

III B.Tech I Semester Examinations, December 2011

WELDING TECHNOLOGY

Metallurgy And Material Technology

Time: 3 hours

Max Marks: 75

**Answer any FIVE Questions
All Questions carry equal marks**

1. (a) Explain the following:
 - i. Hard soldering
 - ii. Soft soldering.(b) Explain with neat diagram the torch method of soldering? [8+7]
2. Write short notes on the following weld defects.
 - (a) Porosity
 - (b) Under cutting
 - (c) Cracks. [15]
3. (a) Why is cleaning of metal is important for successful welding? Explain?
(b) Describe the metallurgical effects in resistance welding cycle? [7+8]
4. Describe the process of welding gray cast iron using manual metal arc welding? [15]
5. Write short notes on the following:
 - (a) Shielding gas in arc welding.
 - (b) Fluxes in arc welding. [15]
6. (a) Explain the concept of dilution particularly in fusion welding of dissimilar metals?
(b) What are the different methods to control dilution? Explain. [7+8]
7. (a) What is nugget? How the size of the resistance spot weld is determined?
(b) How does the spot welding differ from roll spot welding and projection welding? [7+8]
8. (a) Explain the effect of fast and slow cooling on microstructure of low carbon steel weld metal?
(b) Why is it that residual stress tends to become less of a problem that faster you are able to complete an arc welded joint? [7+8]

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1. (a) Explain the different types of welding electrodes used in arc welding process?
(b) Explain the function of electrode coating? [7+8]
2. (a) How does the weldability of steel changes as the steel carbon content increases?
Why?
(b) Explain the factors responsible for high quality welds in welding stainless steels? [7+8]
3. Explain in detail the causes and remedies for over lapping in welds? [15]
4. On what factors do the strength and other mechanical properties of joint affects in adhesive bonding? [15]
5. What are the causes and effect of stresses in welds? How do you control these stresses? [15]
6. (a) Explain the type of electrode materials used in TIG?
(b) Describe the flux materials used in TIG welding? [7+8]
7. Describe the different diffusion welding methods? [15]
8. Explain in detail the types of flames and flux required for gas welding of copper and its alloys? [15]

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1. Explain the following welding residual stresses.
 - (a) Mechanical residual stress.
 - (b) Metallurgical residual stress.
 - (c) Reaction residual stress. [15]
2. (a) Explain the constituents of electrode coating with their functions?
(b) What are the disadvantages of using bare electrodes? [7+8]
3. Explain the factors for the formation of the following weld defects and give remedies:
 - (a) Cracks
 - (b) Poor weld bead appearance. [15]
4. (a) How does the welding of high carbon steels differ from that of medium carbon steels and low carbon steels? Explain.
(b) Explain the welding characteristics of high alloyed steels? [7+8]
5. Write short notes on the following:
 - (a) Infra red brazing
 - (b) Resistance brazing
 - (c) Carbon-arc brazing. [7+8]
6. What are the process employed for welding Al and its alloys? Explain any two of them? [15]
7. (a) Explain the electrode geometry in TIG welding?
(b) Name the shielding gas and uses for the following metals for TIG welding?
 - i. Stainless steel
 - ii. Bronzes and
 - iii. Ti and Mg
(c) Explain how the tungsten contamination in weld is minimized? [15]
8. (a) Can ordinary light be used instead of laser in laser welding? Explain
(b) What precautions should be taken for welding high reflective materials using laser welding?

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(c) Whether welding of plastics are possible by laser welding? Explain. [5+5+5]

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1. Explain in detail the process variables that control the Electron beam welding process? [15]
2. Write short notes on the following:
 - (a) Electrodes in arc welding
 - (b) Power supply in TIG welding. [7+8]
3. (a) Differentiate between brazing and braze welding?
(b) Explain how brazing is carried out? [7+8]
4. Explain MIG welding of Al related to the following:
 - (a) Power supply
 - (b) Shielding gas.
 - (c) Metal transfer.
 - (d) Electrodes. [7+8]
5. (a) Differentiate between porosity and blow holes?
(b) Explain the causes for the formation of porosity in welds? [7+8]
6. (a) What are the conditions required for the phase change in the structures due to welding?
(b) Explain the mechanism for the formation of heat affect zone in welds? [7+8]
7. (a) What are the ingredients used to coat on bare electrodes? Explain each of the ingredients?
(b) Differentiate between AC welding and DC welding? [7+8]
8. Austenitic Stainless Steels are successfully welded by spot welding. Comment on this statement. [15]
