QP Code: SN22BTECH581 | Reg. No | | | | | | | | | | | AR 21

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET University)

B. Tech(Seventh Semester - Regular) Examinations, November – 2025

22BMEPE47011 – Advanced Welding Technology

(Mechanical Engineering)

Time: 3 hrs | Maximum: 70 Marks

Answer ALL questions
(The figures in the right hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

Q.1. Answer ***ALL*** questions

		CO #	Blooms Level
a.	Describe the arc initiation process.	CO1	K2
b.	Explain the properties of heat affected zone.	CO2	K2
c.	Explain role of flux in welding.	CO1	K1
d.	Explain briefly self-regulating type power source	CO3	K2
e.	Explain the tool material properties of ultrasonic welding	CO4	K1

PART – B **(15 x 4=60 Marks)**

Answer ***ANY FIVE*** the questions

		Marks	CO #	Blooms Level
2. a.	Differentiate between touch start and field start method	8	CO1	K3
b.	Explain with a neat sketch the method of electron transfer in different zones of arc gap.	7	CO1	K3
	(OR)			
c.	With a neat sketch, draw all the important zones of weld microstructure and explain it.	10	CO2	K3
d.	Explain the properties of heat affected zone.	5	CO2	K3
3.a.	The static volt-ampere characteristic of a welding power source is given by the parabolic equation $I^2 = -500\,(V - 80)$ and the arc characteristic is represented by the straight line equation $I = 23\,(V - 18)$. Determine (a) The power of a stable arc. (b) The optimum arc length for maximum power, if the arc length (l) and the arc voltage (V) are related by the expression $= 20 + 4.5l$. (c) If the convective and radiative losses for the arc in (b) be 15% of the arc power then determine if it will be advantageous to have an arc length of 4 mm wherein these losses are only 20% of those for the arc in (b). Comment briefly on the two cases.	10	CO3	K4
b.	Differentiate between AC power source and DC power source.	5	CO3	K3
	(OR)			
c.	Explain the static characteristics of constant voltage type welding power source with a neat sketch.	8	CO3	K3
d.	Define nucleation and categorized it.	7	CO2	K3
4.a.	In an arc welding process, the voltage and current are 25 V and 300 A respectively. The arc heat transfer efficiency is 85% and welding speed is 8 mm/sec. Calculate the net heat input in J/mm.	5	CO3	K3
b.	Differentiate between short-circuit mode and dip mode of metal transfer.	10	CO1	K3

	(OR)			
c.	Explain in details on various materials used as electrode coating material.	8	CO1	K3
d.	Explain the importance of melting rate in welding.	7	CO1	K3
5.a.	With a neat sketch, explain the working of FSW process. Describe the advantages and limitation of FSW process.	8	CO4	K3
b.	Describe the method of diffusion welding, explain how it is different from cold pressure welding.	7	CO4	K3
	(OR)			
c.	Explain the working principle, advantages and limitation of electron beam welding	10	CO4	K3
d.	Describe the method of underwater welding.	5	CO4	K2

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