

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

COLLEGE OF ENGINEERING END OF SEMESTER EXAMINATIONS

B.Sc. (Engineering) First Semester Examination, 2009/10. First Year

ME 195/CE153: ENGINEERING TECHNOLOGY 1 PARTI TIME

ALLOWED: 3hrs

NO BOOKS ARE ALLOWED ANSWER ALL QUESTIONS.

- Q1 . a) Describe how a 4-cylinder petrol engine works and state the two possible firing orders.
- b) State two main differences between a petrol engine and a diesel engine.
- c) Briefly describe how power transmission from the engine to the drive wheels.
- Q2. a) With the aid of a diagram, describe the basic gas welding process.
- b) Sketch and label the electric arc welding equipment.
- Q3. a) Which machine tools will you select for the following operations?
- i) Produce a shaft with steps and a thread at one end and keyway at the other end. (two machines)
- ii) Produce a gear with a small bore and a keyway. (three machines)
- iii) Produce one thousand bolts and nuts, (one machine)
- b) List four (4) measuring instruments excluding the rule, Sketch any two of them and show how they are used to measure a specific value.
- Q4. a) Explain briefly how solar energy is used to operate a 240V/10A refrigerator.
- b) Name any three other alternate sources of non -conventional energy.
- c) Name two types of refrigeration compressors and explain two principal differences.
- d) With the aid of a diagram, describe how an air conditioner works.
- Q5. a) Explain how a horizontal oil-fired fire tube boiler generates superheated steam. b)
- State three uses/applications each of the following?
- i. Steam ii) Compressed air

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In a refrigerator, the..... compresses the.....
gas. This raises the pressure and so the
heat-exchanging coils outside the refrigerator allow theto dissipate
the heat of pressurization.

As it cools, the refrigerantinto liquid form and flows
through the valve. When it flows through the
..... valve, the liquid refrigerant is allowed to move from a
.....pressure zone to a pressure zone, so it expands and
.....•..... In so doing, it absorbs....., making it cold. The coils inside
the refrigerator allow the to absorb..... making the inside of the
refrigerator cold. The cycle then repeats.

Carnage

Bed.....

Dead Centre

Longitudinal and Transverse Feed Control

Face plate

Q3. Insert the name of the appropriate machine in the following sentences:

A Machine is generally/commonly used to manufacture gear teeth

A Machine is generally/commonly used to manufacture external keyways

A Machine is generally/commonly used to manufacture internal keyways

A Machine is generally/commonly used to make multiple holes in a flat plate

A Machine is generally/commonly used to make smooth flat surfaces

A Machine is generally/commonly used to manufacture one million bolts

A Machine is generally/commonly used to manufacture thread on a short shaft

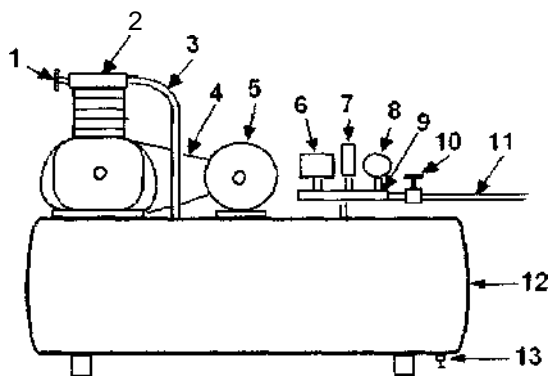
Q4. Label the electric arc welding schematic shown below

List any five types of fire extinguishers

IV. State five ways of providing adequate protective disease control measures

IV.

Q9. LABEL THE DIAGRAM SHOWN BELOW. What equipment is this?



Q1. State one function of the following parts in an automobile.

- Radiator
- Carburetor
- Piston rings
- Piston
- Flywheel
- Alternator
- Battery
- Condenser
- Crankshaft
- Ignition coil
- Gearbox
- Propeller Shaft
- Clutch

Contact Set
Cam Shaft
Muffler/Silencer

CHOOSE THE CORRECT WORD/SET:

A car engine converts fuel into: i: exhaust gases ii: heat iii: motion

A car uses a four-stroke engine. The four strokes are

intake, compression, ignition and exhaust

injection, rotation, ignition and exhaust

injection, carburetion, rotation and exhaust

A turbocharger is:

a set of gears that makes the wheels turn faster

a turbine that compresses the air traveling into the engine

an injector that delivers fuel to the engine faster

List three most common type of springs used in modern car suspensions?

i..... ii..... iii.....

