

Name: _____ Index No. _____

0516/104

METAL PROCESSING TECHNOLOGY

TRADE THEORY

Oct./Nov. 2010

Time: 2 hours

Candidate's Signature: _____

Date: _____

THE KENYA NATIONAL EXAMINATIONS COUNCIL

NATIONAL VOCATIONAL CERTIFICATE IN EDUCATION AND TRAINING

METAL PROCESSING TECHNOLOGY LEVEL I

2 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

Answer booklet;

Drawing instruments;

Pencil;

Eraser.

Write your name and index number in the spaces provided at the top of this page.

Sign and write the date of examination in the spaces provided above.

*This paper consists of **TWO** sections; **A** and **B**.*

*Answer **ALL** the questions from section **A** and any **FOUR** questions from section **B**.*

All questions in each section carry equal marks.

*Maximum marks for each part of a question in section **B** are as shown.*

This paper consists of 8 printed pages.

Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

SECTION A

*Answer ALL the questions in this section.
Use pencil to strike through (P) your correct answer.
Each question carries 1 mark.*

1. Identify the suitable material for use in a mould when casting among the following:
 - (a) clay
 - (b) murram
 - (c) green sand
 - (d) loam sand
2. Which of the following metals is suitable for sand casting process?
 - (a) mild steel
 - (b) copper
 - (c) aluminium
 - (d) cast steel
3. **One** advantage of forging over casting is:
 - (a) less metal is wasted
 - (b) heat is not required
 - (c) less labour is required
 - (d) electricity is not required
4. **One** of the following is a metal heat treatment process:
 - (a) galvanising
 - (b) hardening
 - (c) painting
 - (d) smelting
5. Which one of the following is **not** a forging process:
 - (a) twisting
 - (b) upsetting
 - (c) bending
 - (d) shaping
6. Identify the tools used by a blacksmith among the following:
 - (a) pick-up tongs, anvil
 - (b) calipers, micrometer
 - (c) flat file, anvil
 - (d) flat chisel, sledge hammer

7. The following are the most suitable sources of fuel for a forge shop:
- (a) charcoal, coke, coal
 - (b) oxyacetylene set, blow lamp, L. p gas
 - (c) firewood, charcoal, electric heater
 - (d) wax, candle, oil burner
8. One of the following is not a desired property in metals:
- (a) hardness
 - (b) brittleness
 - (c) roughness
 - (d) toughness
9. Which welding method would be selected for welding thick metals?
- (a) gas welding
 - (b) spot welding
 - (c) arc welding
 - (d) brazing
10. In the workshop arc welding should be carried out in a booth in order to:
- (a) prevent other students not to copy your work
 - (b) protect yourself from the welding light
 - (c) protect other people from glare
 - (d) keep smoke from other people
11. In oxyacetylene welding, which gas is used as the fuel?
- (a) oxygen
 - (b) hydrogen
 - (c) biogas
 - (d) acetylene
12. Which one of the following is the cause of backfire in gas welding?
- (a) too much oxygen
 - (b) metal is too hot
 - (c) dirty nozzle orifice
 - (d) too much liquid metal

13. A corrosive welded joint could have been as a result of:
- (a) too much acetylene
 - (b) less oxygen
 - (c) too much oxygen
 - (d) washing the joint
14. Sheet metal may be made from the following materials:
- (a) mild steel, cast iron, zinc
 - (b) copper, brass, lead
 - (c) aluminium, copper, zinc
 - (d) brass, aluminium, copper
15. Safe edge in sheet metal is produced by:
- (a) ribbing
 - (b) nicking
 - (c) wire edge
 - (d) punching
16. Which of the following is a soldering flux:
- (a) borax
 - (b) killed spirits
 - (c) silica
 - (d) alumina
17. The developed pattern of a conical sheet metal container is to be cut-out. Which of the following tools would be most suitable?
- (a) hammer and chisel
 - (b) hacksaw and chisel
 - (c) curved snips and bench vice
 - (d) straight snips and bench vice
18. Which of the following is a sheet metal pattern layout tool?
- (a) a pair of dividers
 - (b) template
 - (c) anvil
 - (d) pattern

19. One of the following is a sheet metal joint. Which one is it?
- (a) double seams
 - (b) double vee
 - (c) flared edge
 - (d) knocked up edge
20. Identify a soldering tool among the following:
- (a) hatchet iron
 - (b) screw driver
 - (c) blow lamp
 - (d) charcoal hearth
21. One of the following is a cause of tap breakage when tapping. Identify it.
- (a) hammering
 - (b) non-reversal
 - (c) application of oil
 - (d) using a small diameter tap
22. The cost of a component will be determined by:
- (a) cost of material
 - (b) cost of labour and materials
 - (c) cost of materials, labour and overheads
 - (d) cost of labour, electricity and tools
23. The following is a correct order of accuracy for measuring tools:
- (a) engineer's rule, vernier caliper, micrometer
 - (b) tape measure, vernier caliper, engineer's rule
 - (c) micrometer, steel rule, vernier caliper
 - (d) steel rule, micrometer, vernier caliper
24. A milk jug would be best made from the following material:
- (a) copper
 - (b) tin plate
 - (c) galvanised sheet metal
 - (d) aluminium

25. Which of the following tools is a finishing tool in metal removal:
- (a) scraper
 - (b) bastard file
 - (c) hand file
 - (d) diamond chisel
26. In a fitting exercise files should be used in this order:
- (a) round file, half-round file, smooth file
 - (b) bastard file, smooth file, second cut file
 - (c) bastard file, second cut file, smooth file
 - (d) double cut file, single cut file, smooth file
27. Rivets are classified according to their:
- (a) shape
 - (b) heads
 - (c) diameter
 - (d) length
28. Work surface is protected from damage when clamped in a vice by the use of:
- (a) cotton waste
 - (b) cardboard
 - (c) wooden blocks
 - (d) soft jaws
29. Which of the following statements is true for safety in a workshop?
- (a) use of cotton waste when handling hot metal
 - (b) wear goggles when arc welding
 - (c) know the position of all emergency power switches
 - (d) all waste to be put in a dust-bin
30. If a file is used as a tommy bar to tighten the vice, the following might happen:
- (a) vice may be very tight
 - (b) file may injure the student
 - (c) file may damage the vice
 - (d) file may be broken

SECTION B

*Answer any **FOUR** questions from this section in the answer booklet provided.
Each question carries 5 marks.*

31. (a) A carbon steel chisel is to be made in the workshop. State the heat treatment required to be carried out on it. (1 mark)
- (b) State the meaning of 'mushroom head' chisel (1 mark)
- (c) State how the condition in (b) can be corrected. (2 marks)
- (d) State the purpose of annealing metal. (1 mark)
32. (a) A gear shift lever is to be made from steel. State a forging process by which the hand grip knob would be made. (1 mark)
- (b) Sketch a set-up for the forging process in (a). (1½ marks)
- (c) Circular window grill decorations are to be made from a mild steel rod of diameter 10 mm. If the inside diameter is 72 mm calculate the length of the material to be cut. (1½ marks)
- (d) List any two methods by which the material in (c) would be cut. (1 mark)
33. (a) Name a suitable tool for each of the following operations:
- (i) scribing a line parallel to an edge
- (ii) riveting hammer
- (iii) hammering sheet metal body (3 marks)
- (b) Sketch a flat chisel. (1 mark)
- (c) Define burrs. (1 mark)

34. (a) Name **three** types of flames used in oxy-acetylene gas welding. (3 marks)
- (b) A student could not sleep in the night for the eyes were sore after gas welding. State the most likely cause for this. (1 mark)
- (c) State how the oxy-acetylene set should be safely kept. (1 mark)
35. (a) State a safety precaution for each of the following in order to prevent injury to the worker.
- (i) vee-belt pulley drive
 - (ii) using hand grinder
 - (iii) guarding of legs against welding sparks. (3 marks)
- (b) State **two** causes of drilling breakage while drilling. (2 marks)