

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

COLLEGE OF ENGINEERING

B.Sc. (Engineering) First Semester Examination, 2013, First Year

ME 195/CE 153: ENGINEERING TECHNOLOGY

TIME ALLOWED: 3 Hrs

ANSWER ALL QUESTIONS. In PARTS I, II & III SEPARATELY.

NO BOOKS ARE ALLOWED

INDEX NUMBER:

PART I (MECHANICAL)

PROGRAMME/DEPARTMENT:

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- Q1. Sketch in 2D in the space below any of the CENTRE LATHE machine in the machine shop and label the following: Tailstock, Headstock, Compound Slide, Tool holder, Cross slide, Feedshaft, Leadscrew, Barrel, Tool post, Chuck, Jaws, Gear levers, Dead Centre, Bed, Apron
(30 marks)

Q2. Parts in an automobile. (10 marks)

- i. State the difference between Crankshaft and Camshaft
.....
- ii. State what is common with Crankshaft and Camshaft
.....
- iii. What is Dead Center in relation to engine Piston
.....
- iv. State one function of Battery
.....

CHOOSE THE CORRECT WORD/SET:

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

Q3. Insert the name of the appropriate machine in the following sentences: (15 marks)

- A Machine is generally/commonly used to manufacture gear teeth
- AMachine 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. Fill in the blank spaces with the appropriate word:

(10 marks)

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

(10 marks)

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.

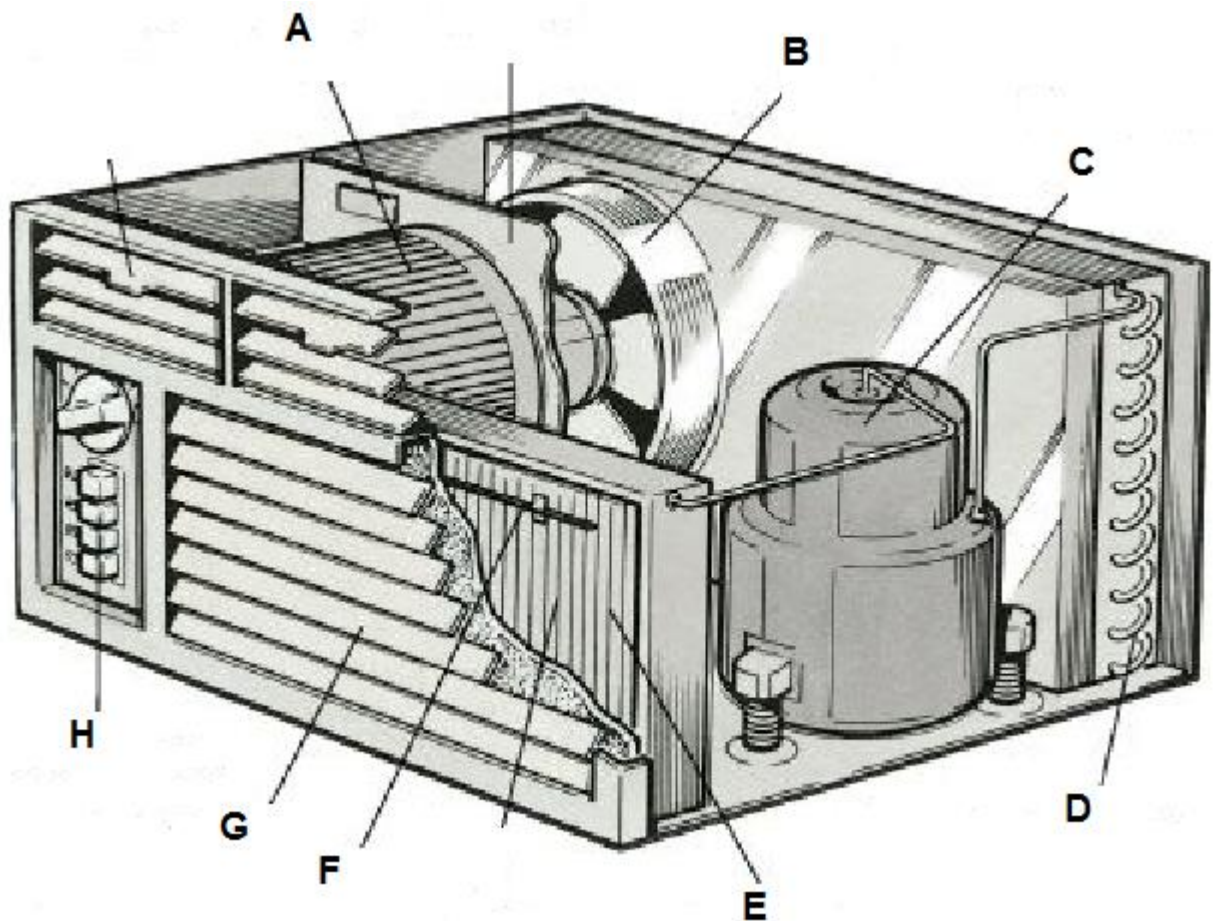
Q6. State the instruments you would use to measure the following:

