



Roll No:

BTECH
(SEM V) THEORY EXAMINATION 2023-24
ADVANCE WELDING

TIME: 3 HRS

M.MARKS: 100

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt all questions in brief.

2 x 10 = 20

| Qno. | Question | Marks | CO |
|------|--|-------|----|
| a. | Describe arc blow. | 2 | 1 |
| b. | Discuss the meaning of solid-state welding. | 2 | 1 |
| c. | Explain the working principle of friction welding. | 2 | 2 |
| d. | Explain soldering. | 2 | 2 |
| e. | Describe heat affected zone in brief. | 2 | 3 |
| f. | Explain cooling rate. | 2 | 3 |
| g. | Describe the formula for carbon equivalent. | 2 | 4 |
| h. | Discuss the use of reclamation welding. | 2 | 4 |
| i. | Explain weld distortion in brief. | 2 | 5 |
| j. | Describe residual stresses in welding in brief. | 2 | 5 |

SECTION B

2. Attempt any three of the following:

10 x 3 = 30

| | | | |
|----|---|----|---|
| a. | The dc arc current has voltage – length characteristics as $V = (20 + 40L)$ volts. The characteristics of power source is $V = (80 - 0.08I)$ volts. Determine the optimum arc length and corresponding arc power. | 10 | 1 |
| b. | Describe: (i) Underwater welding (ii) Ultrasonic welding | 10 | 2 |
| c. | Illustrate (i) Welding distortion (ii) Factors affecting changes in microstructure and mechanical properties of HAZ | 10 | 3 |
| d. | Illustrate hardfacing with neat sketch. Also illustrate its advantages, limitations and applications. | 10 | 4 |
| e. | Explain various types of weld. Also discuss different types of weld joints. | 10 | 5 |

SECTION C

3. Attempt any one part of the following:

10 x 1 = 10

| | | | |
|----|---|----|---|
| a. | Illustrate: (i) Comparison of welding with other fabrication processes (ii) Classification of welding processes | 10 | 1 |
| b. | Explain the different types of metal transfer used in various types of arc welding process with neat sketch. | 10 | 1 |

4. Attempt any one part of the following:

10 x 1 = 10

| | | | |
|----|---|----|---|
| a. | Explain shielded metal arc welding with neat sketch. Discuss its advantages and limitations. Also describe the functions of flux. | 10 | 2 |
|----|---|----|---|

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| | | | |
|--|--|-------------|---|
| b. | Describe: (i) Laser beam welding (ii) Gas tungsten arc welding | 10 | 2 |
| 5. Attempt any <i>one</i> part of the following: | | 10 x 1 = 10 | |
| a. | Illustrate peak temperature. For steel plates of 10 mm thickness, arc welded at 20 volts, 200 amps with a speed of 5mm/sec, Calculate the peak temperature at a distance of 1.5 mm from the fusion boundary. The initial temperature of the plate is room temperature which is 25°C. Heat transfer efficiency $f_1 = 0.9$, $\rho c = 0.0044 \text{ J/mm}^3$ and melting point $T_m = 1510^\circ\text{C}$, Where ρ is density (g/mm^3), $c =$ specific heat ($\text{J/g}^\circ\text{C}$). | 10 | 3 |
| b. | Illustrate: (i) Gas metal reaction (ii) Slag metal reaction | 10 | 3 |
| 6. Attempt any <i>one</i> part of the following: | | 10 x 1 = 10 | |
| a. | Explain in brief: (i) Welding of aluminium alloys (ii) Welding of cast iron | 10 | 4 |
| b. | Describe: (i) Effect of alloying elements on weldability (ii) Cladding | 10 | 4 |
| 7. Attempt any <i>one</i> part of the following: | | 10 x 1 = 10 | |
| a. | Explain various types of weld defects with neat sketches along with their causes and remedies. https://www.aktuonline.com | 10 | 5 |
| b. | Describe: (i) Welding procedure specification (ii) Difference between destructive and non-destructive testing | 10 | 5 |

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