PAPER ID-311050

Subject Code: KME055

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 *one* 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 25^0C. Heat transfer efficiency $f_1 = 0.9$, $\rho c = 0.0044$ J/mm^3 and melting point $T_m = 1510^0$C, Where ρ is density (g/mm^3), c = specific heat (J/g^{0}C).	10	3
b.	Illustrate: (i) Gas metal reaction (ii) Slag metal reaction	10	3

6. Attempt any *one* 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 *one* part of the following: 10 x 1 = 10

a.	Explain various types of weld defects with neat sketches along with their causes and remedies.	10	5
b.	Describe: (i) Welding procedure specification (ii) Difference between destructive and non-destructive testing	10	5