(10 marks)

An internal measurement (bore) to an accuracy of two decimal places
The depth of a hole estimated to be about 51 mm to two decimal places
A round solid bar 55.35 mm. in diameter
Checking a horizontal surface for leveling.....

Q7. LABEL THE DIAGRAM SHOWN BELOW

(15 marks)



A.....
 C.....
 E.....
 G.....

B.....
 D.....
 F.....
 H.....

What are the functions of?

B.....
 C.....
 D.....
 F.....
 G.....

Q8. It is required to provide 220-240 volt solar power system to one of the classrooms in the college.
 Make a list of six components and materials required. Do not give quantities and state the purpose of each one. **(12marks)**

Component/material	Purpose
i.
ii.
iii.
iv.
v.
vi.

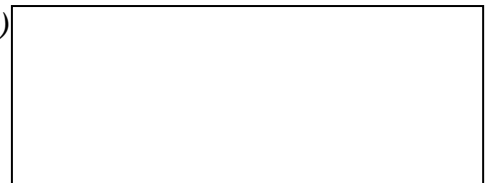
Q9. Name any three other alternate sources of non -conventional energy **(6 marks)**

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

Q10. Suggest **four** uses of compressed air **(4 marks)**

- i.
- ii.
- iii.
- iv.

Q11. Sketch and label a carburizing flame in the box **(3 marks)**



Q12 Sketch and label an oxidizing flame in the box **(3 marks)**



- Q13 Write down the names of the parts A - E indicated on the steam boiler in Figure 1. And state the function of each one (15 marks)

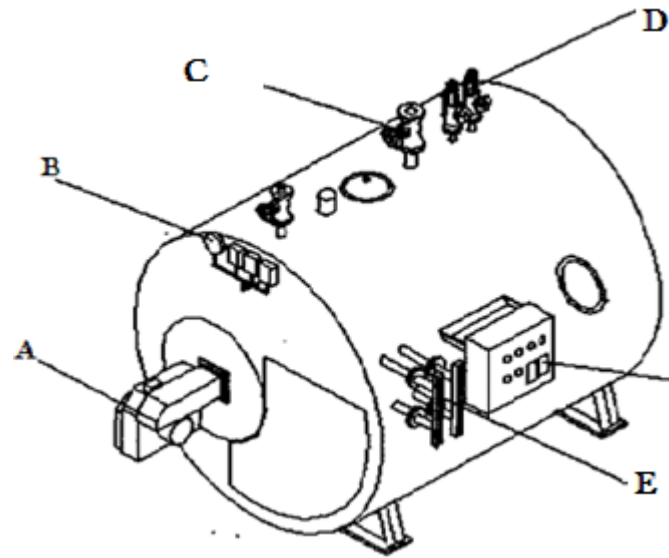


Figure 1: Steam Boiler

TABLE	FUNCTION
A:
B.
C.
D.....
E.

