

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
Fourth Semester B.Tech Degree Examination July 2021 (2019 Scheme)

Course Code: MET204

Course Name: MANUFACTURING PROCESS

Max. Marks: 100

Duration: 3 Hours

PART A

(Answer all questions; each question carries 3 marks)

		Marks
1	List any three causes of occurrence of shrinkage in castings.	3
2	Differentiate between composite moulds, permanent moulds and expendable moulds.	3
3	Write down any three practical applications of thermit welding.	3
4	What are the causes of porosity in welds? How can it be controlled?	3
5	Define (a) neutral point and (b) draft in a flat rolling process.	3
6	Represent alligating in rolled sheets with a neat sketch and explain.	3
7	Draw and explain any three defects in forged parts.	3
8	Distinguish between drawing and extrusion processes.	3
9	List any three press tool operations.	3
10	Draw a neat sketch to represent shear action in die cutting operation.	3

PART B

(Answer one full question from each module, each question carries 14 marks)

Module -1

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|----|---|---|
| 11 | a) Write a note on selection of patterns for castings. Sketch any two types of patterns. | 8 |
| | b) Explain i) permeability, ii) cohesiveness and iii) refractoriness of moulding sand. | 6 |
| 12 | a) Represent the temperature-time graph of i) pure metal, and ii) alloy. Draw the heat extraction pattern in i) sand mould and ii) metal mould. | 8 |
| | b) What are the requirements of an ideal gating system? | 6 |

Module -2

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|----|--|---|
| 13 | a) Draw a neat sketch of friction welding and explain the mechanisms of welding. | 6 |
|----|--|---|

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- b) Define weldability. Explain the weldability characteristics of i) stainless steels, 8
ii) copper alloys and iii) tungsten.
- 14 a) Draw a schematic of various regions in a fusion weld zone. Write a note on 6
HAZ.
- b) Explain any four destructive tests for testing welded joints. 8

Module -3

- 15 a) Draw and explain any four roll arrangements in a rolling mill. 8
b) Write a note on residual stresses developed in rolling. 6
- 16 a) Define hot working. List any four advantages of hot working. 6
b) Explain Von Mises' maximum distortion energy criterion in plastic flow. Draw 8
a neat sketch and give an example.

Module -4

- 17 a) Define and explain forging process. Explain the method of choosing forging 8
temperature range for metals.
- b) Draw the sketches of any three extrusion-die configurations. 6
- 18 a) Draw a neat sketch of a die used for wire drawing. Write a short note on die 8
materials.
- b) Distinguish between wet drawing and dry drawing. Write a note on roll 6
straightening of a drawn round rod.

Module -5

- 19 a) Draw a neat sketch and explain: i) conical locators, ii) adjustable locators and 6
iii) profile locators.
- b) Draw and explain: i) location of bar in vee block, ii) location in two vees, 8
iii) location of a rectangular job and iv) location of a job for drilled holes.
- 20 a) Draw the sketch of a die assembly for press working and explain all the 6
components.
- b) Draw neat sketches of the following sheet metal bending operations: 8
i) hemming, ii) flanging, iii) beading and iv) roll forming.

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
Fourth Semester B.Tech Degree Examination June 2022 (2019 scheme)

Course Code: MET204

Course Name: MANUFACTURING PROCESS

Max. Marks: 100

Duration: 3 Hours

PART A

(Answer all questions; each question carries 3 marks)

		Marks
1	How do patterns differ from casting?	(3)
2	What is the role of core and chill in casting process?	(3)
3	Explain any two destructive tests performed on welded joints.	(3)
4	What is shielded metal arc welding?	(3)
5	What is thread rolling? Compare it with thread cutting.	(3)
6	Sketch a typical rolling process and define (a) neutral point; (b) lagging and leading zones; (c) forward and backward slip.	(3)
7	What is open die forging?	(3)
8	Differentiate between direct extrusion and indirect extrusion.	(3)
9	What is stretch forming?	(3)
10	Describe any three sheet metal operations.	(3)

PART B

(Answer one full question from each module, each question carries 14 marks)

