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KIBABII UNIVERSITY
2020/2021 ACADEMIC YEAR
FIRST YEAR FIRST SEMESTER
MAIN EXAMINATIONS (January 2021)

**FOR THE DEGREE OF BACHELOR OF SCIENCE IN RENEWABLE ENERGY AND
BIOFUELS TECHNOLOGY**

COURSE CODE: REN113

COURSE TITLE: **Workshop Technology and Practice**

DATE: ~~12/04/2021~~ **18/05/2021**

TIME: 2:00-4:00PM

INSTRUCTIONS TO CANDIDATES

Answer question **ONE** and any other **two** questions

This paper consists of **5** printed pages. Please Turn over

Question One

- a) A grinding wheel is marked 38A40-K4R. What does this mean? [5 Marks]
- b) With the aids of sketches describe the difference between straight-type and angle-type portable grinding machines and give examples where each type would be used [5 Marks]
- c) Compare the relative advantages and limitations of a bench drilling machine, a pillar drilling machine and a radial arm drilling machine. Give examples where each type would be used. [5 Marks]
- d) As an employee you have duties under the Health and Safety at Work Act. Copy out and complete Table Q1 by writing brief comments regarding your duties in the following circumstances. [5 Marks]

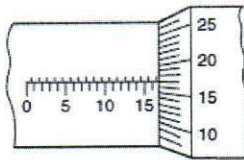
Table Q1

Circumstances	Duties
You are uncertain how to operate a machine needed to complete your task	
You need to carry some sheet metal with very sharp edges	
You are working on site and you have mislaid your safety helmet	
You find that the belt guard has been removed from a machine you have been told to use	
You have spilt hydraulic oil on the floor whilst servicing a machine	
The earth wire has come disconnected from a portable power tool you are using	
Your supervisor has told you to clear up the rubbish left by another worker	
You find someone smoking in a prohibited area	

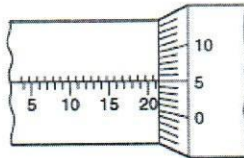
- e) Explain what is meant by the term *parallax errors* when marking out using a steel rule. [5 Marks]
How can such errors be minimized?
- f) Explain why portable electrical equipment should be:
- i) Earthed unless it is 'double-insulated'.
 - ii) Operated from a low-voltage supply.
 - iii) Protected by an earth leakage isolator incorporating a residual current detector. [5 Marks]

Question Two

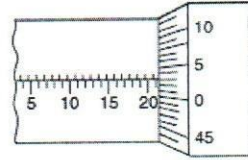
- a) Sketch a micrometer caliper [5 Marks]
- b) Write down the micrometer readings shown in Fig. Q2(a). [5 Marks]



(a) 0-25 mm micrometer



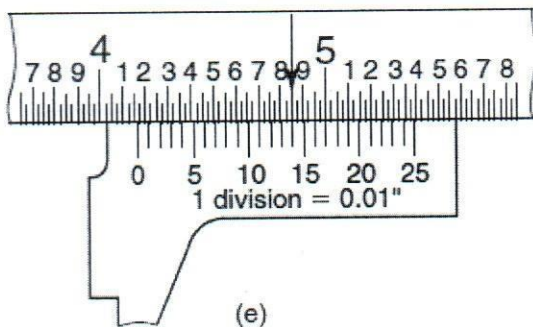
(b) 25-50 mm micrometer



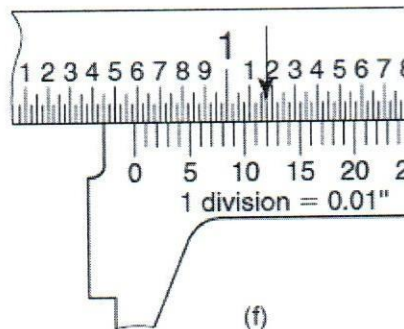
(c) 75-100 mm micrometer

Figure Q2(a)

- c) Sketch a vernier caliper that can be used for internal and external measurements, and also depth measurements. Name its more important features. [5 Marks]
- d) Write down the vernier readings shown in Fig. Q2 (b). [5 Marks]



(e)



(b)

(f)

Figure Fig. Q2 (b)

Question Three

Copy out and complete Fig. Q3 by stating:

- i) The category of the sign (e.g., warning sign, mandatory sign, etc.). [3 Marks]
- ii) The meaning of the sign. [10 Marks]
- iii) Where the sign should be used. [7 Marks]

Sign	Meaning	Category	Where used
			
			
			
			
			
			
			

Figure Q3

Question Four

- a) List FIVE advantages for using templates in sheet metalwork. *[5 Marks]*
- b) List the essential information that should appear on a template. *[5 Marks]*
- c) With the aid of sketches briefly describe THREE different types of template and show how they are used. *[3 Marks]*
- d) Describe how the profile of the template can be transferred to workpiece material. *[2 Marks]*
- e) Describe two ways in which a scribed line can be made to show up more clearly. *[2 Marks]*
- f) With the aid of sketches describe how the scribing points of the following marking out tools should be sharpened:
 - i) Divider points
 - ii) Dot-punch point. *[3 Marks]*

Question Five

- a) Explain how a file is specified and give typical applications of (i) a half-round file, (ii) a three-square file, (iii) a ward file, (iv) a round file and (v) a flat file. *[10 Marks]*
- b) Name the faults you would look for before using the following items of equipment:
- i) hammer
 - ii) chisel
 - iii) File
 - iv) Spanner
 - v) Screwdriver *[5 Marks]*
- c) In the interests of safety what visual inspections of an item of portable equipment should be carried out before accepting it for use? *[2 Marks]*
- d) State how the hazard of electric shock can be minimized when using portable power tools. *[3 Marks]*