

QUESTION BANK

Multiple choice questions to be answered by the welders

Difficult questions:

SMAW

1. Select the false statement in shielded metal arc welding process
 - a. Basic coated electrodes can give superior mechanical properties
 - b. The slag detachability is excellent in the case of rutile coated electrodes
 - c. Electrodes meant for AC should contain sodium salts for better arc stability
 - d. Deep penetration is obtained when using cellulose coated electrodes

2. The parameter which has no effect on cold cracking of a shielded metal arc weld is
 - a. cleanliness of the job surface
 - b. baking of the electrode
 - c. preheating the job
 - d. excessive weaving of the electrode

3. Select the false statement on austenitic stainless steel material
 - a. the material retains toughness even at very low temperatures
 - b. the material gets hardened on rapid cooling
 - c. the material cannot be tested by magnetic particle test
 - d. the material has very high ductility

4. Weld decay during austenitic stainless steel welding cannot be minimized by
 - a. preheating
 - b. using a low carbon variety of the material
 - c. using a material containing niobium or titanium stabilizing elements
 - d. welding using low heat input

5. Schaeffler's diagram is drawn with the x and y axes being

- a. chromium equivalent and nickel equivalent
- b. chromium and nickel
- c. carbon and chromium
- d. carbon and nickel equivalent

6. Post weld heat treatment of a carbon steel weldment will not result in

- a. improvement of ductility
- b. reduction of hardness
- c. minimizing distortion
- d. reduction of residual stresses

7. The welding heat input during shielded metal arc welding does not depend on

- a. extent of weaving of the electrode
- b. employing a low welding speed
- c. employing a low current level
- d. preheating the job

8. Select the false statement

- a. U groove weld is recommended for thicknesses more than 40 mm
- b. Square groove edge preparation is only suitable for thin sheets
- c. Excess root gap may lead to burn through defect
- d. Double vee groove weld produces more distortion compared to single vee groove

9. Select the false statement pertaining to ASME code for the qualification of welders.

- a. The test plate must pass the radiographic test for qualification of the welder

- b. The purpose of the welder qualification test is to ensure that the minimum mechanical property requirements of the weldment are met
- c. Whenever there is a deviation in the essential variable, then the welder needs requalification
- d. The welder who has passed 6G position can carry out welding in all other positions

10. Select the false statement on carbon steels

- a. After post weld heat treatment, the ductility of the material will increase
- b. The peak temperature for post weld heat treatment of low alloy steel is generally higher than that for carbon steel
- c. The heating and cooling rates do not influence the effectiveness of post weld heat treatment
- d. The soaking time is given for equalization of temperature across the thickness

11. Select the false statement

- a. the brittle fracture takes some time for propagation
- b. creep rupture is usually experienced at high temperatures
- c. The material operating at high temperature suffers corrosion and oxidation
- d. Thermal fatigue is not experienced during steady state operation

12. Select the false statement on welding procedure qualification as per ASME

- a. Any change in welding position calls for requalification of the procedure
- b. A change from rutile coated electrode to basic coated electrode requires requalification
- c. A change from vee groove to U groove does not require any requalification
- d. A welding procedure for carbon steel cannot be used for low alloy steel

13. The penetration in work piece during tungsten inert gas welding does not depend on

- a. The polarity of welding
- b. The shielding gas
- c. The welding speed

- d. The arc starting technique

14. Select the false statement on pulsed tungsten inert gas welding

- a. The heat build up in the job is minimized by pulsing
- b. The background current maintains the arc
- c. The overall heat input is higher for the same penetration levels
- d. The process can be used for joining thin to thick sections easily

15. Select the false statement on the shielding gases for tungsten inert gas welding

- a. Argon is heavier than air and provides better arc shielding
- b. The minimum purity level required for argon is 99.95%
- c. Higher flow rate is required for helium compared to argon as it is a lighter gas
- d. Helium arc is not as hot as argon arc

16. Select the false statement on tungsten inert gas welding

- a. The arc starting is by the use of a high frequency start
- b. The arc stability is better in the case of AC compared to DC
- c. For square wave AC, there is no need for high frequency unit for reignition of the arc
- d. During sinusoidal wave AC welding, the arc gets extinguished when the current becomes zero

