

JHARKHAND UNIVERSITY OF TECHNOLOGY

Diploma 3rd Semester Sample Paper (DIPLOMA WALLAH)

MANUFACTURING PROCESS (MEC 303)

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Time: 3 Hours

Full Marks: 70

SET: 3

INSTRUCTIONS:

1. Question No. 1 is Compulsory.
2. Answer any **FOUR** questions from the remaining (Q.2 to Q.7).
3. Use diagrams wherever necessary to explain your answer.

Q.1. Multiple Choice Questions

[2 × 7 = 14]

(i) The vertical passage for bringing molten metal to the runner is called:

(a) Riser	(b) Sprue
(c) Gate	(d) Core

(ii) Thermit Welding is mainly used for:

(a) Automobile bodies	(b) Railway rails
(c) Electronic circuits	(d) Sheet metal

(iii) In rolling, the difference between initial thickness and final thickness is called:

(a) Camber	(b) Draft
(c) Slip	(d) Spread

(iv) Which process uses a non-consumable electrode?

(a) MIG welding	(b) TIG welding
(c) Stick welding	(d) Submerged arc welding

(v) Spring back phenomenon occurs in:

(a) Forging	(b) Casting
(c) Bending (Sheet Metal)	(d) Welding

(vi) Which plastic is used for electrical switches?

(a) PVC	(b) Polyethylene
(c) Bakelite	(d) Nylon

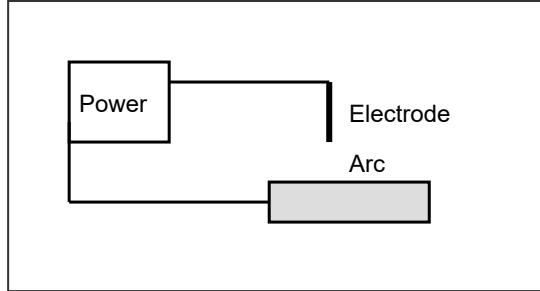
(vii) Green sand is a mixture of:

(a) Silica, Clay, and Water	(b) Silica and Oil
(c) Silica and Cement	(d) Silica and Resin

SECTION B (Long Answer Type)

Q.2. (a) [Theory] Explain **Centrifugal Casting**. Differentiate between True Centrifugal and Semi-Centrifugal casting. Why is it suitable for pipes? [7]

Q.2. (b) [Figure Based] Explain the **Electric Arc Welding** circuit. What is the function of the flux coating on the electrode? [7]



Q.3. (a) [Theory] Explain the **Thermit Welding** process. Write the chemical reaction involved ($\text{Al} + \text{Fe}_2\text{O}_3 \rightarrow \text{Fe} + \text{Al}_2\text{O}_3$). Where is it typically applied? [7]

Q.3. (b) [Theory] What are **Welding Defects**? Explain causes and remedies for:

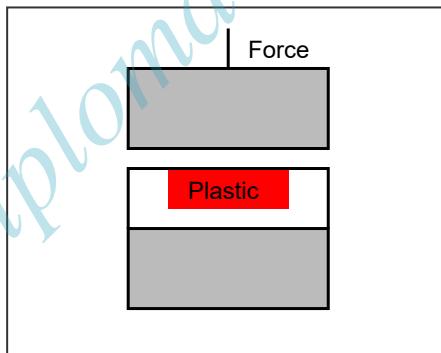
- (i) Porosity
- (ii) Undercut
- (iii) Spatter.

[7]

Q.4. (a) [Theory] Explain the **Upset Forging** process. How does it differ from **Drawing Out**? Give examples of components made. [7]

Q.4. (b) [Theory] Explain **Progressive Die** and **Combination Die**. Which one performs multiple operations at a single station? [7]

Q.5. (a) [Theory/Diagram] What is **Compression Moulding**? Explain with a diagram. Which type of plastics (Thermosetting/Thermoplastic) is it used for? [7]



Q.5. (b) [Theory] Explain **Shell Moulding** process. What are its advantages over Green Sand Moulding? [7]

Q.6. (a) [Theory] Explain **Rolling Defects** (Alligatoring, Wavy Edges, Edge Cracks) with sketches. [7]

Q.6. (b) [Theory] Describe the **Cupola Furnace** operation steps (Charging, Melting, Tapping). How is the temperature controlled? [7]

Q.7. Write Short Notes on (Any FOUR): $[3.5 \times 4 = 14]$

- a. Investment Casting (Lost Wax)
- b. Neutral Flame vs Oxidizing Flame
- c. Bending and Spring Back

- d. Types of Plastics
- e. Friction Welding

Diploma Wallah: Solution Key

MCQ: (i) b, (ii) b, (iii) b, (iv) b, (v) c, (vi) c, (vii) a.

Q3(a) Reaction: $2\text{Al} + \text{Fe}_2\text{O}_3 \rightarrow 2\text{Fe} + \text{Al}_2\text{O}_3 + \text{Heat}$ (Exothermic).

Q4(b) Note: Combination Die = Multiple ops (e.g., Cutting + Bending) at ONE station.
Progressive Die = Single op at MULTIPLE stations sequentially.

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