

FABRICATION PROCESSES

Subject code: **ME623OE**

Regulations: R16-JNTUH

Class: III Year B. Tech CE II Sem



DEPARTMENT OF CIVIL ENGINEERING
BHARAT INSTITUTE OF ENGINEERING AND TECHNOLOGY
Ibrahimpatnam - 501 510, Hyderabad

FABRICATION PROCESSES (ME623OE)

(Open Elective-II)

COURSE PLANNER

I. OBJECTIVE AND RELEVANCE:

The main objective of Fabrication processes is to introduce students to the production and manufacturing industry. This course provides knowledge within the academic environment to apply theoretical and practical concepts to improve manufacturing processes and components. Through this students will learn how manufacturers use technology to change raw materials into finished products.

II. COURSE PURPOSE:

The goal is to accomplish the fabrication processes in the smoothest, most judicious and most economical way. Production engineering encompasses the application of casting, machining processes, joining processes, die and mould design, etc. In industry, once the design is finalized production engineering concepts regarding work study, ergonomics, operation research, manufacturing management, production planning, etc.

III. SCOPE OF COURSE:

Production engineers are responsible for making manufacturing operate as smoothly as possible. Production Engineering is said to touch all aspects of industry. At the end of the course student would be able to,

- Know the basic ideas of manufacturing processes
- Learn the updated techniques in production field
- Get exposed to the different techniques of joining processes for metals and non-metals.

| S. No. | Course Objectives |
|---|--|
| At the end of the course, the students will be able to: | |
| I. | Understand the basic concepts of Fabrication processes, Have a working knowledge of accuracy, precision and recognize the importance of manufacturing processes. |
| II. | To gain knowledge in performance manufacturing processes like casting, welding. |
| III. | To provide the students with a foundation in Manufacturing processes. |
| IV. | To provide the students' knowledge in forging, extrusion cold working operations. |
| V. | To impart knowledge in latest fabrication processes. |

| S. No. | Course Outcomes (CO) | Blooms Taxonomy Levels |
|---|---|--------------------------|
| After completing this course the student must demonstrate the knowledge and ability to: | | |
| CO1 | To study fundamental concepts in Casting processes . | L2: Understanding |
| CO2 | Effective approach to the Fundamentals of Welding, different welding processes. | L2: Understanding |
| CO3 | To discuss various technological approaches applied to the different hot working and cold working operations. | L3: Apply |
| CO4 | To understand the concept of Extrusion of metals, forces in extrusion. | L2: Understanding |
| CO5 | To understand the concept of Forging processes, Forging defects, forces in forging operations. | L3: Apply |
| CO6 | Manufacturability and management knowledge and techniques to estimate time, resources to complete project. | L2: Understanding |

IV. PREREQUISITE(S):

| Level | Credits | Periods | Prerequisite |
|-------|---------|---------|--------------|
| UG | 3 | 3 | Nil |

V. HOW PROGRAM OUTCOMES ARE ASSESSED:

| Program outcomes | | Level | Proficiency assessed by |
|------------------|--|-------|-------------------------|
| PO1 | Engineering knowledge: To Apply the knowledge of mathematics, science, engineering fundamentals/principals, and civil engineering to the solution of complex engineering problems encountered in modern engineering practice. | 1.2 | Assignments |
| PO2 | Problem analysis: Ability to Identify, formulate, review research literature, and analyze complex engineering problems related to Civil Engineering and reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. | 1.8 | Exercise, Exams |
| PO3 | Design/development of solutions: Design solutions for complex engineering problems related to Civil Engineering | 0.8 | Exercise |

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| | and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations. | | |
| PO4 | Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions. | 1.8 | Discussion, Seminars |
| PO5 | Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. | 1.2 | Discussion, Seminars |
| PO6 | The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the Civil Engineering professional engineering practice. | 0.8 | Discussions |
| PO7 | Environment and sustainability: Understand the impact of the Civil Engineering professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. | - | ----- |
| PO8 | Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice. | - | ----- |
| PO9 | Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. | 0.6 | ----- |
| PO10 | Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions. | - | ----- |
| PO11 | Project management and finance: Demonstrate knowledge and understanding of the engineering and management | 0.6 | ----- |