Which type is used in the chassis in the automobile workshop?

Q2. State one function of the following parts in a Lathe machine.

Apron
Split Nut Control.....

Clutch

Feed Selector

Hand Wheel

Spindle Speed Selector

Chip Pan

Cross Slide

Compound

Headstock Assembly

Tool Post

Guide ways

Spindle with Chuck

Tail Stock Assembly

Feed Rod (Screw)

Lead Screw

Carriage

Bed

Dead Centre

Longitudinal and Transverse Feed Control

Face plate

Q3. Insert the name of the appropriate machine in the following sentences:

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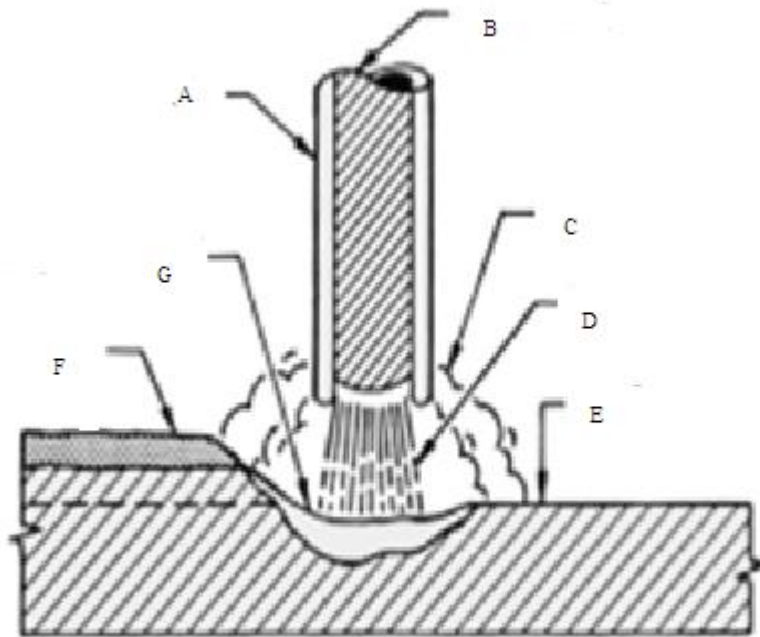
A Machine is generally/commonly used to make multiple holes in a flat plate

A Machine is generally/commonly used to make smooth flat surfaces

A Machine is generally/commonly used to manufacture one million bolts

A Machine is generally/commonly used to manufacture thread on a short shaft

Q4. Label the electric arc welding schematic shown below



A..... B..... C.....

D..... E..... F..... G.....

Fill in the blank spaces with the appropriate word:

In arc welding, the intense needed to melt metal is produced by an arc. The arc is formed between the actual work and an that is manually or mechanically guided along the joint. Arc welding may be done with current with the electrode either positive or negative or current. The choice of current and polarity depends on the, the type of, the arc atmosphere, and the being welded