17. Select the false statement on tungsten inert gas welding

- a. Thoriated tungsten electrode is suitable for both DC and AC
- b. For better arc stability during DC welding, grinding of the electrode is done to a tapered end
- c. The current carrying capacity of a tungsten electrode is significantly less for DC ep polarity than DC en polarity
- d. Tungsten has a melting point close to 3400°C

18. Select the false statement on tungsten inert gas welding

- a. A higher flow rate of the shielding gas than optimum value, results in porosity
- b. Lack of fusion defect is encountered during welding of aluminium with DC ep polarity
- c. There is no chance for slag inclusion in TIG welding
- d. A higher current during root pass welding may lead to burn through defect

19. The quality of an arc stud weld during welding of a carbon steel material is not dependent on

- a. Job cleanliness
- b. Welding polarity
- c. The flow rate of the shielding gas
- d. Welding time

20. Select the false statement

- a. The shortening of stud length during capacitor discharge type stud weld is minimum
- b. The duty cycle for stud welding machines should be 100%
- c. Flux is used during arc stud welding of carbon steel to stabilize the arc and to remove oxides
- d. During arc stud welding of aluminium, DC reverse polarity is employed

Medium questions

21. The arc stability in the case of AC welding using shielded metal arc welding process is achieved by

- a. Addition of low ionization potential chemicals to the flux coating
- b. Addition of metals having low melting point to the flux coating
- c. Use of high frequency high voltage system
- d. Use of square wave AC power source

22. Superior mechanical properties can be obtained in shielded metal arc welding by the use of

- a. Cellulose coated electrode
- b. Rutile coated electrode

- c. Basic coated electrode
- d. None of the above

23. In the AWS classification of shielded metal arc welding process as E7018, the number "70" refers to

- a. Impact energy of 70J at room temperature
- b. Tensile strength of deposited weld metal of 70000 psi
- c. The welding current should not exceed 70 A
- d. The electrode has to be baked at 70°C before use

24. Baking of the basic coated electrode in shielded metal arc welding is carried out because

- a. The moisture in the electrode coating can be driven out
- b. The arc stability will be good after baking
- c. The penetration will increase
- d. The weld heat input can be minimized

25. A violent arc which produces deep penetration in the base metal is achieved in the case of

- a. Cellulose coated electrode
- b. Rutile coated electrode
- c. Basic coated electrode
- d. Electrode with iron powder addition in the coating

26. In the welding of a pipe in 5G position

- a. The pipe axis is horizontal and pipe is rotated during welding
- b. The pipe axis is vertical and pipe is rotated during welding
- c. The pipe axis is horizontal and welding is done around the circumference
- d. The pipe axis is vertical and welding is done around the circumference

27. When the plates to be welded lie in parallel planes and one plate is made to overlap on the other plate, the joint is referred to as

- a. Corner joint
- b. Butt joint
- c. Tee joint
- d. Lap joint

28. The volume of weld metal required for double vee groove weld is

- a. Same as that in the case of single vee groove weld
- b. Dependent on the plate thickness
- c. Higher than that in the case of single vee groove weld
- d. Lower than that in the case of single vee groove weld

29. Apart from hydrogen content of weld metal, the factors responsible for cold cracking are

- a. Weld metal surface finish and bead width
- b. Weld metal hardness and joint restraint levels
- c. Weld metal penetration in the base metal
- d. Root gap and root face in the weld joint

30. Hot cracking of the weld metal is due to

- a. Improper preheating
- b. Welding in vertical position
- c. Low melting impurities in the weld metal
- d. Welding using rutile coated electrode

31. When very high current level is employed during the root pass welding of a plate, the defect which is expected to occur is

- a. burn through
- b. lack of penetration
- c. cracking
- d. undercut

32. Heat affected zone in the case of welding refers to

- a. The region close to the weld where the temperature exceeds the transformation temperature
- b. The region close to the weld where preheating is done
- c. The region where the weld metal has excess penetration
- d. The region covered by the weaving of the electrode

33. After post weld heat treatment of shielded metal arc welded component,

- a. Both hardness of the weld metal and ductility increase
- b. Both hardness and ductility of the weld metal decrease
- c. Hardness of the weld metal increases while the ductility decreases
- d. Hardness of the weld metal decreases while the ductility increases

34. When austenitic stainless steel weld is cooled rapidly

- a. The metallurgical phase changes to hard martensitic structure
- b. There is a risk of hydrogen cracking
- c. The ductility of the material decreases
- d. None of the above