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| | principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. | | |
| PO12 | Life-long learning: Recognize the need for, and have the preparation and ability to engage independent and life-long learning in the broadest context of technological change. | - | Prototype, Discussions |

VI. HOW PROGRAM SPECIFIC OUTCOMES ARE ASSESSED

| Program Specific Outcomes | | Levels | Proficiency accessed by |
|---------------------------|--|--------|-------------------------|
| PSO1 | Foundation of mathematical concepts: To use mathematical methodologies to crack problem using suitable mathematical analysis, data structure and suitable algorithm. | 0.6 | Assignments |
| PSO2 | Foundation of Mechanical System: The ability to interpret the fundamental concepts and methodology of Mechanical systems. Students can understand the functionality of different machine, men and material. | 0.8 | Assignments |
| PSO3 | Layout of plant: The ability to grasp the knowledge of plant layout and material handling along with the systematic allocation of all the facilities. | - | - |

VII. COURSE CONTENT: JNTUH SYLLABUS

Course Objectives: Understand the philosophies of various Manufacturing process.

Course Outcomes: For given product, one should be able identify the manufacturing process.

UNIT – I

Casting: Steps involved in making a casting – Advantage of casting and its applications; Patterns - Pattern making, Types, Materials used for patterns, pattern allowances and their construction; Properties of moulding sands.

Methods of Melting - Crucible melting and cupola operation – Defects in castings;

Casting processes – Types – Sand moulding, Centrifugal casting, die- casting, Investment casting, shell moulding; Principles of Gating – Requirements – Types of gates, Design of gating systems – Riser – Function, types of Riser and Riser design.

UNIT – II

Welding: Classification – Types of welds and welded joints; Gas welding - Types, oxy-fuel gas cutting. Arc welding, forge welding, submerged arc welding, Resistance welding, Thermitwelding.

Inert Gas Welding - TIG Welding, MIG welding, explosive welding, Laser Welding; Soldering and Brazing; Heat affected zone in welding. Welding defects – causes and remedies; destructive and non- destructive testing of welds.

UNIT – III

Hot working, cold working, strain hardening, recovery, recrystallisation, and grain growth. Stamping, forming, and other cold working processes. Blanking and piercing – Bending and forming – Drawing and its types – wire drawing and Tube drawing – coining – Hot and cold spinning. Types of presses and press tools. Forces and power requirement in the above operations.

UNIT – IV

Extrusion of Metals: Basic extrusion process and its characteristics. Hot extrusion and cold extrusion - Forward extrusion and backward extrusion – Impact extrusion – Extruding equipment – Tube extrusion and pipe making, Hydrostatic extrusion. Forces in extrusion

UNIT – V

Forging Processes: Forging operations and principles – Tools – Forging methods – Smith forging, Drop Forging – Roll forging – Forging hammers : Rotary forging – forging defects – cold forging, swaging, Forces in forging operations.

SUGGESTED BOOKS:

TEXT BOOK:

1. Manufacturing Technology / PN Rao/Mc grow hill.
2. Manufacturing Technology – P.N Rao; TMH
3. Manufacturing Processes for Engineering Materials – Serope Kalpakjian and Steven R Schmid, Pearson Pub
4. Manufacturing Processes By Mikel P Grover.
5. Workshop Technology by RaghuVamsi.
6. Métal Fabrication Technology/Mukherjee/PHI
7. Metal Casting / T.V Ramana Rao / NewAge

REFERENCES:

6. Production Technology / R.K Jain
7. Process and materials of manufacturing – Lindberg /PE
8. Principles of Metal Castings – Roenthal
9. Welding Process-Paramar

10. Production Engineering-Suresh Dalela &Ravi Shankar/Galgotia Publications Pvt Ltd.
Manufacturing Engineering and Technology /Kalpakjin S/Pearson Edu.

MOOC’S- SWAYAM/ NPTEL:

<https://nptel.ac.in/courses/108108113/18>

GATE SYLLABUS:

Metal Casting: Design of patterns, mould’s and cores; solidification and cooling; riser and gating design, design considerations.

Forming: Plastic deformation and yield criteria; fundamentals of hot and cold working processes; load

Estimation for bulk (forging, rolling, extrusion, drawing) and sheet (shearing, deep drawing, bending) metal forming processes; principles of powder metallurgy.

Joining: Physics of welding, brazing and soldering; adhesive bonding; design considerations in welding.

