (a) Describe with the help of neat sketches the following tools used in forging operation.

- i. Fullers
- ii. Tongs
- (b) Explain the reasons for the following forging defects and their remedies
 - i. Dimensional discrepancies
 - ii. Decarburization
 - iii. Under filling
 - iv. Cracks.

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1. (a) Explain the working principle of crucible furnace. Discuss pit crucible furnace.
(b) Give reasons for the occurrence of the following casting defects:
 - i. Pin hole porosity
 - ii. Run out
 - iii. Drop
 - iv. Metal penetration
2. (a) Sketch and explain the constructional and operation of hot chamber die casting machine.
(b) Calculate the size of a cylindrical riser (Height and diameter equal) necessary to feed a steel slab casting $25 \times 25 \times 5$ cm with a side riser, casting poured horizontally into the mould. Use Chapeau's equation and take constants in Chapeau's equation as: $a = 0.1$, $b = 0.03$ and $C = 1.0$.
3. (a) Classify the different regions of Oxy-acetylene flame and with the help of neat sketches explain their Characteristics?
(b) What is flux generally used in gas welding? What Characteristics are required for a flux?
4. (a) Why is cleaning of metal important for successful resistance welding? Explain.
(b) State the purpose of Thermit welding. Where would you recommend it and why?
5. (a) List out the weld defects and provide sketches where necessary.
(b) Describe the following metal joining techniques:
 - i. Dip brazing
 - ii. Wave soldering.
6. (a) List the characteristics of sheet metals that are important in sheet forming operation.
(b) Classify the sheet metal operations based on stresses induced.
7. (a) What are the various equipment used in extrusion of metals? Briefly describe them.
(b) What are the various methods of making seamless pipes? Discuss any two methods in brief.

8. (a) Explain the various forging operations.
(b) Describe the process of making hexagonal bolt in drop forging.

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(b) Give reasons for the occurrence of the following casting defects:
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2. (a) What are the typical situations in which the following casting processes are used?
 - i. Precision Investment casting
 - ii. True centrifugal casting
 - iii. Pressure die casting
 - iv. Shell moulding
(b) Why pouring basin is required in gating system? Discuss different types of Pouring basins. Also explain design of pouring basin.
3. (a) What are the 3 types of flames obtained in gas welding? How to select the flamer for the given plate thickness?
(b) How to carry out manual arc welding process? Explain the procedure?
4. Explain the following types of welding techniques:
 - (a) TIG welding
 - (b) Friction welding
 - (c) Explosive welding.
5. (a) Explain the term HAZ in welding and its role in the success of a weldment.
(b) How is Brazing different from Welding and soldering?
6. (a) Explain what do you understand by the following terms:
 - i. Ingot
 - ii. Slab
 - iii. Bloom
 - iv. Billet
(b) Name the process of manufacture of the following articles.

- i. Steel sections
 - ii. Tooth paste tubes
 - iii. Long wires
 - iv. Hand tools like spanner
- 7. (a) What is hot extrusion? In how many ways it can be performed?
(b) Explain the role of container and die in the analysis of extrusion.
- 8. (a) Explain the process and applications of the following forging operations.
 - i. Upsetting
 - ii. Bending
- (b) What are common materials used for forging? Give their forging temperatures and applications.

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