35. To avoid hot cracking during the welding of austenitic stainless steel,

- a. The impurities like Sulphur should be controlled
- b. The heat input must be minimized
- c. The amount of delta ferrite in the weld must be between 3 to 8%

- d. The restraint level during welding should be reduced

36. The problem of weld decay during austenitic stainless steel welding refers to

- a. Cracking of the weld metal after welding
- b. Formation of chromium carbide
- c. High level of residual stress in the weld metal
- d. Lack of penetration in the base metal

37. The creep rupture strength of a material depends on

- a. Temperature and the total operating hours
- b. Temperature and the thickness
- c. Rate of heating and cooling
- d. Total operating hours alone

38. The brittle fracture of carbon steel is caused by the action of

- a. Very high operating temperatures and operating time
- b. Very low operating temperature, stress raisers and shock loading
- c. Presence of corrosive media in contact with the material
- d. Static loading close to ultimate tensile strength of the material

39. In a pipe containing a longitudinal weld and circumferential weld,

- a. Circumferential weld experiences higher stress than longitudinal welds
- b. Both longitudinal and circumferential welds carry equal stress
- c. Longitudinal weld experiences higher stress than circumferential weld
- d. The stress experienced by the welds cannot be predicted

40. The effectiveness of post weld heat treatment of a weldment is decided by

- a. weld heat input

- b. joint restraint level
- c. baking of the electrode
- d. none of the above

41. Soaking time is given during post weld heat treatment for

- a. diffusion of hydrogen from the material
- b. removal of weld defects
- c. equalization of temperature across the thickness
- d. none of the above

42. As per ASME, a welder who is qualified in 5G position of a pipe cannot carry out plate welding in

- a. 1G position
- b. 2G position
- c. 3G position
- d. 4G position

43. For qualifying the welding procedure, the tests to be conducted as per ASME code are

- a. tensile and hardness test
- b. tensile and impact test
- c. tensile test alone
- d. tensile and bend test

44. For qualifying the welder as per ASME, the tests to be performed are

- a. tensile test
- b. impact test
- c. radiographic test
- d. liquid penetrant test

45. The main problem during DC reverse polarity welding using tungsten inert gas welding is

- a. Overheating of the electrode
- b. Insufficient arc cleaning action
- c. Arc instability
- d. Higher requirement for shielding gas

46. When a constant current characteristic power source is used

- a. the current change is more even for a small variation in arc voltage
- b. the current does not change for any variation in arc voltage
- c. the current change is less for a large variation in arc voltage
- d. the current change is equal to the change in arc voltage

47. When helium is used as a shielding gas in place of argon during tungsten inert gas welding, then

- a. the arc temperatures are equal for helium and argon gases
- b. the arc temperature does not depend on the type of shielding gas
- c. the arc temperatures are lower with helium than with argon
- d. the arc temperatures are higher with helium than with argon

48. The flow rate of shielding gas during tungsten inert gas welding is

- a. more for helium than argon since helium is a heavy gas compared to argon
- b. less for helium than argon since helium is a very light gas compared to argon
- c. less for helium than argon since helium is a heavy gas compared to argon
- d. more for helium than argon since helium is a very light gas compared to argon

49. The electrode which is used during tungsten inert gas welding is

- a. thoriated tungsten electrode is used for DC and pure tungsten is used for AC
- b. thoriated tungsten electrode is used for DC and zirconated electrode is used for AC

- c. Pure tungsten is used for DC and thoriated tungsten electrode is used for AC
- d. Pure tungsten electrode is used for DC and zirconated electrode is used for AC

50. The arc stability during AC welding of tungsten inert gas welding is

- a. worse with square wave AC than with sinusoidal wave AC current
- b. same with both square wave AC and sinusoidal wave AC
- c. better with square wave AC than sinusoidal wave AC current
- d. Arc stability is not an issue with AC current

51. The cleaning of aluminium oxide during tungsten inert gas welding is

- a. better with DC reverse polarity as the job surface is bombarded by ions
- b. better with DC straight polarity as the job surface is bombarded by electrons
- c. better with DC straight polarity as the job surface is bombarded by ions
- d. better with DC reverse polarity as the job surface is bombarded by electrons