IES SYLLABUS:

Metal Forming: Basic Principles of forging, drawing and extrusion; High energy rate forming; Powder metallurgy.

Metal Casting: Die casting, investment casting, Shell Moulding, Centrifugal Casting, Gating & Riser design; melting furnaces.

Fabrication Processes: Principles of Gas, Arc, Shielded arc Welding; Advanced Welding Processes, Weld ability: Metallurgy of Welding.

VIII. COURSE PLAN:

| Lecture No. | Week | Unit | Topics to be covered | Learning Objective | References |
|-------------|------|------|--|---|------------|
| 1. | 1 | 1 | UNIT-I Introduction to fabrication processes. | Outline of various units | T1 |
| 2. | 1 | 1 | Steps involved in casting. | explain about casting | T1 |
| 3. | 1 | 1 | Advantage of casting and its applications | explain Advantage of casting and its applications | |
| 4. | 2 | 1 | Patterns - Pattern making. | explain types of Patterns | |
| 5. | 2 | 1 | Types, Materials used for patterns | explain types of materials for pattern. | T1 |

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| 6. | 2 | 1 | pattern allowances and their construction | Classify types of allowances. | |
| 7. | 3 | 1 | Properties of moulding sands, Methods of Melting - Crucible melting and cupola operation | classify Properties of moulding sands | |
| 8. | 3 | 1 | Defects incastings; Casting processes | classify defects of casting. | T1 |
| 9. | 3 | 1 | Types – Sand moulding, Centrifugal casting | classify Types – Sand moulding | |
| 10. | 4 | 1 | die- casting, Investment casting | classify die- casting, Investment casting | |
| 11. | 4 | 1 | Principles of Gating – Requirements – Types of gates | Principles of gating system. | |
| 12. | 4 | 1 | Design of gating systems – Riser – Function, types of Riser and Riser design | Gating systems | T1 |
| 13. | 5 | 2 | UNIT-II Classification – Types of welds and welded joints | Explain types of welds | |
| 14. | 5 | 2 | Gas welding - Types, oxy-fuel gas cutting | Gas welding - Types, oxy-fuel gas cutting | T1 |
| 15. | 5 | 2 | Arc welding, forge welding, submerged arc welding, Resistance welding | Principle of arc welding | |
| 16. | 6 | 2 | Thermitwelding. Inert Gas Welding - TIG Welding, MIG welding | Explain welding processes | |
| 17. | 6 | 2 | explosive welding, Laser Welding; Soldering and Brazing | Explain solidstate state welding. | |
| 18. | 6 | 2 | Heat affected zone in welding. Welding defects | Heat affected zone in welding. Welding defects | T1 |

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| 19. | 7 | 2 | causes and remedies | causes and remedies | |
| 20. | 7 | 2 | destructive and non- destructive testing ofwelds | destructive and non-destructive testing ofwelds | |
| 21. | 7 | 3 | UNIT -III Hot working, cold working, strain hardening | Explain differences between cold and hot working. | T1 |
| 22. | 8 | 3 | Recovery, recrystallisation, and grain growth. | Explain about recrystalization | |
| 23. | 8 | 3 | Stamping, forming, and other cold working processes | Explain cold working | T1 |
| 24. | 8 | 3 | Blanking and piercing – Bending and forming | Explain blanking and piercing | |
| 25. | 9 | 3 | Drawing and its types | Drawing and its types | |
| 26. | 9 | 3 | wire drawing and Tube drawing – coining | Explain drawing and coining | T1 |
| 27. | 9 | 3 | Hot and cold spinning | Hot and cold spinning | |
| 28. | 10 | 3 | Types of presses andpress tools | Explain types of tool press | |
| 29. | 10 | 3 | Forces and power requirement in the operations | Explain forces and power requirement. | T1 |
| 30. | 10 | 4 | UNIT4 Basic extrusion process and its characteristics | Classify extrusion processes | |
| 31. | 11 | 4 | Hot extrusion and cold extrusion | Classify extrusion processes | |
| 32. | 11 | 4 | Forward extrusion and backward extrusion | Classify extrusion processes | T1 |
| 33. | 11 | 4 | Impact extrusion – Extruding equipmen | Classify extrusion processes | |

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| III | 3 | | | 3 | 3 | | | | 3 | | 3 | | 3 | | |
| IV | 3 | 3 | 2 | | | | | | | | | | | | |
| V | | | 2 | | 3 | | | | | | | | | 2 | |
| Average | 1.2 | 1.8 | 0.8 | 1.8 | 1.2 | 0.8 | - | - | 0.6 | - | 0.6 | - | 0.6 | 0.8 | - |

X. QUESTION BANK: (JNTUH)

DESCRIPTIVE QUESTIONS: (WITH BLOOMS PHRASES)

UNIT-I

SHORT ANSWER QUESTIONS-

| S.NO | Question | Blooms Taxonomy Level | Programme Out come |
|------|---|-----------------------|--------------------|
| 1. | List different types of patterns. | Understanding | 1 |
| 2. | What are the basic requirements of the moulding sand in order to achieve a fine finished casting? | Understanding | 1 |
| 3. | List the advantages and limitations of die casting. | Understanding | 1 |
| 4. | Why is not the cupola furnace used for melting steel? | Understanding | 1 |
| 5. | How the gates are classified | Understanding | 1 |
| 6. | What is the function of core | Understanding | 1 |
| 7. | What is the function of core prints | Understanding | 1 |
| 8. | What are the types of casting defects | Understanding | 2 |
| 9. | What are the principles of Gating. | Understanding | 1 |
| 10. | What are the types of riser. | Understanding | 1 |

LONG ANSWER QUESTIONS-

| S.No | Question | Blooms Taxonomy Level | Programme Out come |
|------|--|-----------------------------|--------------------|
| 1. | What is the purpose of gate in foundry? How the gates are classified. Illustrate with the help of diagrams? | Understanding & remembering | 5 |
| 2. | List important considerations when selecting pattern materials | Analyze | 5 |
| 3. | Explain the principles of gating system | Analyze | 5 |
| 4. | Briefly describe the Cupola furnace. Describe the other operations and zones related to the melting of metals in Cupola furnace. | Analyze & Apply | 5 |
| 5. | Give a step – by – step procedure for the following processes (a) Investment casting (b) Die Casting | Analyze & Apply | 5 |
| 6. | Explain the use of risers. Why can blind risers be | Analyze & Apply | 5 |

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| | smaller than open-top risers? | | |
| 7. | Briefly explain the applications of castings | Analyze & Apply | 5 |
| 8. | Compare the differences in casting and forming | Analyze & Apply | 5 |
| 9. | Why gating system is required in the casting? Explain the purpose of different elements of gating systems | Analyze & Apply | 5 |
| 10. | Briefly explain the applications of castings | Analyze & Apply | 5 |

UNIT-II

SHORT ANSWER QUESTIONS-

| S.NO | Question | Blooms Taxonomy Level | Programme Out come |
|------|--|-----------------------|--------------------|
| 1. | List out five arc welding equipments | Understanding | PO1 |
| 2. | How resistance welding is performed | Understanding | PO1 |
| 3. | What is Thermit welding? Explain | Understanding | PO1 |
| 4. | What are the characteristics of heat affected zones | Understanding | PO1 |
| 5. | What is the purpose of flux | Understanding | PO1 |
| 6. | Write the principle of flash welding | Understanding | PO1 |
| 7. | Describe the characteristics of groove and fillet weld | Understanding | PO1 |
| 8. | What are the types of flux used? | Understanding | PO1 |
| 9. | What is solid state welding ? | Understanding | PO1 |
| 10. | What are the gases used in gas welding? | Understanding | PO1 |

LONG ANSWER QUESTIONS-

| S.No | Question | Blooms Taxonomy Level | Programme Out come |
|------|--|-----------------------------|--------------------|
| 1. | What are the different types of welded joints? Classify the welding process and describe the characteristics of groove and fillet weld | Understanding & remembering | PO1,PO3,PO2 |
| 2. | How resistance welding is performed? Describe various resistance welding processes in detail | Analyze | PO1,2 |
| 3. | Write the applications, advantages and limitation of gas welding | Analyze | PO1,2,3 |
| 4. | Explain the basic principles of arc welding process | Analyze & Apply | PO1,2 |

