

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

COLLEGE OF ENGINEERING

B.Sc. (Engineering) First Semester Examination, 2012, First Year

ME 195/CE 153: ENGINEERING TECHNOLOGY 1

TIME ALLOWED: 2½ Hrs

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

NO BOOKS ARE ALLOWED

INDEX NUMBER:

PART I: MECHANICAL

DEPARTMENT:.....

Q1a Sketch below the Steam Boiler at the Thermodynamics Laboratory, KNUST and label ONLY the safety devices (12marks).



Q1b State four (4) applications of Steam Boiler (8marks):

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

Q5 Underline the correct statement that best describes the following major parts in an automobile engine either as an internal or external part. (12marks)

| | |
|----------------|--------------------------------------|
| Radiator | Internal part/External part |
| Carburettor | Internal part / External part |
| Piston | Internal part/External part |
| Flywheel | Internal part / External part |
| Battery | Internal part / External part |
| Crankshaft | Internal part / External part |
| Cam Shaft | Internal part / External part |
| Manifold | Internal part / External part |
| Connecting Rod | Internal part / External part |
| Gudgeon Pin | Internal part / External part |
| Timing chain | Internal part / External part |
| Spark plug | Internal part / External part |

Q6a CHOOSE THE CORRECT WORD/SET: (6marks)

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

intake, compression, power and exhaust

injection, rotation, power and exhaust

injection, carburetion, rotation and exhaust

b State two (2) main types of automobile engine cooling system (4marks)

(i) _____ (ii) _____

Q7. What machine tool is best suited for producing each of the following? (12 marks)

- a) gear teeth _____
- b) external keyway _____...
- c) internal keyway. _____
- d) multiple holes in a flat plate _____.
- e) smooth flat surface _____
- f) thread on a short shaft. _____

Q8. List any three types of fire extinguishers (6 marks)

- i _____
- ii _____
- iii _____

Q9. Suggest **four** uses of compressed air (4 marks)

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

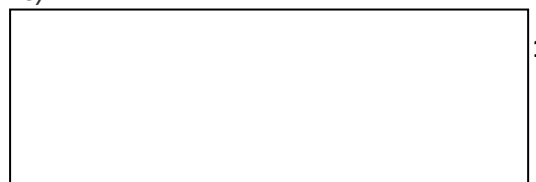
Q10. Name any three other alternate sources of non -conventional energy (6 marks)

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

Q11. Sketch and label a carburizing flame in the box (5marks)



Q12. Sketch and label a neutral flame in the box (5marks)



Q13. Sketch and label an oxidizing flame in the box (5 marks)



Q14. Sketch and fully label a single-core PVC-insulated PVC-covered cable. (5 marks)



Q15. State the reading on the micrometer shown in figure 2 (5 marks)

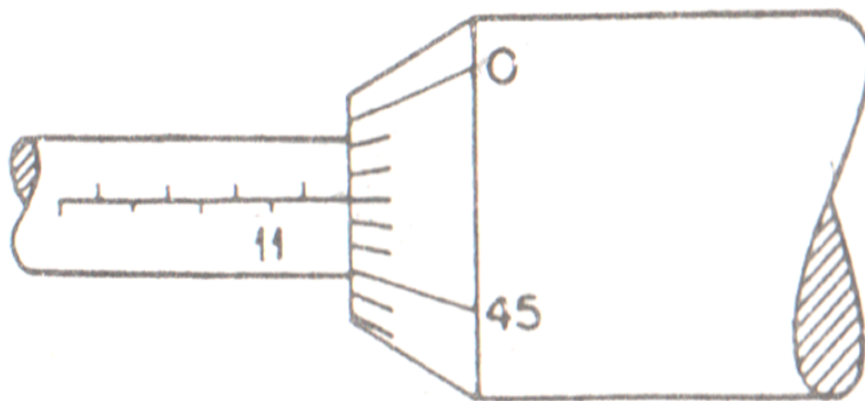


Figure 2

Ans:

Q16. Which state institution is responsible for the compliance of the Industrial Safety Act (2 marks)