- Q14. Write down the appropriate names of the two milling machines shown in Figures 2 and 3 (4marks)

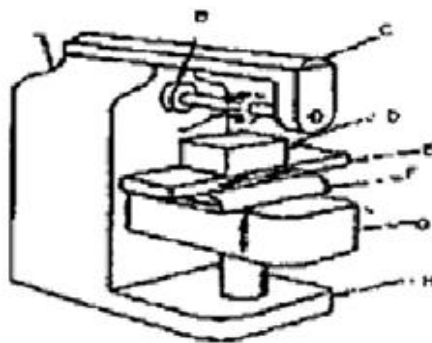


Figure 2:

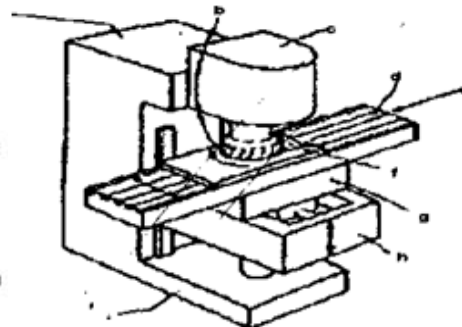


Figure 3:

Q15. List any four types of fire extinguishers (4 marks)

- i.
- ii.
- iii.
- iv.

Q16. Label the diagram in Figure 4 for an oxy-acetylene cutting system. (14 marks)

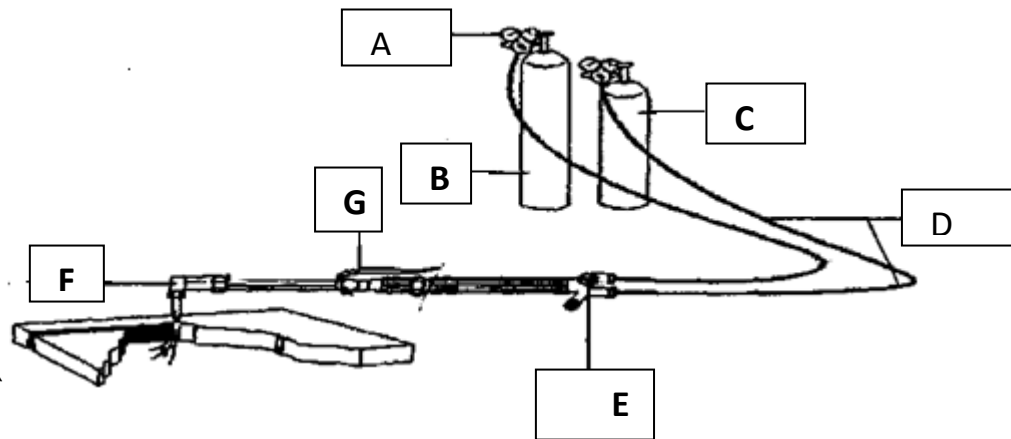


Figure 4: Gas welding set

- | | |
|---------|---------|
| A | B |
| C | D |
| E | F |
| G | |

Q17. State the reading on the micrometer shown in figure 5 Ans: (3 marks)

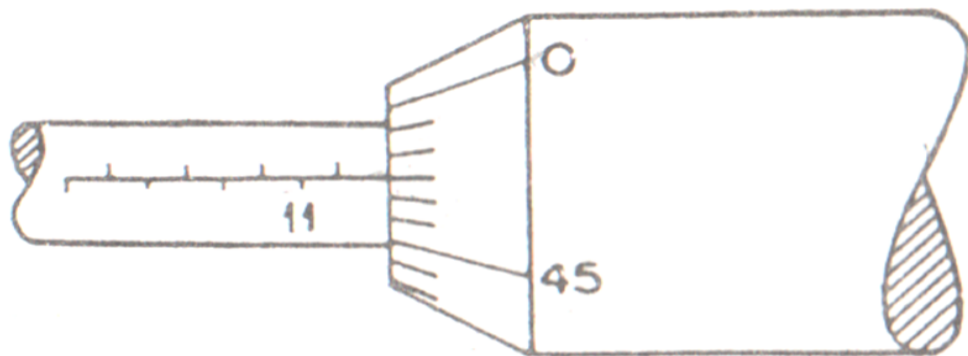


Figure 5

Q18. Sketch and fully label a single-core PVC-insulated steel wire armoured PVC-covered (PVC/SWA/PVC) cable. (5 marks)

Q19. Explain the operation of the following switches: (4 marks)

i. **Single Pole Double Throw** switch

.....

ii. **Double Pole Single Throw** switch

.....

Q20. State the institution of State responsible for the compliance of the Industrial Act : (5 marks)

.....