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| 5. | What are the various welding defects? Explain its causes and remedies | Analyze & Apply | PO1,2 |
| 6. | List out the differences between TIG Welding and MIG welding with the help of diagrams and its applications | Analyze & Apply | PO1,2,3 |
| 7. | Why do properties vary widely in most welding heat affected zones | Analyze & Apply | PO1,2 |
| 8. | With the help of a neat sketch explain the metal inert gas welding process | Analyze & Apply | PO1,2 |
| 9. | With the help of a neat sketch explain induction welding process | Analyze & Apply | PO1 |
| 10. | Describe the advantages and limitations of explosion welding | Analyze & Apply | PO1,2 |

UNIT-III

SHORT ANSWER QUESTIONS-

| S.NO | Question | Blooms Taxonomy Level | Programme Out come |
|------|-------------------------------|-----------------------|--------------------|
| 1. | What is LASER? | Understanding | 1 |
| 2. | Write the welding defects | Understanding | 1 |
| 3. | Write about soldering defects | Understanding | 1 |
| 4. | List out the welding process | Understanding | 1 |
| 5. | What is TIG welding | Understanding | 1 |
| 6. | Define Welding process. | Understanding | 1 |
| 7. | What is hot working? | Understanding | 1 |
| 8. | What is recrystallization? | Understanding | 1 |
| 9. | What is grain growth? | Understanding | 1 |
| 10. | What is coining? | Understanding | 1 |

LONG ANSWER QUESTIONS-

| S.No | Question | Blooms Taxonomy Level | Programme Out come |
|------|---|-----------------------------|--------------------|
| 1. | List the differences between hot working and cold working. | Understanding & remembering | PO1,PO3,PO2 |
| 2. | Describe the different stages of recovery, recrystallization and grain growth | Analyze | PO1,2 |
| 3. | What effects does re-crystallization have on properties of metals | Analyze | PO1,2,3 |
| 4. | What is strain hardening and what effects does it have on the properties of metals? | Analyze & Apply | PO1,2 |
| 5. | Describe rolling mills and rolling of bars and shapes | Analyze & Apply | PO1,2 |
| 6. | Explain the TIG welding Process. | Analyze & Apply | PO1,2,3 |

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| 7. | Describe the destructive and Non-destructive tools | Analyze & Apply | PO1,2 |
| 8. | Explain the induction and Explosive welding | Analyze & Apply | PO1,2 |
| 9. | What are the differences between cold and hot working? | Analyze & Apply | PO1,2 |
| 10. | Explain about blanking and piercing with neat sketch? | Analyze & Apply | PO1,2 |

UNIT-IV

SHORT ANSWER QUESTIONS-

| S.NO | Question | Blooms Taxonomy Level | Programme Out come |
|------|--|-----------------------|--------------------|
| 1. | How the forging defect can be minimized. | Understanding | 1 |
| 2. | Write about force operations | Understanding | 1 |
| 3. | What is forming operations | Understanding | 1 |
| 4. | Write rolling operations | Understanding | 1 |
| 5. | Write about power requirements | Understanding | 1 |
| 6. | What is the difference between punching and blanking | Understanding | 1 |
| 7. | What is re-crystallization temperature | Understanding | 1 |
| 8. | What is forward extrusion? | Understanding | 1 |
| 9. | What is backward extrusion? | Understanding | 1 |
| 10. | What is impact Extrusion? | Understanding | 1 |

LONG ANSWER QUESTIONS-

| S.No | Question | Blooms Taxonomy Level | Programme Out come |
|------|--|-----------------------------|--------------------|
| 1. | Explain rod and wire drawing processes. | Understanding & remembering | PO1,PO3,PO2 |
| 2. | How are seamless tubes produced | Analyze | PO1,2 |
| 3. | Differentiate between hot and cold spinning | Analyze | PO1,2,3 |
| 4. | Explain the difference between punching and blanking. | Analyze & Apply | PO1,2 |
| 5. | Explain about coining | Analyze & Apply | PO1,2 |
| 6. | Differentiate between hot extrusion and cold extrusion | Analyze & Apply | PO1,2,3 |
| 7. | How does extrusion differ from rolling and forging | Analyze & Apply | PO1,2 |
| 8. | Differentiate between forward and backward extrusion | Analyze & Apply | PO1,2 |
| 9. | How are tubes extruded? How are they drawn? | Analyze & Apply | PO1,2 |