Q17. Figure 3 is a sketch developed by a student for his/her engineering technology report. State the name of the equipment and label the parts A – K. _____ (15marks)

A _____

B _____

C _____

D _____

E _____

F _____

G _____

H _____

I _____

J _____

K _____

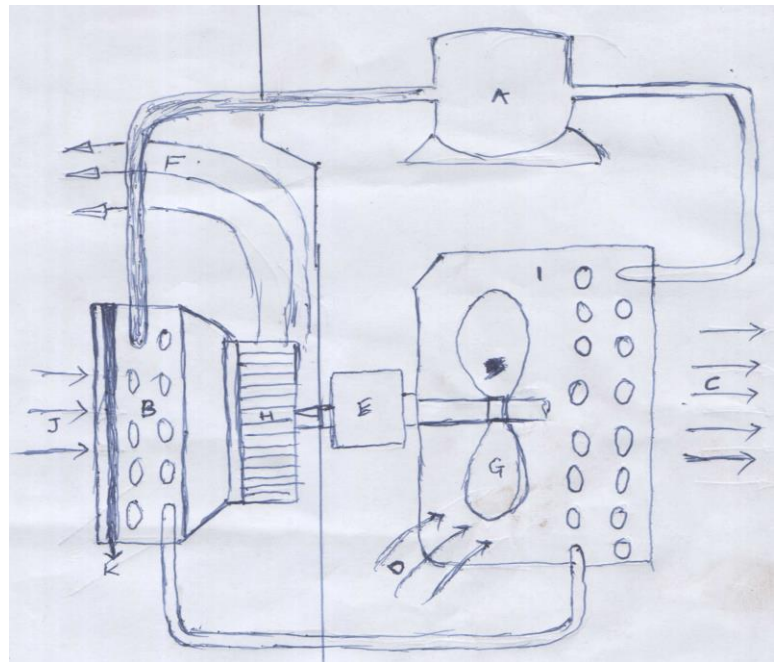


Figure 3

Q18. State the names of the labels A – D of gas welding set as shown in Figure 4 (8 marks)

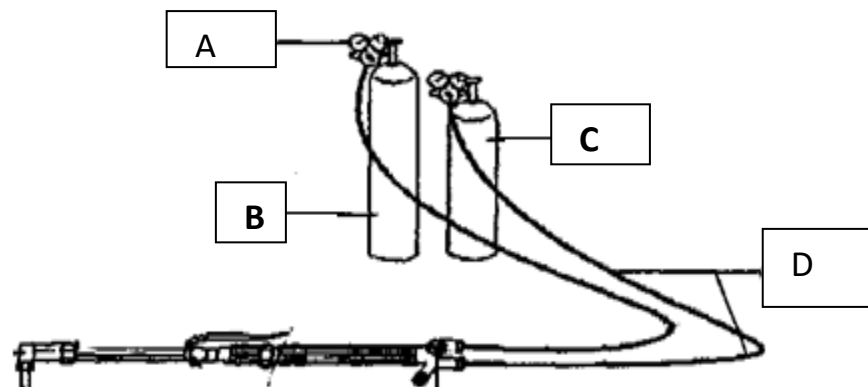


Figure 4: Gas welding set

A B

C D

Q19 State the difference between a Refrigerator and an Air Conditioner (4marks)

Q20a List the equipment you will need to provide solar PV electricity to power LCD projector in a classroom . (10 marks)

| | |
|-------|-------|
| <hr/> | <hr/> |
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b. Show in the box below how the solar PV equipment you have listed in Q20a can be connected together. (10marks)

Q21. Write the name of the instrument shown in figure 5

(2 marks)