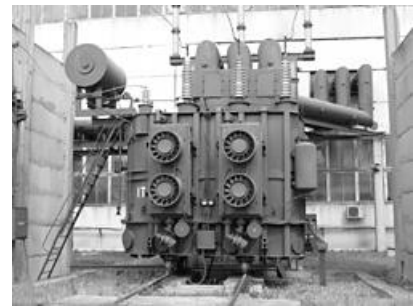
Q21. LABEL THE DIAGRAM SHOWN BELOW. What equipment is this? (12 marks)

1	
2	
3	
4	
5	
6	
8	
10	
12	

Q22. Suggest **four** uses of compressed air (4 marks)

- i. ii.
- iii. iv.

Q23. Electricity generated at power plants has to get to the consumer through cables and other devices. State the names of the electrical devices and equipment listed below. (15 marks)



A B. C

Q24. List the order in which the following electrical components A-H listed below will be connected for electricity generated to be supplied to a household: (10 marks)

A. Main Switch Sub-Station B. Consumer Control Unit (CCU) C. Distribution Line D. Transformer E. Transmission Line F. Cut Out G Energy Meter H. Service Cable

1. 2.
3. 4.
5. 6.
7. 8.

Q25 The peak value of irradiance (solar radiation) at the earth's surface is? (2 marks)

- a) 1 kW / m
b) 1 kW / m²
c) 1 kW / cm²
d) 1.5 kW / m²

- Q26** In my room we have the following appliances and operate them on daily basis. Calculate my daily energy consumption in Watt-hours (Wh), kilowatt-hours (kWh) and units of electricity (Units).
(5 marks)

No.	Appliance	Power (Watts)	Time (hours)	Energy
1	refrigerator	100	12	
2	water heater	1000	½	
3	Electric Iron	750	½	
4	Rice cooker	900	½	
5	Television	80	6	
6	Standing Fan	70	6	
7	Laptop Computer	60	6	
8	Compact Fluorescent Lamp (CFL)	20	8	
			Total	

i. Wh ii. kWh . iii. Units

- Q27** Complete the wiring diagram of a Solar Home System (SHS) figure 6 below by joining the correct connecting terminals.
(10 marks)

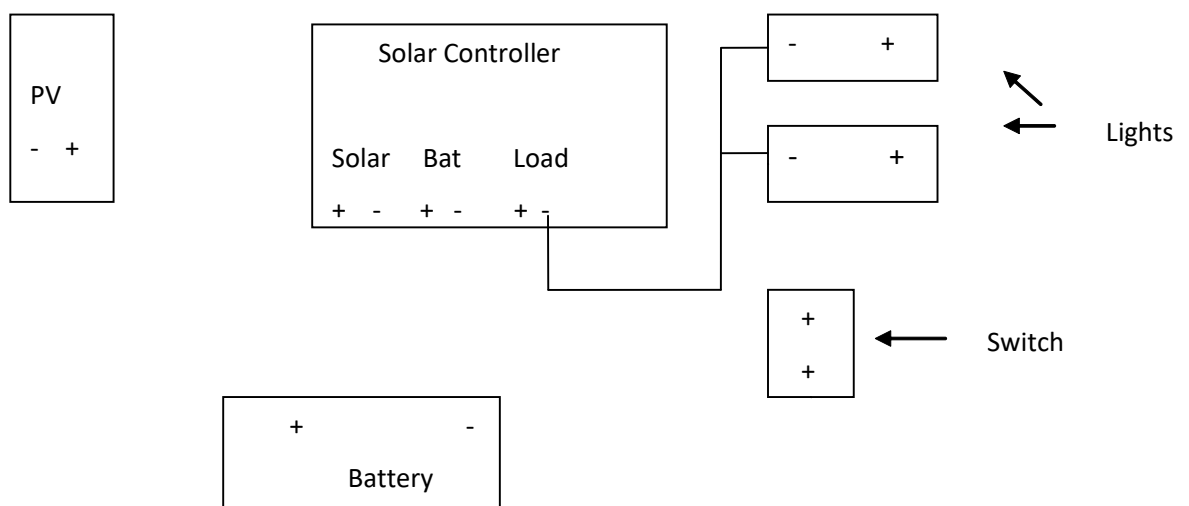


Figure 6: Wiring Diagram of 1 module 2 lights Solar Home System

Q28

I. A. Edwin