

35.22

Manufacturing Technology 1, Set B

Max. Marks: 100

Time: 1.5 hrs.

Date: 25.09.17

Venue: LT- 9 & 10

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| S. No. | Question | Marks |
|--------|---|-------|
| 1 | <p>Explain in brief about:</p> <p>A. Structure of the oxy-acetylene flame.</p> <p>B. Heat balance in resistance spot welding.</p> <p>C. Effect of electrode polarity in GTAW process.</p> <p>D. Limitations and difficulties in SAW.</p> <p>E. Transferred and non-transferred arc in plasma arc welding.</p> <p>F. Functions of a covering on the covered electrodes.</p> | 15 |
| 2 | How does the resistance welding differ from conventional arc welding process ? | 3 |
| 3 | <p>LNMIIT – Jaipur claim that they developed Advanced Submerged arc welding process which can deliver 35% more metal deposition with improved weld metal mechanical properties. Naval metallurgical Research board Ambarnath approaches and visits the facilities at LNMIIT and demanded more metal deposition rate than developed process with slightly better mechanical properties and offer very attractive research grant for same. What should we do ? Do we accept the challenge or deny. If accept, then what will be the proposed solution and why ?</p> | 7 |
| 4 | Surfacing needs high melting rates with minimum dilution, what technology you will adopt to achieve high metal deposition rate with minimum dilution which enables higher hardness of modified surface with SMAW process ? | 5 |
| 5 | T/F statements. Read the statement and comment by writing true (T) or false (F) in the corresponding column. Correct comment will carry +1 and wrong comment will carry - 0.25. | 70 |

| S. No. | Statements | T/F |
|--------|--|-----|
| 1 | 'Ozone' formation is a photochemical reaction by UV radiation. | |
| 2 | A welding arc is a gaseous conductor of electrons. | |
| 3 | A Welding structure can have a joint efficiency of more than 100%. | F |
| 4 | Addition of oxygen to the shielding gas will decrease the fume formation rate. | F |

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| 5 | Autogenous welds are not possible with GTAW. | |
| 6 | Change in type of shielding gas will affect the weld pool with same arc voltage. | T |
| 7 | Chromium is a potential carcinogenic element. | |
| 8 | CO ₂ is the only reactive gas used as shielding gas in GMAW. | T |
| 9 | Constant voltage power supply is a recommended for mechanized process. | F |
| 10 | Crack formation does not commonly associate with resistance welding. | |
| 11 | Difference in freezing temperatures between metals in a metal matrix lead to cold cracking | T |
| 12 | Dirty base metal can cause porosity in welds. | T |
| 13 | Excessive voltage will cause spattering in GMAW process. | |
| 14 | FCAW has the minimum fume formation rate among all welding processes. | F |
| 15 | For nonferrous metals pure argon and helium shielding gives better results. | T |
| 16 | For reactive materials, GMAW is a better process than GTAW. | F |
| 17 | For thicker sections, GTAW is the preferred process. | T |
| 18 | Friction welding processes can be termed as green manufacturing processes. | T |
| 19 | GMAW is best suitable for inaccessible positional welding. | F |
| 20 | GTAW gives the better quality welds compared to GMAW and SAW. | T |
| 21 | In AC welding circuit current always flows from anode to cathode. | F |
| 22 | In Gas Tungsten Arc Welding (GTAW) wire is continuously fed from a spool. | T |
| 23 | In GTAW the power source provides the self-regulating of arc. | F |
| 24 | In GTAW, DC with reverse polarity provides cathodic cleaning. | F |
| 25 | In GTAW, same electrode with different shape changes the weld quality. | T |
| 26 | In GTAW, the shielding gas flow should be arrested before the stoppage of current flow. | F |
| 27 | In most commonly used fuel gases the maximum flame temperatures can be achieved by burning them in an open flame with oxygen. | T |
| 28 | In PESMAW process, oxygen is used to increase the penetration. | T |
| 29 | In PESMAW process, shielding is generated by the covered flux over the tubular electrode. | F |
| 30 | In SAW process increase in voltage with constant current will increase the weld bead width and decrease the alloying pick up from the flux. | F |