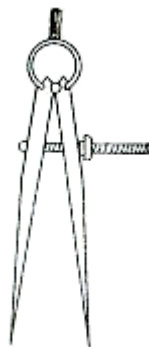
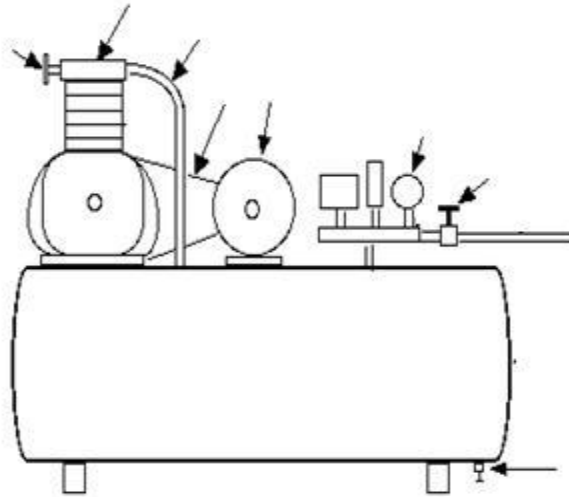
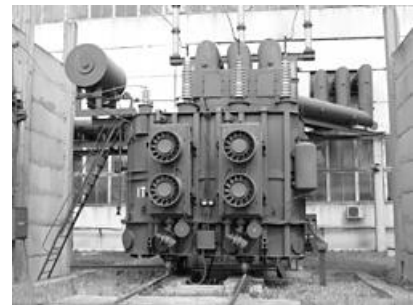


Figure 5 _____

Q22. Label the diagram shown below. What equipment is this? _____ (20marks)



Q23 Electricity is produced at power plants and it has to get to the customers that use the electricity through conductors and other devices. State the names of the electrical devices and equipment below. (15marks)



A _____ B. _____ C _____

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

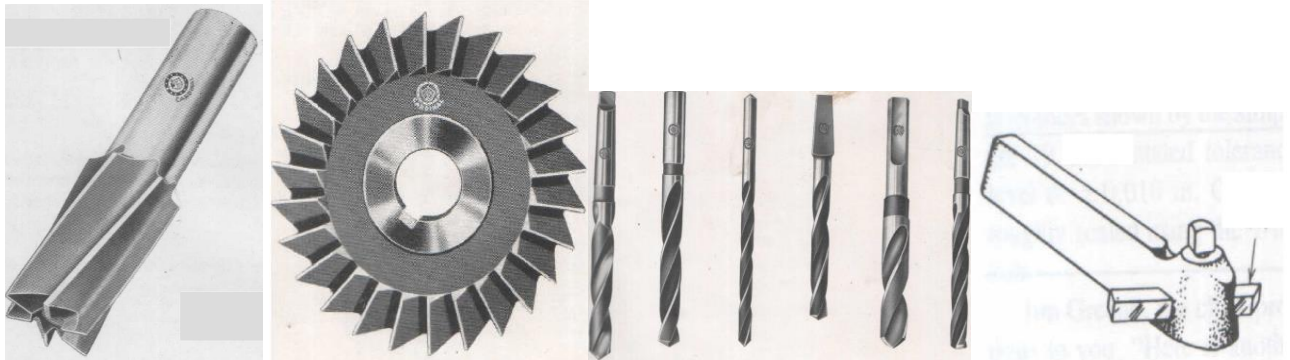
A. Transmission Line B. Consumer Control Unit (CCU) C. Distribution Line
D. Transformer Sub-Station E. Cut Out F Meter G. Service Cable

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

Q25. Indicate the voltages at which electricity from the National Grid in Ghana is distributed:
(10marks)

- i. Transmission lines _____ V ii. High Voltage lines _____ V
 iii. Low Voltage lines _____ V iv Three Phase Supply _____ V
 v Single Phase Supply _____ V

Q26. Name the cutting tools shown in the figures below (20 marks)



A: _____ B: _____ C: _____ D: _____

Q27. List at least two (2) machine tools that employs or uses the cutting tools as shown in Q26
(8 marks)

| | A | B | C | D |
|---|---|---|---|---|
| 1 | | | | |
| 2 | | | | |

Q28. Name two (2) types of work holding devices on the centre lathe machine (4 marks)

- i. _____ ii. _____

Q29. Name the machine tool in the Mechanical Engineering workshop that uses magnetic vice (2 marks) _____

