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GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (Seventh Semester – Regular) Examinations, November – 2022

BPEME7011 – 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: (Multiple Choice Questions)

(1 x 10 =10 Marks)

Q.1. Answer ALL questions

	[CO#]	[PO#]
a. Which of the following welding method operates at highest arc voltage	CO1	PO1
(i) Shielded metal arc welding		
(ii) MIG		
(iii) SMAW		
(iv) None of these		
b. Which of the following welding process has highest charged particle density	CO1	PO1
(i) SMAW		
(ii) GTAW		
(iii) GMAW		
(iv) SAW		
c. What is the maximum temperature at the centre of the weld zone	CO2	PO1
(i) 10000 °C		
(ii) 20000 °C		
(iii) 14000 °C		
(iv) 25000 °C		
d. Which of the following zone has a grain structure equivalent to base metal	CO2	PO1
(i) Underbead zone		
(ii) Grain refined zone		
(iii) Zone of spherodized carbides		
(iv) Grain growth zone		
e. Which of the following welding power source is used in the sites where domestic supply not available	CO3	PO1
(i) AC welding transformer type		
(ii) DC welding rectifier type		
(iii) Engine couple DC generator type		
(iv) DC generator type		
f. Welding power source classification does not depend on which of the following parameter	CO3	PO1
(i) Type of current		
(ii) Type of electrode material		
(iii) Cooling medium		
(iv) Cooling system		
g. Which among the following is not a function of electrode coating	CO1	PO1
(i) Stabilization of arc		
(ii) Protects the weld pool		
(iii) Reduce the cooling rate		
(iv) Improves oxidation		
h. With DCEN configuration, which of the following can be achieved	CO3	PO1
(i) welding of non ferrous metals		
(ii) Wider weld bead		
(iii) Higher electrode consumption		
(iv) Deep penetration		
i. Which of the following metal transfer method has highest electrode melting rate	CO4	PO1
(i) Globular transfer		
(ii) Short-circuit transfer		
(iii) Spray transfer		
(iv) Dip transfer		
j. Solid state joining takes place at _____ of the melting point temperature of the work piece material.	CO4	PO1
(i) 10%		
(ii) 30%		
(iii) 50%		
(iv) 100%		

PART – B: (Short Answer Questions)**(2 x 10=20 Marks)**Q.2. Answer ALL questions

	[CO#]	[PO#]
a. Describe the arc initiation process.	CO1	PO1
b. Plot the graph between arc voltage and arc length for SMAW and MIG.	CO1	PO1
c. Explain freezing of alloys.	CO2	PO1
d. Explain the significance of grain growth zone in welding metallurgy	CO2	PO1
e. Differentiate between annealing and tempering	CO2	PO1
f. Classify the arc welding power sources	CO3	PO1
g. Differentiate between AC power source and DC power source	CO3	PO1
h. Define the importance of melting rate in welding.	CO4	PO1
i. Classify the major steps of FSW process.	CO4	PO1
j. Define the function of electron gun.	CO4	PO1

PART – C: (Long Answer Questions)**(10 x 4 = 40 Marks)**Answer ALL questions

	Marks	[CO#]	[PO#]
3. a. Differentiate between touch start and field start method	5	CO1	PO1
b. Sketch the arc characteristic curve and explain it.	5	CO1	PO1
(OR)			
c. Explain the effect of polarity on welding; with neat sketch explain briefly DCEN process.	10	CO3	PO1
4. a. Differentiate between homogeneous and heterogeneous nucleation.	5	CO2	PO1
b. With a neat sketch, draw all the important zones of weld microstructure.	5	CO2	PO1
(OR)			
c. Explain the static characteristics of constant current type welding power source with a neat sketch.	10	CO3	PO1
5. a. The arc length-voltage characteristics of a DC arc is given by the equation $V = 24 + 4l$ where V is the arc voltage and l is arc length in mm. The static volt-ampere characteristic of the power source is approximated by a straight line with no load voltage of 80 volts and the short-circuit current of 600 amperes. Determine the optimum arc length for maximum power.	5	CO3	PO2
b. Explain in details on various materials used as electrode coating material.	5	CO1	PO1
(OR)			
c. Explain the role of flux and shielding gases during welding.	5	CO1	PO1
d. Draw a neat sketch of USW and explain the function of each part.	5	CO4	PO1
6. a. Classify fusion welding and Non-fusion welding.	5	CO1	PO1
b. Categorize the zones of FSW process at the weld cross section and explain briefly.	5	CO4	PO1
(OR)			
c. Explain the working principle, advantages and limitation of electron beam welding	10	CO4	PO1

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