Module -1

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|----|--|-----|
| 11 | a) What are the steps involved in a sand casting process? | (7) |
| | b) Sketch and explain the components of a gating system in casting process. | (7) |
| 12 | a) Explain the salient features of investment casting process. | (7) |
| | b) Two solids of the same material, one a cube and the other a sphere, are cast. Volume of the cube of side 'a' and that of the sphere of radius 'r' are equal. Find the ratio of the solidification time of the cube to that of the sphere. | (7) |

Module -2

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|----|---|-----|
| 13 | a) Sketch and explain the basic regions in a typical fusion welded joint. | (8) |
| | b) How is welding performed in a thermit welding process? | (6) |

- 14 a) What are the components in oxy-acetylene welding operation? How is the flame adjusted in gas welding? (8)
- b) Resistance flash welding using 30 V power supply is done to join two pipes each having inner diameter 100 mm and outer diameter 110 mm. At the interface, 1 mm of material melts from each pipe which has a resistance of 42.4Ω . If the unit melt energy is 64.4 MJ/m^3 , find the time required for welding. (6)

Module -3

- 15 a) Narrate the features of (i) four high rolling mill (ii) planetary rolling mill (iii) cluster rolling mill. (6)
- b) If μ is the coefficient of friction between metal and roll surface and R is the radius of the roll, obtain an expression for maximum possible reduction in a single pass. (8)
- 16 a) Define (i) true stress; (ii) flow stress; (iii) average flow stress (6)
- b) What is yield criterion? Explain Tresca and von Mises yield criteria. (8)

Module -4

- 17 a) Differentiate between hot working and cold working of metals. Compare the relative merits and demerits of hot working and cold working. (6)
- b) Distinguish between drop forging and press forging. (8)
- 18 a) Differentiate between wire drawing and deep drawing. (6)
- b) Applying the slab method, obtain an expression for forging pressure under plane strain conditions with sliding friction. (8)

Module -5

- 19 a) What is 3-2-1 principle? (6)
- b) List the different locating methods and explain any two of them. (8)
- 20 a) Explain spring back which is observed in sheet metal bending. (6)
- b) What are the main principles of clamping? Give a classification of clamps used. (8)

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fourth Semester B.Tech Degree Supplementary Examination June 2023 (2019 scheme)

Course Code: MET204**Course Name: MANUFACTURING PROCESS**

Max. Marks: 100

Duration: 3 Hours

PART A*(Answer all questions; each question carries 3 marks)*

Marks

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|----|---|---|
| 1 | What are different shrinkages taking place during the solidification of molten metal from pouring temperature to room temperature? How can they be compensated? | 3 |
| 2 | List any three desirable properties of pattern material used in metal casting. | 3 |
| 3 | What are the advantages of Laser Beam Welding over Electron Beam Welding? | 3 |
| 4 | What are the functions of coatings given to electrodes in arc welding? | 3 |
| 5 | What are the ways to reduce the occurrence of chatter during rolling operation? Give any three. | 3 |
| 6 | What is spreading in rolling operation? What are its causes (any 2)? | 3 |
| 7 | Give any three reasons for die failure in forging operation. | 3 |
| 8 | A round billet made of 70-30 brass is extruded at a temperature of 675°C. The billet diameter is 125 mm, and the diameter of the extrusion is 50 mm. Calculate the extrusion force. Given that for 70-30 brass, extrusion constant is 250 MPa at the given extrusion temperature. | 3 |
| 9 | List any three major processing parameters in shearing. | 3 |
| 10 | What are the basic requirements of clamping devices? | 3 |

PART B*(Answer one full question from each module, each question carries 14 marks)***Module -1**

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|----|--|---|
| 11 | a) With neat sketch, explain the role of various components of gating system in casting. | 7 |
| | b) With neat sketches, explain the role of core, core prints and chaplets in metal casting operations. | 7 |
| 12 | a) With neat sketches, explain an expendable pattern casting processes. | 8 |
| | b) With neat sketch, explain the different accessories used in gating system of casting? | 6 |