52. The reignition in the case of sinusoidal wave AC welding during tungsten inert gas welding is achieved by

- a. the use of a high voltage high frequency power
- b. the use of a material with low ionization potential as a filler metal
- c. the use of a power source with constant voltage characteristics
- d. the use of a flux on the job surface

53. When the tungsten electrode in tungsten inert gas welding accidentally touches the job surface during welding, the typical problem which can be expected is

- a. burn through problem as high current is drawn during short circuiting
- b. porosity as the gas flow is disturbed during the accidental touching
- c. cracking as tungsten combines with iron and forms a low melting point compound
- d. tungsten inclusion as the electrode tip may break and get embedded in the weld metal

54. For welding of a pipe, the tungsten inert gas welding is most suitable for

- a. filler passes in the groove
- b. cover passes near the surface
- c. root pass welding
- d. tack welding for good fit up

55. The weld bead width in the case of tungsten inert gas welding is decided by the

- a. welding current
- b. electrode polarity
- c. shielding gas
- d. welding voltage

56. The main advantage in using thoriated tungsten electrode for tungsten inert gas welding process is

- a. thorium helps in overhead position welding
- b. thorium improves the emission of electrons when heated thus ensuring stable arc
- c. thorium prevents tungsten inclusion defect during welding
- d. thorium minimizes the shielding gas consumption

57. The purpose of adding a ferrule in arc stud welding process is

- a. to restrict the entry of atmospheric gases and to shape the weld
- b. to help the welder to locate the stud accurately
- c. to remove surface contaminants
- d. to stabilize the arc

58. Ferrules are not used for capacitor discharge stud welding process since

- a. the protection for the weld is given by inert gases

- b. the protection is not required due to short welding time
- c. the protection for the weld is by a local vacuum
- d. the protection for the weld is by a flux

59. The shortening of the stud length after stud welding is

- a. less in the case of arc stud welding compared to capacitor discharge stud welding
- b. equal in the case of arc stud welding and capacitor discharge stud welding
- c. more in the case of arc stud welding compared to capacitor discharge stud welding
- d. none of the above

60. During arc stud welding, when the plate thickness is less, then

- a. the welding quality is good
- b. there are chances of melt through and plate distortion
- c. the protection from atmospheric gases will not be effective
- d. the total welding time is higher

61. The main purpose of flux coating on shielded metal arc welding electrode is

- a. To prevent rusting of the electrode during storage
- b. To enable smooth transfer of electric current from the power source
- c. To provide gas shielding and slag shielding to the weld metal
- d. To help the welder to locate the weld bead

62. In the case of shielded metal arc welding, the term “electrode feed” refers to

- a. The weaving of the electrode across the line of welding
- b. The extent of penetration in the base metal
- c. The speed of movement of the arc along the line of welding
- d. The movement of the electrode to maintain the arc gap during welding

63. Constant current characteristic power source is used for shielded metal arc welding because

- a. Arc initiation is very smooth
- b. The penetration remains steady even for large changes in the arc length
- c. Welding can be done in all positions
- d. There will no risk of cracking

64. When the duty cycle of a shielded metal arc welding power source is mentioned as 60%, it means

- a. The power source can be operated for 60% time and the balance time must be for cooling the power source
- b. The power source will be used with alternating current with 60 Hz frequency
- c. The power source can deliver only 60% of the rated current
- d. The power source can be used by 60% of the welders

65. The skill level required for a welder is the lowest in

- a. Flat position
- b. Horizontal position
- c. Vertical position
- d. Overhead position

66. A shielded metal arc weld has many gas pockets which are revealed as circles in the radiograph. This defect is called

- a. Slag inclusion
- b. Undercut
- c. Porosity
- d. Lack of fusion

67. The main disadvantage of shielded metal arc welding is

- a. The welding can be carried out only in flat position
- b. Welding defect like slag and porosity cannot be totally avoided
- c. The cost of welding is very high
- d. The welding is not continuous and is intermittent

68. When carbon steel is heated to a temperature above the transformation temperature and is cooled rapidly then the metallurgical phase is expected to be

- a. ferrite
- b. pearlite
- c. austenite
- d. martensite

69. Cold cracking of a carbon steel weld is mainly due to

- a. oxygen which results in formation of oxides
- b. hydrogen which dissolves in the liquid weld metal
- c. carbon which produces carbon dioxide
- d. argon which is inert

