2850-253 DECEMBER 2014
Level 2 Certificate/Diploma in Engineering (IVQ)
Principles of manufacturing technology

Monday 8 December 2014
09:30 – 11:30
You should have the following for this examination
• one answer book
• drawing instruments
• calculator

General instructions
• All intermediate steps in calculations must be shown.
• All questions do not carry equal marks. The maximum marks for each section within a question are shown.
• All pressures are absolute unless otherwise stated.
• Answer all questions.
1 a) Name **four** departments, other than stores and sales, within a manufacturing organisation. (4 marks)
b) Describe the function of **two** departments named in part a). (4 marks)

(Total marks 8)

2 a) State the type of organisation for **each** of the following companies that
i) is a production line filling cans with soft drinks
ii) constructs tower cranes on site
iii) provides hand tools
iv) carries out portable electrical appliance testing. (4 marks)
b) Classify, as light, medium or heavy engineering, **each** of the organisations listed in part a). (4 marks)

(Total marks 8)

3 a) State **four main** differences between jobbing and mass production. (4 marks)
b) State which type of manufacturing process fits **each** of the following descriptions.
   i) A small quantity of products to be produced once.
   ii) Production of a very large quantity of the same type of product.
   iii) An individual product.
   iv) Medium scale manufacturing for products produced on a regular basis. (4 marks)

(Total marks 8)

4 a) State the **main** difference between general purpose and dedicated equipment. (1 mark)
b) Identify **each** of the following types of equipment as general purpose, computerised or dedicated.
   i) Hammer.
   ii) Simulator.
   iii) Test equipment.
   iv) Pulley extractor.
   v) Lathe. (5 marks)

(Total marks 6)

5 a) Describe the **main** difference between thermosetting plastic and thermoplastic. (2 marks)
b) Classify **each** of the following metals as ferrous or non-ferrous.
   i) Copper alloy.
   ii) Aluminium.
   iii) Stainless steel.
   iv) Cast iron. (4 marks)
c) Describe **each** of the following properties of materials.
   i) Elasticity.
   ii) Toughness. (4 marks)

(Total marks 10)

6 Name **ten** forms of material supply. (10 marks)

(Total marks 10)
7 a) Specify one non-permanent fastening suitable for each of the following situations.
i) Securing wheels to a vehicle.
ii) Positive drive of a pulley system.
iii) Fixing a bracket to a wall.                           (3 marks)
b) Specify one permanent fastening for each of the following situations.
i) Jointing the conductors of copper cables.
ii) Jointing brass components.
iii) Joining together sections of steel pipe.              (3 marks)
c) Describe how a non-permanent fixing would be used to stop a castellated nut from vibrating loose when used on a wheel hub assembly.   (2 marks)
d) Give two examples of permanent fixing methods that could be used to join together two sides of a shape cut from a sheet of copper.        (2 marks)
(Total marks 10)

8 a) State four economic factors which need consideration in manufacturing processes. (4 marks)
b) Describe each of the following terms in reference to economic costs of production.
i) Breakeven.                                      (6 marks)
ii) Capital.                                          (6 marks)
iii) Inflation.                                      (Total marks 10)

9 a) State four production requirements to manufacture routine components in an engineering organisation.  (4 marks)
b) Describe the function of any three of the production requirements stated in part a). (6 marks)
(Total marks 10)

10 a) State two information requirements to produce components to specification.  (2 marks)
b) With reference to the selection of the correct material for a component manufacturing process.
i) State two items of information that are required. (4 marks)
ii) Give one typical example for each item of information identified in part b) i). (Total marks 6)

11 a) Name two direct costs other than direct labour.  (2 marks)
b) Describe one of the costs named in part a). (2 marks)
c) Name two indirect costs other than heating.  (2 marks)
d) Describe one of the costs named in part c). (2 marks)
(Total marks 8)

12 Draw a flow chart to show the stages, including quality checks, for producing a component on a lathe.       (6 marks)
(Total marks 6)