Q30. Which part of the radial drilling machine houses the driving mechanism? (2marks)

Q31a. Two (2) shafts on the centre lathe machine control the movement of the carriage. State the names of these shafts. (4 marks) i _____ ii. _____

b. Which of the two (2) shafts stated in question **Q31a** is engaged in screw cutting process? (2 marks)_____

Q32. Name any three (3) accessories used in electric arc welding and state their uses. (6marks)

A. _____

B. _____

C. _____

Q33. State three (3) functions of flux used in gas welding process. (6 marks)

i _____

ii. _____

iii. _____

Q34. Explain the difference between electric arc welding and Oxy-acetylene (4 marks)

Q35 Sketch the chassis in the automobile workshop (KNUST) showing the components of the transmission in the space provided below and label the parts. (20 marks)



Q36 Underline the instruments that are NOT capable of giving direct readings: (5 marks)

- i. Pair of dividers
- ii. Vernier depth guage
- iii. Thread guage
- iv. Telescope guage
- v. Steel Rule

Q37 State the name of the machine tool in figure 5 (2 marks)

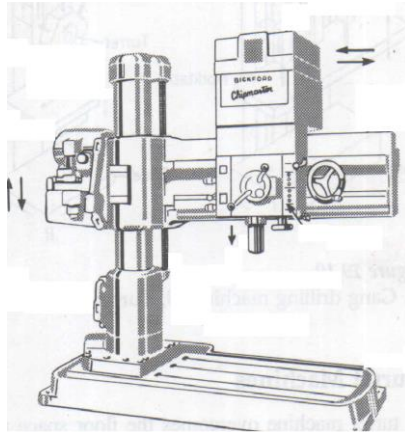


Figure 5: _____

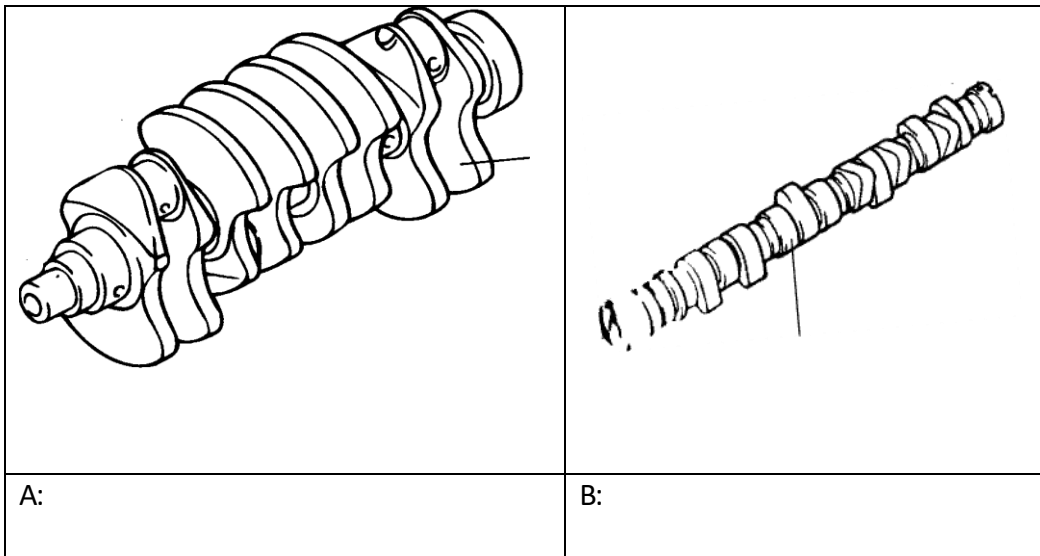
Q38 State any FOUR applications of solar energy (8 marks)

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

Q39 Sketch and fully label a single-core PVC-insulated steel wire armoured PVC-covered (PVC/SWA/PVC) cable. (5 marks)



Q40 Write down the appropriate names of the automobile engine components as shown in figure below (4 marks)



I. A. Edwin