Subject:	Engineering	*Title in Book:*	Welding	*Chapter:*	N/A	*Page Numbers:*	N/A

Questions 2005-2016:

KEY POINTS / QUESTIONS:	*DETAILS / ANSWERS:*
HOW TO PREVENT POROSITY IN WELDS:	• Make sure the gas tank isn't empty • Clean surfaces thoroughly • Eliminate moisture • Eliminate drafts in the air • Make proper use of anti-spatter compounds • Make sure the gas flow is at the right pressure • Weld at a steady pace
WHY USE MIG WELDING:	• Effective way of welding mild steel even in tubular form. • It is easy to setup and use • The torch can be manoeuvred easily • Mild steel welding electrode is commonly used
SAFTEY PRECAUTIONS TO CONSIDER:	• Ensure equipment is well maintained – cables insulated and secured • Clean the materials to be welded to remove dirt and grease • Ensure the area is well ventilated • Wear protective clothing – e.g. welding apron and mask • Erect a welding curtain
METHODS OF JOINT PROTECTION:	• The flux on the electrode – when burned it creates a gas shield and also forms a slag • The inert gas shielding in both MIG and TIG • The layer of flux blocks out contaminants in SAW • The Oxyacetylene flame
OXYACETYLENE SAFETY PRECAUTIONS:	• Ensure flashback arrestors are in place • Observe colour coding • Pieces must be cleaned to remove oil and grease • Thoroughly clean the torch before use
COLOUR CODING IN OXYACETYLENE WELDING:	• Oxygen cylinder is black and the acetylene is maroon • Hoses and regulators are colour coded – Red for acetylene and blue for oxygen • Ensure the right gas is turned on/off at the right time
WHAT IS DISSOLVED ACETYLENE:	If acetylene is compressed at high pressures it will explode therefore a porous material soaked in acetone is added to the cylinder. This can absorb up to 25 times its own volume in acetylene. Acetylene in this form is known as dissolved acetylene.
HOW TO MINIMISE ELECTRICAL HAZARDS:	• MMA welding machines are protected from electrical surges • Welding stations should be free form dampness • Welding machines are earthed • Wires and electrode holders are insulated • Power should be adjusted to a suitable level
WHY USE PROGRAMMABLE ROBOTS:	• They allow for precise movements • Motions are accurate, consistent and repeatable • Speed of the motions can be adjusted and controlled • Movements can be changed and reprogrammed • Similar drive mechanisms can be used in a variety of machines

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USES OF ROBOTS IN INDUSTRY:	• Painting • Circuit assembly • Fabrication • Picking and placing of parts • Component testing • Welding
METHODS USED TO CONTROL A ROBOTS MOVEMENTS:	• Electro-mechanical • Hydraulic • Pneumatic
WHAT IS THE WORK ENVELOPE:	Is the volume of space in which the robot can operate. It outlines the places reachable by the robot and is also used to prevent collisions between robots.
DEGREES OF FREEDOM:	This is the number of ways in which a robot can move. A single joint provides one degree of freedom and different joints provide a variety of degrees of freedom e.g. rotary or linear.
BENEFITS OF ROBOTS IN HAZARDOUS ENVIROMENTS:	• Robots can be controlled from a distance - removing the operator from danger • Robots can be shielded from hazardous materials • Robots can be repaired or replaced
WHY IS TIG SUITABLE FOR WELDING ALLUMINIUM:	Aluminium oxidises very quickly when heated. TIG overcomes this with the use of an inert gas and the cathodic action of the arc.

Summary: