

**CHRISTIAN SOCIAL SERVICES COMMISSION (CSSC)
NORTHERN ZONE JOINT EXAMINATION SYNDICATE (NZJES)
FORM TWO PRE- NATIONAL EXAMINATIONS 2024
CODE : 090 MECHANICAL ENGINEERING
MARKING SCHEME**

1. TEN 10 (MARKS)

I	ii	iii	iv	v	vi	vii	viii	ix	X
A	C	C	C	A	A	B	C	C	C

2. FIVE 5 (MARKS)

I	ii	iii	iv	v
D	G	C	F	A

3. (a) FIVE 5 (MARKS)

- i. Iron- white cast iron contains about 90% of iron
- ii. Sulphur – Iron impurity it compose 4.5% g iron
- iii. Silicon – Is an impurity it contains 0.5% g iron
- iv. Phosphorus- is an impurity contain 1% of iron
- v. Carbon – is chemically combined about 4%

(b) (i) Malleable cast iron can be easily coated forged and be machined well.

(ii) Malleable cast iron is strong and hard

(iii) Malleable cast iron is less brittle

(iv) Malleable cast iron can be rolled extracted or hammered

(v) Malleable cast iron has high tensile strength and it is ductile

4. (a) five 5 (MARKS)

- i. Bolts hole ii. Fixed jaw iii. Body
- ii. Jaws plate
- iii. Movable jaw

(b) **FIVE 5 (MARKS)**

- i. For the manufacture of horticultural equipment
- ii. For the manufacture of car bodies
- iii. For the manufacture of engine blocks
- iv. For making lead springs
- v. Used in fabrication of metal sheets

5. (a) FIVE 5 (MARKS)

- i. Arch crater : Is a basin shaped hole that occurs when the work piece treated and the filled by slag.
- ii. Arch blow: Are randomly movement of arc during welding the work piece
- iii. Welding polarity: Are the two inputs which are positive and negative charges that causes arc to be obtained.
- iv. Flux: Is a material that coats an electrode so as to protect molten metal from atmospheric air and support combustion
- v. Arc length: Is the length that should be left between electrode and the work piece so that arc can be obtained and take place.

(b) FIVE 5 (MARKS)

- i. Wearing appropriate personal protective equipment
- ii. Avoid jokes and careeners during work
- iii. Working with a correct tool of working
- iv. Operating tools and equipments by following their rules
- v. Use a proper tool and equipments for proper job

6. TEN 10 (MARKS)

- a. To avoid accidents that may cause injuries and even disabilities
- b. To ensure safety and security
- c. To prevent loss of properties and damage of properties
- d. To prevent death of people
- e. To reduce destruction and danger

7. TEN 10 (MARKS)

- i. Teeth breakages
 - Improper use of hacksaw
 - Bad practice of cutting
- ii. Excessive teeth wear
 - Poor holding of the hacksaw
 - Bad cutting position
- iii. Blade breakages
 - Poor closing of the blade to the frame
 - Lastly bad cutting position

- (b) (i) You must ensure the blade is tighten connected to the frame
 (ii) You must tight the device properly
 (iv) You must stay in a good position while cutting
 (iv) You must handle well the hacksaw while cutting

8. (a) Advantages Marks (5)

- i. It can be used in widely manufacturing and maintenance situations
- ii. It can be used for cutting metal
- iii. It can be applied in a place where there is no electricity
- iv. The cost and maintenance of equipment is low
- v. The operator has got a better control since the source of heat and filter metal are separately

(b) Disadvantages Marks (5)

- i. It is very slower process compared to electric welding
- ii. The oxygen is more expensive
- iii. More safety problems are involved in storing and using equipment
- iv. It does not provide the complete shield
- v. It provides harmful radiation and needs skilled welders

9. (a). Six 6 (Marks)

- i. Water : water extinguishers can be used on solid fires and small fires such as papers or burning, paper wood and plastics
- ii. Foam type: May be used to extinguish fires made by liquids such as fire from Petroleum and diesel.
- iii. Carbon dioxide can be used to extinguish fires from electrical source.

(b) Four 4 (Marks)

- (i) Avoid carelessness and skylarking when handling the mechanical equipment
- (ii) Handle the mechanical equipment properly and with care.
- (iii) Make sure that the equipment is held firmly
- (iv) Keeps the equipments in a safe manner and making is kept rigid from damage or falling

10. (a) The type of furnace to install is Cupola furnace

Because it may conduct three zones such as Oxidizing zone, reducing zone and electrical zone.

4 Marks

(b) (i) The furnace make iron production easier

(ii) The furnace is very cheaper

(iii) The furnace is very accurate

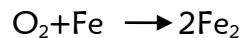
(iv) The furnace is easier to manage

4 Marks

(c) (i) Combination or Oxidizing zone

Heating of Iron converts to produce pig iron

Chemical reaction: Oxygen + Iron $\xrightarrow{\text{Heat}}$ contaminated molten



(ii) Reducing zone. Reduction being conducted it means it make cool of the iron overheating.

(iii) Melting zone: Is the changing of iron to molten pig Iron.

Iron Ore + Limestone + Coke $\xrightarrow{\text{Heat}}$ Molten pg Iron