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| 10. | What are the different types of power hammers you know? Draw a neat sketch of any one and explain its functioning | Analyze & Apply | PO1,2 |
| 11. | Define rolling process. Using schematic diagram, state the difference between cluster mills and continuous rolling | Analyze & Apply | PO1,2 |

UNIT-V

SHORT ANSWER QUESTIONS-

| S.NO | Question | Blooms Taxonomy Level | Programme Out come |
|------|--|-----------------------|--------------------|
| 1. | What is Forward Extrusion. | Understanding | 1 |
| 2. | What is Backward Extrusion | Understanding | 1 |
| 3. | What is a smith forging operation | Understanding | 1 |
| 4. | What is rotary forging methods | Understanding | 1 |
| 5. | Compare the cold and hot forging methods | Understanding | 1 |
| 6. | What are the principles of forging? | Understanding | 1 |
| 7. | What is smith forging? | Understanding | 1 |
| 8. | What are forging Defects? | Understanding | 1 |
| 9. | What is rotary forging? | Understanding | 1 |
| 10. | What is cold forging | Understanding | 1 |

LONG ANSWER QUESTIONS-

| S.No | Question | Blooms Taxonomy Level | Programme Out come |
|------|---|-----------------------------|--------------------|
| 1. | Describe the advantages of cold forming of plastics over other processing methods | Understanding & remembering | PO1,PO3,P02 |
| 2. | Name the major methods used in processing reinforced plastics. | Analyze | PO1,2 |
| 3. | Explain about blow moulding | Analyze | PO1,2,3 |
| 4. | Explain about injection moulding | Analyze & Apply | PO1,2 |
| 5. | Explain types of plastics & write the properties and applications of plastics | Analyze & Apply | PO1,2 |
| 6. | Explain the extruding equipment and its operation methods | Analyze & Apply | PO1,2,3 |
| 7. | Explain the smith forging and drop forging methods | Analyze & Apply | PO1,2 |
| 8. | Write about tube extrusion and tube making methods | Analyze & Apply | PO1,2 |
| 9. | Explain with neat diagram the roll forging? | Analyze & Apply | PO1,2 |
| 10. | Explain about forging tools? | Analyze & Apply | PO1,2 |

XI. OBJECTIVE QUESTIONS: JNTUH

UNIT I

1. Which of the following are casting defect _____?
a) Blow holes b) cold cracks c) sand spots d) all of the above
2. In soldering, the melting point of the filler metal should be _____.
a) Below 300°C b) below 420°C c) above 420°C d) above 300°C
3. What are pattern materials?
a) Wax b) wood c) metal d) plastic
4. Function of core vent option is _____.
a) External b) Internal core c) reverse vent option d) course detracton
5. The purpose of sprue is to _____.
a) Acts as reservoir for molten metal b) feed molten metal from pouring basin gate
c) Removing pattern from the mould d) split the pattern in two parts

UNIT-2

1. A mixture of 70% sand and 30% clay is known as _____ sand.
2. To obtained high density and pure casting, _____ casting is used.
3. For cutting operation _____ flame is used.
4. In TIG welding _____ electrode is used.
5. _____ zinc diffusion process.
6. Best example for neutral flame _____.
7. In DCSP, electrode is connected with _____ terminal.
8. Welding process for analytic part _____.

UNIT-3

1. The process of pouring molten metal under high pressure in to mould, is known as _____.
a) Die casting b) slush casting c) pressed casting d) permanent mould casting
2. Flux is not used in welding _____.
a) cast iron b) brass c) bronze d) carbon steel
3. In thermit welding, the aluminum and iron oxide are mixed the proportion of _____. a)
1:3 b) 1:2 c) 1:1 d) 2:1
4. In arc welding processes, penetration is least for _____.
a) DCSP b) DCRP c) A.C d) none of the above
5. Projection welding is a _____.
a) An arc welding process b) a continuous welding process
c) A multisport welding process d) a process used for joining round bars
6. Weld spatter refers to _____.
a) flux b) welding defect c) filler material d) shield
7. In brazing, the melting point of the filler metal should be _____.
a) Above 1000°C b) above 800°C c) above 420°C d) above 300°C
8. The torque of the rolls is _____.
a) 1 b) 2 c) 0 d) 3