70. The purpose of preheating the job before welding is

- a. to increase the extent of penetration
- b. to minimize the porosity problem
- c. to reduce the rate of cooling of the weld metal
- d. to increase the metal deposition rate

71. The residual stresses in the middle of the weldment after welding is completed is expected to be

- a. tensile with a magnitude as high as the yield strength of the material
- b. compressive with a magnitude as high as the yield strength of the material
- c. negligible

- d. either tensile or compressive with a low magnitude

72. The toughness of austenitic stainless steel is

- a. very high compared to that of carbon steel
- b. very low compared to that of carbon steel
- c. equal to that of carbon steel
- d. cannot predict the trend

73. A steel is considered to be stainless steel when it contains

- a. minimum 8% nickel
- b. minimum 0.1% carbon
- c. minimum 0.03% Sulphur
- d. minimum 11% chromium

74. The term weld decay during welding of austenitic stainless steel refers to

- a. the distortion experienced by the weldment
- b. cracking of the weld metal
- c. the formation of chromium carbides close to the weld region
- d. the reduction of the thermal conductivity due to welding

75. The Schaffler diagram in stainless steel is used to determine

- a. the selection of welding current for a given welding system
- b. the hardening of the metallurgical phase due to rapid cooling
- c. the selection of preheat for a given thickness
- d. the metallurgical phase of the alloy for a given chemical composition

76. In the specification "AISI 304L" to denote stainless steel, the letter L stands for

- a. low alloy content
- b. low carbon content
- c. longer length of the welding electrode
- d. low electrical resistance

77. waterwall panels are made of

- a. thin walled tubes for better heat transfer to heat water
- b. thick pipes to store hot water
- c. tubes to pipe configuration to supply cooling water
- d. pipe to pipe intersection to heat water

78. Orbital welding of a pipe refers to

- a. welding of the pipe with pipe rotated during welding
- b. welding of the pipe with the pipe remaining stationary and welding torch going around the pipe
- c. longitudinal welding of the plate formed pipe
- d. circumferential welding between a pipe to another pipe

79. The purpose of qualification of a welding procedure is to

- a. ensure that the welding is completed in time
- b. ensure that the cost of welding does not exceed the expected level
- c. ensure that the deposited weld metal will have the required mechanical properties
- d. ensure that the deposited weld metal is free from distortion

80. When there is a deviation of an essential variable in a qualified welding procedure

- a. The welder has to be trained
- b. The new welding procedure has to be qualified
- c. The welding equipment must be sent for maintenance
- d. The welding electrode has to be changed

81. The purpose of welder qualification is to

- a. Ensure that the welder follows the welding plan
- b. Ensure that the welder has the required formal education
- c. Ensure that the welder has the necessary skill
- d. Ensure that the welder completes welding in time

82. Post weld heat treatment of a pressure vessel is meant for

- a. Removal of oxides from the surface of the weldment
- b. Correction of distortion in the component
- c. Removal of defects in the weldment
- d. Improvement in ductility and reduction of hardness of the weldment

83. Penetrant test is carried out on the weldment to determine

- a. Both surface and subsurface defects
- b. Surface defects
- c. The qualification of the welding procedure
- d. The mechanical properties of the weldment

84. When impact test has been specified in a welding procedure and if there are deviations in supplementary essential variable during welding, then

- a. The weldment cannot be accepted without requalification of the procedure
- b. The weldment cannot be accepted without welder qualification
- c. The weldment cannot be accepted without additional NDT
- d. The weldment cannot be accepted without post weld heat treatment

85. In tungsten inert gas welding, the tungsten is used as

- a. Non consumable electrode to strike the arc with base metal
- b. Non consumable backing to support the weld metal
- c. Consumable electrode to add tungsten as an alloying addition
- d. Consumable electrode for welding of tungsten material

86. In tungsten inert gas welding, the protection to the weld metal from atmosphere is provided by

- a. The use of a flux which is coated around the electrode
- b. The use of a vacuum chamber around the weld metal
- c. The use of inert gas which protects the weld from atmosphere
- d. The use of a coating on the surface of the job

87. Tungsten inert gas welding can be successfully applied for

- a. only carbon steels
- b. carbon steels and stainless steels but not for aluminium
- c. carbon steels, stainless steels, aluminium but not for titanium
- d. carbon steels, stainless steels, aluminium and titanium alloys