Module -2

- 13 a) With neat sketches, explain the characteristics of different types of flames used in gas welding. 9
- b) Compare the characteristic features of Gas Metal Arc Welding and Metal Inert Gas Welding operation. 5
- 14 a) Define weldability. Briefly explain any 6 factors influencing weldability of engineering materials. 7
- b) Compare the following characteristics when arc welding is performed using Direct Current straight polarity and Direct Current reverse polarity 7
- i. Heat generation at the base metal
 - ii. Depth of penetration
 - iii. Melting point of metals that can be welded
 - iv. Thickness of metals that can be welded
 - v. Welding speed
 - vi. Melting rate of electrode
 - vii. Heat generation at electrode

Module -3

- 15 a) With neat sketches, explain shape rolling, roll forging and tube rolling. 9
- b) Comparing with metal casting, what are the advantages of plastically deforming materials to achieve final product. 5
- 16 a) With neat sketches, explain any four rolling defects. 8
- b) List any three advantages and disadvantages of hot rolling operation. 6

Module -4

- 17 a) With neat sketches, compare and contrast direct and indirect extrusion processes. 10
- b) What are the factors influencing the selection of die material for forging operations? 4
- 18 a) With neat sketches explain open die and closed die forging operations. 10
- b) What are the factors to be incorporated to avoid tearing of sheet metal during deep drawing operation? 4

Module -5

- 19 a) Explain the four basic principles of location. 8
- b) With neat diagrams briefly explain what is meant by trimming, shaving, nibbling, and notching. 6
- 20 a) With neat diagrams, explain compound die, combination die and progressive die. 9
- b) List any five factors to be considered while designing for clamping. 5

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S4 (R,S) / S4 (PT) (R,S) Examination June 2023 (2019 Scheme)

Course Code: MET204**Course Name: MANUFACTURING PROCESS**

Max. Marks: 100

Duration: 3 Hours

PART A*(Answer all questions; each question carries 3 marks)*

Marks

- | | | |
|----|--|---|
| 1 | What is choke area? What is its importance? | 3 |
| 2 | The size of a pattern is greater than that of a casting. Why? | 3 |
| 3 | What is meant by weldability? What is its importance? | 3 |
| 4 | Write down the chemical reactions involved in a thermit welding process. | 3 |
| 5 | What is neutral point? What is its importance in rolling process? | 3 |
| 6 | Explain working of planetary rolling mill with sketch. | 3 |
| 7 | What is meant by forging under sticking condition? | 3 |
| 8 | Draw the cross section of a wire drawing die and mark entry, approach and bearing surface in it. | 3 |
| 9 | What are the various degrees of freedom enjoyed by an object in space? | 3 |
| 10 | Differentiate between pin and button locators. | 3 |

PART B*(Answer one full question from each module, each question carries 14 marks)***Module -1**

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|----|--|---|
| 11 | a) Explain the various steps of the sand-casting process with suitable diagrams. | 7 |
| | b) With the help of a neat sketch explain the cold chamber die casting process. | 7 |
| 12 | a) Explain the squeeze casting process. What are its applications? | 7 |
| | b) With the help of a neat sketch explain the investment casting process. | 7 |

Module -2

- | | | |
|----|--|---|
| 13 | a) Explain the various types of flames formed in an oxy-acetylene welding process. | 7 |
| | b) How does the resistance welding process carry out? What are its advantages and disadvantages? | 7 |
| 14 | a) With a neat sketch explain the electro-slag welding process. | 7 |
| | b) Explain the submerged arc welding process with the help of a neat diagram. | 7 |

Module -3

- 15 a) Explain the various steps involved in finding out the power requirement in a rolling process. 7
b) With a neat sketch, explain the ring rolling process. 7
- 16 a) Sketch and explain plane stress diagrams for maximum-shear-stress and distortion-energy criteria. 7
b) Give an account of heat generation and heat transfer in metal forming process. 7

Module -4

- 17 a) With the help of neat sketches, explain the various steps involved in the coining process. 7
b) With the help of neat sketches, explain open die and impression die forging process. 7
- 18 a) With the help of neat diagrams, explain the direct and indirect extrusion processes. 7
b) Explain the various steps involved in the tube drawing process. 7

Module -5

- 19 a) With the help of neat sketches, explain the hydraulic and pneumatic clamping systems. 7
b) Explain the various steps in shearing operation with neat sketches. 7
- 20 a) With the help of neat diagrams, explain the various steps involved in deep drawing process. 7
b) How spinning process is carried out? What are its applications? 7