UNIT -4

1. In punching operation, the clearance is provided on _____.
A) punch B) Die C) both D) none
2. In cold working of metals, the working temperature is _____.
A) Less than the room temperature B) below the recrystallization temperature.
C) Above the re-crystallization temperature D) None of the above

3. Which mechanical property of a metal should possess to enable it to be mechanically formed?
A) Ductility B) Elasticity C) Machinability D) Brittleness.
4. Mass production of cooking utensils is usually done by _____.
A) Stretching B) Deep drawing C) Coining D) Embossing
5. The following are the defects in forging _____.
A) Cold shuts B) Internal cracks C) Surface cracks D) All of the above
6. Large size Rivet heads are made by _____.
A) Hammerzing B) Swaging C) upset forging D) none of the above
7. In press tool operations, the following one is the shaping operation. _____.
A) Blanking B) Piercing C) Notching D) Drawing
8. In blanking operation, the clearance is provided on _____.
9. The starting material for Rolling is _____
10. In Two-high Rolling mill, the rolls are rotated in _____ direction. .

UNIT -5

1. Cold working of metal increases _____.
A) Hardness B) Tensile strength C) Yield strength D) All of the above
2. Following material is a good example for thermo-plastics _____.
A) PVC B) Urea formaldehyde C) Phenol-formaldehyde D) none of the above
3. Extrusion ratio is defined as _____.
4. In hydrostatic extrusion the most commonly used pressure transmitting fluid is _____.
5. The _____ additive increases strength, stiffness and impact resistance to the plastics
6. PVC stands for _____.

XII.GATE:

1. In a rolling process, the state of stress of the material undergoing deformation is _____.
(A) Pure compression (B) Pure shear (C) Compression and shear (D) Tension and shear
2. The maximum possible draft in cold rolling of sheet increases with the:
A) Increase in coefficient of friction (B) Decrease in coefficient of friction
C) Decrease in roll radius (D) Increase in roll velocity
3. Green sand mould indicates that:
(A) Polymeric mould has been cured (B) Mould has been totally dried
(C) Mould is green in color (D) Mould contains
4. The material property which depends only on the basic crystal structure is:
(A) Fatigue strength (B) work hardening (C) fracture strength (D) Elastic constant
5. In a gating system, the ratio 1:2:4 represents:
(A) sprue base area: runner area: ingate area
(B) pouring basin area: ingate area: runner area
(C) sprue base area: ingate area: casting area
(D) runner area: ingate area: casting area
6. Two streams of liquid metal, which are not hot enough to fuse properly, result into a casting defect known as:
(A) Cold shut (B) swell (C) sand wash (D) scab

7. An expendable pattern is used in
(A) Slush casting (B) squeeze casting (C) Centrifugal casting (D) investment casting
8. The main purpose of spheroidizing treatment is to improve
(A) Hardenability of low carbon steels (B) machinability of low carbon steels
(C) Hardenability of high carbon steels (D) machinability of high carbon steels.
9. When the temperature of a solid metal increases _____.
(a) strength of the metal decreases but ductility increases
(b) both strength and ductility of the metal decrease
(c) both strength and ductility of the metal increase
(d) strength of the metal increases but ductility decreases
10. The strength of a brazed joint:
(a) decreases with increase in gap between the two joining surface
(b) increases with increase in gap between the two joining surfaces
(c) decreases up to certain gap between the two joining surfaces beyond which
(d) it increases
(e) increases up to certain gap between the two joining surfaces beyond which it decreases
11. The purpose of sprue is to _____.
a) Acts as reservoir for molten metal b) feed molten metal from pouring basin gate
c) Removing pattern from the mould d) split the pattern in two parts
12. Which of the following are casting defect _____?
a) blow holes b) cold cracks c) sand spots d) all of the above
13. In soldering, the melting point of the filler metal should be _____.
a) Below 300°C b) below 420°C c) above 420°C d) above 300°C
14. The process of pouring molten metal under high pressure into mould, is known as:
a) Die casting b) slush casting c) pressed casting d) permanent mould casting
15. Flux is not used in welding _____.
a) cast iron b) brass c) bronze d) carbon steel
16. In thermit welding, the aluminum and iron oxide are mixed the proportion of _____. a)
1:3 b) 1:2 c) 1:1 d) 2:1
17. Projection welding is a _____.
a) An arc welding process b) a continuous welding process
c) A multisport welding process d) a process used for joining round bars
18. Weld spatter refers to _____.
a) flux b) welding defect c) filler material d) shield
19. Match the CORRECT pairs. Processes Characteristics – P. Friction Welding; Q. Gas Metal Arc Welding; R. Tungsten Inert Gas Welding, S. Electro slag welding. Application–1. Non-consumable electrode: 2. Joining of thick plates:3. Consumable electrode wire: 4. Joining of cylindrical dissimilar materials.
(A) P-4;Q-3;R-1;S-2 (B) P-4;Q-2;R-3;S-1 (C) P-2;Q-3;R-4;S-1 (D) P-2;Q-4;R-1;S-3.
20. Match the items of List I (Equipment) with the items of List II (Process) and select the correct answer using the given codes. List I (Equipment) P – Hot Chamber Machine; Q – Muller; R – Dielectric Baker; S – Sand Blaster. List II (Process) 1 – Cleaning; 2 – Core making; 3 – Die casting; 4 – Annealing; 5– Sand mixing.
(a) P – 2 Q – 1 R – 4 S – 5 (b) P – 4 Q – 2 R – 3 S – 5
(c) P – 4 Q – 5 R – 1 S – 2 (d) P – 3 Q – 5 R – 2 S – 1