88. The major limitation of tungsten inert gas welding is

- a. The quality of welding is inferior
- b. Can be applied only for aluminium alloys
- c. Can be applied only in flat position
- d. The deposition rates are less

89. During tungsten inert gas welding using AC power source

- a. $\frac{2}{3}$ heat is liberated near the job
- b. Equal heat is liberated near the job and electrode
- c. $\frac{2}{3}$ heat is liberated near the electrode

d. The heat liberated does not depend on polarity

90. The arc starting in the case of tungsten inert gas shielding is done by

- a. Touching the job surface with the electrode and retracting it
- b. Using a flux material
- c. Using a high frequency starting
- d. Using a low melting material near the job

91. When the current level in tungsten inert gas welding is much lower than the recommended value, then

- a. the arc stability will not be good
- b. the electrode will get overheated
- c. the arc cleaning action will not happen
- d. the welding can be performed without any inert gas

92. For tungsten inert gas welding using DC straight polarity, the recommended electrode is

- a. Thoriated tungsten electrode
- b. Zirconated tungsten electrode
- c. Pure tungsten electrode
- d. None of the above

93. During tungsten inert gas welding using AC power, the tungsten electrode tip should

- a. Retain sharp tip for better arc stability
- b. Become flat for better arc stability
- c. Can take any shape and does not affect arc stability
- d. Become a ball for better arc stability

94. The recommended shielding gas during tungsten inert gas welding is

- a. Argon with 95.0% purity
- b. Argon with 2% oxygen
- c. Argon with 99.95% purity
- d. Argon with 5% carbon dioxide

95. The advantage of pulsed current tungsten inert gas welding is

- a. Water cooling is not required for the welding torch
- b. The shielding gas consumption can be reduced
- c. The deposition rate can be increased
- d. Required penetration is achieved with lower heat input

96. The power source for tungsten inert gas welding is required to have

- a. Constant voltage characteristics
- b. Constant current characteristic
- c. Constant power characteristics
- d. Constant inductance characteristic

97. The protection from atmosphere in the case of arc stud welding of carbon steel material is by use of

- a. Flux
- b. Inert gas
- c. a local vacuum around the weld zone
- d. None of the above

98. The power supply suitable for arc stud welding of carbon steel is

- a. both DC and AC
- b. Only DC straight polarity
- c. Only DC reverse polarity
- d. Only AC

99. The duty cycle of the power source for arc stud welding is low as compared to that for shielded metal arc welding because

- a. Low currents are drawn from the power source for a long time
- b. High currents are drawn from the power source for a long time
- c. High currents are drawn from the power source for a short time
- d. Low currents are drawn from the power source for a short time

100. The quality of the stud weld can be assessed by

- a. Radiographic test
- b. Destructive test
- c. Ultrasonic test
- d. Magnetic particle test

Viva questions

1. Explain the AWS designation of shielded metal arc welding electrodes.
2. Explain the different edge preparations for the butt joining of plates
3. Explain the characteristics of cellulose, rutile and basic coated electrodes.
4. Explain with a sketch the different welding positions for a plate and a pipe
5. Explain the mechanism of cold cracking in SMAW process
6. List the various advantages and limitations of SMAW process
7. Explain the constant current characteristic power source and how it is useful for TIG welding.
8. What is meant by the term polarity and how does it affect the bead penetration.
9. What are the shielding gases which are used in TIG welding and what are their characteristics.
10. Explain the various defects in TIG welding, causes and remedies.
11. Name some important process parameters and their effect on the bead shape.
12. What is the criteria for the selection of material for various components in a power plant
13. Explain the construction of a waterwall panel.

14. What is a header and how is it fabricated.

15. Explain the arc stud welding process and the equipment.

On the job training

1. What are the electrode diameters and the applicable current ranges in SMAW
2. Explain the pipe welding techniques in 5G position
3. How to achieve complete joint penetration in a butt joint using single vee groove edge preparation.
4. Identify the defects lack of penetration, undercut in a butt joint.
5. Explain the construction of a TIG torch.
6. How is the arc stability ensured in AC TIG welding.
7. How to set the optimum shielding gas flow rate in TIG welding.
8. What are the advantages of pulsed TIG welding over conventional TIG welding.
9. What are the inspection methods for a typical pipe joint.
10. List some defects during welding of tube panels.