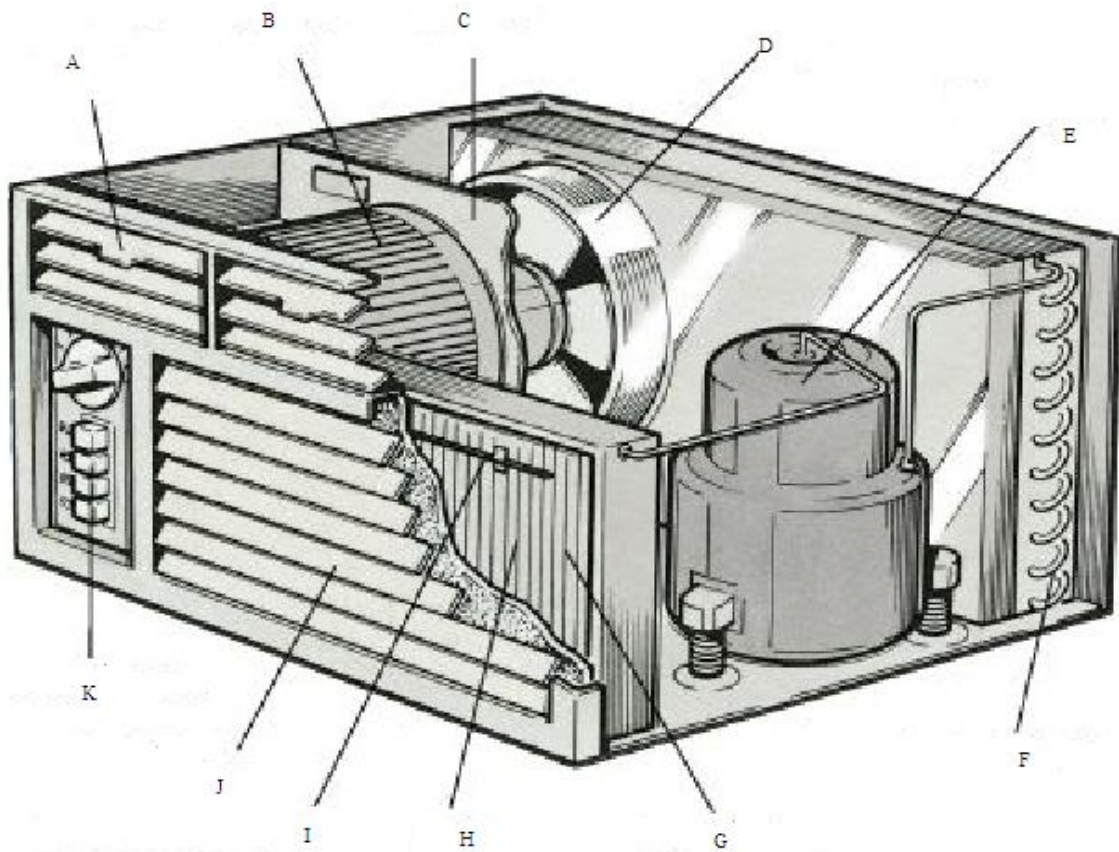
Q5. Fill in the blank spaces with the appropriate word

In a refrigerator, the compresses the gas. This raises the pressure and, so the heat-exchanging coils outside the refrigerator allow the to dissipate the heat of pressurization.

As it cools, the refrigerant into liquid form and flows through the valve. When it flows through the valve, the liquid refrigerant is allowed to move from a

..... pressure zone to a pressure zone, so it expands and
 In so doing, it absorbs making it cold. The coils
 inside the refrigerator allow the to absorb, making the
 inside of the refrigerator cold. The cycle then repeats.

LABEL THE DIAGRAM SHOWN BELOW



A..... B..... C.....
 D..... E..... F.....
 G..... H..... I.....
 J..... K.....

What are the functions of:

B.....
 D.....
 E.....
 F.....
 G.....

Q6. State the instruments you would use to measure the following:

An internal measurement (bore) to an accuracy of two decimal places

An internal measurement (bore) to an accuracy of three decimal places

The depth of a hole estimated to be about 51 mm to two decimal places

The depth of a hole estimated to be about 51 mm to three decimal places

A round solid bar 55.355 mm. in diameter

The included angle of a taper gauge.....

Checking a horizontal surface for leveling.....

What is meant by a standard M 46/2 slip gauge set

.....
.....

Q7.It is required to provide 220-240 volt solar power system to one of the classrooms in the faculty. Make a list of six components and materials required and state the purpose of each one.

Component/material	Purpose
.....
.....
.....
.....
.....
.....

State any SIX applications of solar energy

- i.
- ii.
- iii.
- iv.
- v.
- vi.

Q8. List the three basic elements required for a fire to start:

i ii iii

In machines, the hazards to the operators arise from the unguarded points of operation, such as

i.....

ii.....

iii

iv.....

In fire protection some advantages of sprinkler systems are:

i.....

ii.....

iii

iv.....

v

List any five types of fire extinguishers

i.....

ii.....

iii

iv.....

v

State five ways of providing adequate protective disease control measures

i.....

ii.....

iii

iv.....

v