IES:

- Two streams of liquid metal, which are not hot enough to fuse properly, result into a casting defect known as
(A) Cold shut (B) swell (C) sand wash (D) scab
- An expendable pattern is used in
(A) Slush casting (B) squeeze casting (C) Centrifugal casting (D) investment casting
- The main purpose of spheroidising treatment is to improve
a) hardenability of low carbon steels b) machinability of low carbon steels
c) hardenability of high carbon steels d) machinability of high carbon steels
- When the temperature of a solid metal increases.
a) strength of the metal decreases but ductility increases
b) both strength and ductility of the metal decrease
c) both strength and ductility of the metal increase
d) strength of the metal increases but ductility decreases
- Projection welding is a _____.
a) An arc welding process b) a continuous welding process
c) A multisport welding process d) a process used for joining round bars
- Weld spatter refers to _____.
a) Flux b) welding defect c) filler material d) shield
- In a rolling process, the state of stress of the material undergoing deformation is
(A) Pure compression (B) Pure shear (C) Compression and shear (D) Tension and shear
- The maximum possible draft in cold rolling of sheet increases with the
A) Increase in coefficient of friction (B) Decrease in coefficient of friction
C) Decrease in roll radius (D) Increase in roll velocity
- Green sand mould indicates that
a) Polymeric mould has been cured (b) Mould has been totally dried
c) Mould is green in color (d) Mould contains
- The material property which depends only on the basic crystal structure is
(A) Fatigue strength (B) work hardening (C) Fracture strength (D) elastic constant

XIII.WEBSITES:

- <http://nptel.ac.in/courses/112107145/>
- <http://www.jainbookagency.com/booksearch.aspx?title=Production%20Technology>
- <http://link.springer.com/book/10.1007%2F978-3-319-12304-2>
- <http://www.only4engineer.com/2014/10/manufacturing-technology-by-p-n-rao.html>
- <http://booksmeapp.com/downloads/a-textbook-of-production-engineering-by-p-c-sharma.pdf>

XIV.EXPERT DETAILS:

- Mr. G. V. Rao, Associate Professor, NIT Warangal.
- Dr. Navneet Arora, Professor, IIT Roorkee.
- Dr. Pankaj Biswas, Associate Professor, IIT Guwahati.
- Prof. A. Krishnaiah, Professor, OU, Hyderabad.

X.JOURNALS:

- The International Journal of Advanced Manufacturing Technology

2. International Journal of Manufacturing Technology and Management
3. International Journal of Manufacturing Research
4. International Journal of Production Economics
5. International Journal of Industrial and Production Engineering & Technology

XI.LIST OF TOPICS FOR STUDENT SEMINARS:

1. Types of casting
2. Types of extrusion
3. Injection moulding
4. Types of welding
5. Hot rolling and cold rolling
6. TIG and MIG welding
7. Forging
8. Hot and cold spinning

XII.CASE STUDIES / SMALL PROJECTS:

1. Sand casting.
2. Pattern making.
3. Blow Moulding
4. Injection Moulding.
5. TIG welding process.
6. MIG welding process.