

Code No: 07A5EC22

**R07****Set No. 2**

III B.Tech I Semester Examinations, May 2011

**WELDING TECHNOLOGY**

Common to Production Engineering, Metallurgy And Material Technology

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions

All Questions carry equal marks

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1. (a) Describe the welding consideration for cast iron?  
(b) Explain the following:  
    i. Buttering  
    ii. Studding. [8+8]
2. (a) State the possible causes for cracking of welded joints in carbon steel, and explain how this effect may be avoided.  
(b) State the precaution which should be taken to minimize cracking. [8+8]
3. (a) Compare spot welding with upset welding?  
(b) State the differences between seam and roll welding? [8+8]
4. (a) What is wettability? How the wetting behavior of material against a particular substrate is determined?  
(b) How the high electrical and thermal conductivities of copper and copper alloys have effect on their weldability? Explain. [8+8]
5. (a) Explain with a neat sketch the principle of submerged arc welding process?  
(b) Mention the advantages, disadvantages and application of submerged arc welding? [8+8]
6. (a) What are the conditions required for an ideal metallurgical bond? Explain them in detail.  
(b) What is Heat Affected Zone? What are the characteristics of Heat Affected Zone? Explain them. [10+6]
7. (a) Explain why primers are used in adhesive bonding process? What are different types of adhesives used?  
(b) What are important characteristics of adhesives used in adhesive bonding process? [8+8]
8. The voltage - length characteristics of a DC arc is given by  $V = (20 + 4L)$  volts Where  $L =$  length of the arc in mm. During a welding operation, it is expected that the arc length will vary between 4mm and 6mm. It is desired that the welding current be limited to the range 450 - 550 amp. Assuming a linear power source characteristic, determine the open circuit voltage and the short circuit current of the power source. [16]

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FIRSTRANKER

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1. (a) Discuss the weldability of martensitic stainless steels?  
(b) What is weldability? Explain how and on what basis weldability can be assessed. [8+8]
2. (a) Discuss the causes and remedies for porosity and slag entrapment in fusion welding?  
(b) What are the variables that affect the strength of a welded joint? Explain. [8+8]
3. (a) Write the advantages and limitations of spot welding?  
(b) Explain the important applications of spot welding. [10+6]
4. What are the variables that affect the strength of a welded joints? Explain in detail. [16]
5. (a) How the design consideration effects the minimizing the welding residual stresses? Explain?  
(b) List out the post heating methods of welding. [10+6]
6. (a) Explain different types of brazing processes.  
(b) What is adhesive bonding? Describe the materials, procedure and applications of adhesive bonding. [8+8]
7. (a) Explain the process of explosive welding for joining of dissimilar metals.  
(b) How do you calculate and control the weld metal composition resulting from dilution of two different metals? [8+8]
8. (a) State the approximate pressure of acetylene in a fully charged cylinder.  
(b) What is the maximum possible pressure at which acetylene may be used for welding or cutting operations? Explain.  
(c) What equipment is required for automatic hydrogen welding? Explain the power sources, gas supply, torch, electrodes and filler rods. [2+3+11]

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1. (a) Discuss the welding characteristics of gray cast iron?  
 (b) What are different joints are preferred for cast iron welding?  
 (c) Explain detailed arc welding of cast iron with the help neat sketch? [5+5+6]
2. (a) Discuss the relative weldability of aluminum and mild steel.  
 (b) Discuss the welding characteristics of copper and its alloys. [8+8]
3. (a) Discuss the need for edge preparation in welding.  
 (b) How do you classify the different weld positions? Explain them in detail. [8+8]
4. (a) Describe the techniques used for dissimilar metal joining?  
 (b) Explain with neat sketch furnace welding process? [8+8]
5. What is arc blow? Why and where it will occur? What are the defects that may produce due to arc blow? Give suggestion to avoid arc blow. [16]
6. Explain the following term in fusion weld:
  - (a) Contraction
  - (b) Residual stress
  - (c) Metallurgical phase transformation. [16]
7. (a) Distinguish giving reasons, between joining of sheets in resistance welding and arc welding from the point of current required and duration of the welding?  
 (b) Mention the various types of resistance welding operations? And explain each of it in brief? [8+8]
8. (a) Mention the maximum temperature that can be attained if different fuel gases are used for combination with oxygen.  
 (b) Write a note on dynamic and static characteristics of power sources for arc welding. [8+8]

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**R07****Set No. 3**

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1. (a) What are the causes and remedies of the defects of excessive electrode indentation and metal expulsion?  
(b) Name any eight welding defects commonly encountered. [8+8]
2. What are the various types of welding joints? How are they classified? Explain all of them with neat sketches. [16]
3. (a) In what way does laser butt welding resembles plasma arc welding?  
(b) What happens during the hold time of spot weld? [8+8]
4. (a) What are the different gases that can be used in gas welding?  
(b) Explain the principle of gas welding; also indicate important reactions taking place during the process? [6+10]
5. (a) Define residual stress. What are causes for the development of residual stresses in welded structures?  
(b) Briefly explain the effect of weld thermal cycle on residual stress. [8+8]
6. List out the methods for joining dissimilar metal welding? Explain any one of them? And also, mention the advantages and limitations of this process? [16]
7. (a) Explain the welding of galvanized steels.  
(b) What are the welding characteristics of heat treatable low alloy steels? [8+8]
8. (a) What is Resistance Brazing? Explain the procedure of Resistance Brazing with neat sketch? Mention the advantages, limitations and application.  
(b) Compare Furnace Brazing with Dip Brazing. [8+8]

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