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| 31 | In SMAW the electrical supply is at low voltage and high current. | T ✓ |
| 32 | In SMAW the electrode is deposited in a puddle of molten base and filler metal. | T ✓ |
| 33 | In SMAW the flux covering the electrode melts during welding and forms the gas and slag to shield the arc and molten weld pool. | F ✓ |
| 34 | In SMAW, AC is better suited for vertical and overhead positional welding. | T ✓ |
| 35 | In SMAW, arc initiation is easier in AC than in DC. | T ✓ |
| 36 | In SMAW, operator duty cycle is more than that of GMAW process. | T ✓ |
| 37 | In SMAW, power sources with drooper characteristics are preferable. | |
| 38 | In SMAW, when the arc length increases the arc voltage increases and thereby increases the arc current. | F ✓ |
| 39 | Inverter-Power source is one, which increases the frequency of the incoming primary power. | T ✓ |
| 40 | Inverters can help minimize the spatter during welding. | |
| 41 | It is possible to maintain dilution levels less than 10% in single pass. | T ✓ |
| 42 | It is possible to weld a metal plate whose thickness is more than one meter. | T ✓ |
| 43 | Maximum post-weld cleaning is required in GMAW process. | F ✓ |
| 44 | Most pipes are manufactured through welding route. | F ✓ |
| 45 | Multiple wire welding systems are used in SAW process. | F ✓ |
| 46 | Nitrogen dioxide is a by-product due to reaction of UV radiation with atmosphere. | |
| 47 | Oxygen or carbon dioxide additions to the inert shield gas stabilize the arc, but usually result in increased fume formation rates. | |
| 48 | PESMAW process is a multipurpose welding process. | T ✓ |
| 49 | Plasma welding generates highest radiation. | T ✓ |
| 50 | Porosity is not a Stick Welding Problem. | T ✓ |
| 51 | Sharpening of tungsten electrodes will decrease the penetration. | |
| 52 | Shielding gas is used as a coolant in GTAW process. | |
| 53 | Slag inclusions usually do not occur in GTAW welding. | T ✓ |
| 54 | The amount and character of radiation emitted by arcs depend fundamentally on atomic mass. | T ✓ |
| 55 | The arc in Helium is more penetrating than Argon. | T ✓ |

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| 56 | The bigger the height of reinforcement the better the weld strength. | F ✓ |
| 57 | The biggest advantage of welded joints is that virtually all materials can be welded with ease. | T ✓ |
| 58 | The deadly gas phosgene is generated by the decomposition of Chlorinated hydrocarbons by IR radiation. | F ✓ |
| 59 | The flux also provides a method of deoxidizers to the weld metal. | T ✓ |
| 60 | The heated gas of the plasma arc can attain a maximum temperature around 50,000 K. | |
| 61 | The intensity delivered by the welding power source is expressed in watts | - |
| 62 | The maximum currents in resistance welding may be as great as 200,000 A. | BT ✓ |
| 63 | The slag inclusion in welding is non-metallic in nature. | T ✓ |
| 64 | The term 'exothermic' refers heat consumption during chemical reaction. | T ✓ |
| 65 | The tungsten electrode is alloyed to reduce the current carrying capacity thereby reducing power consumption. | |
| 66 | The welding pool width is proportional to the arc length. | T ✓ |
| 67 | Water vapour in welding is detrimental. | T ✓ |
| 68 | Weldmetal toughness is much more sensitive to temperature than strength and hardness. | T ✓ |
| 69 | Welded joints are superior to Riveted Structures in arresting the fracture propagation. | |
| 70 | With alternating current SMAW produces more spatter. | T ✓ |

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8.5



Mechanical Mechatronics Engineering Department

End - Term Examination, 3rd Semester 2017

All questions are compulsory. Use of unfair means are strictly prohibited.

Subject: Manufacturing Technology 1

Duration: 3 Hour

| S. No. | Question | Marks |
|--------|--|-------|
| ✓ 1 | Explain the physics behind arc formation in arc welding process ? | 5 |
| ✓ 2 | Explain the limitation of SMAW process and how it overcome with PESMAW process ? | 6 |
| 3 | Identify various welding defects in figure given below: | 5 |
| ✓ 4 | Wright various controlling process parameters of following process along with their effect on bead geometry ? SMAW, GMAW, SAW, GTAW and <u>ASAW</u> . | 12.5 |
| ✓ 5 | Explain various defects in casting process ? | 6 |
| ✓ 6 | Explain the various parameters to achieve sound casting ? | 8 |
| ✓ 7 | Explain the following casting processes with suitable diagram ? GREEN sand casting, investment casting process, Die casting process, <u>injection molding process</u> , last foam casting process. | 20 |
| ✓ 8 | In construction industry various material mixed in a wet mixture and fed through flexible pipe, find out the wear mode, select the composition of material and propose process to manufacture one feet pipe with 8 mm thickness to resist the wear. Hardness of material should not below 60 HRC ? | 7.5 |

