JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF ENGINEERING AND TECHNOLOGY

UNIVERSITY EXAMINATIONS FOR THE DEGREE IN SCIENCE IN RENEWABLE ENERGY TECHNOLOGY AND MANAGMENT

SECOND YEAR RESIT EXAMINATION 2020/21 ACADEMIC YEAR

CENTRE: MAIN CAMPUS

COURSE CODE: TET 3227

COURSE TITLE: WORKSHOP PROCESS AND PRACTICE II

EXAM VENUE: **STREAM: BSc REN TECH & MGT**

DATE: ../11/2020 EXAM **SESSION:**

DURATION: 2 HOURS

Instructions

1. **Answer question 1 (Compulsory) and ANY other two questions**
2. **Candidates are advised not to write on question paper**
3. **Candidates must hand in their answer booklets to the invigilator while in the examination room**

Question ONE: **This Question is Compulsory and carries 20 marks**

a) Comment on whether or not a grinding operation can be performed on a drilling machine (1 mark)

b) Determine the machining time required for machining a surface, 600mm by 800mm, on a shaping machine. Assume the cutting speed is 8 mm/min. The return stroke – to – cutting stroke ratio is 1:4, and the feed is 2mm/double stroke. The clearance at each end is 70mm. (3 marks)

c) What is the purpose of using a cutting fluid (coolant) on the lathe? (2 marks)

d) Identify any six of the parts of a twist drill numbered (1) to (9) in Figure 1. (3 marks)

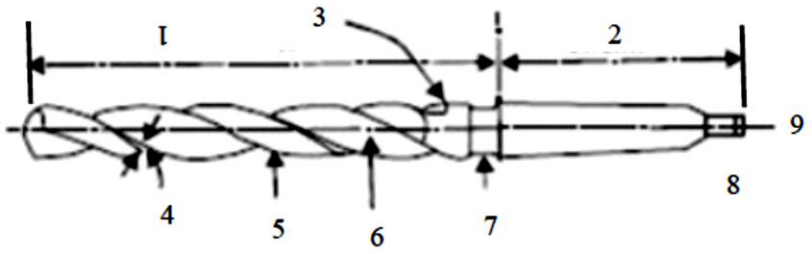

Figure 1: Main parts of a twist drill

e) What does the term *swing diameter* mean, as applied to lathes? (1 mark)

f) Outline the safety precautions associated with the operation of lathes, specifically when stopping the lathe spindle and when removing a large chuck from the spindle? (2 marks)

g) Assume a center lathe task of taper turning. In this task, the length of the cylindrical workpiece is ***L***. It is to be taper-turned to an end product having the diameter of the larger end of the taper as ***D***, and the diameter of the smaller end of the taper as ***d***. Find the angle at which the taper turning tool needs to be set in order to produce the desired taper. The answer should be expressed as a formula involving ***D***, ***d***. and ***L***. (3 marks)

Question TWO

a) Outline the safety precautions for lathe operations, with reference to:
   i. The Standard Operating Procedure (SOP) (3 marks)
   ii. Personal Protective Equipment (3 marks)

b) Describe the use of the following lathe accessories:
   i. Mandrel (3 marks)
   ii. Faceplate (3 marks)
   iii. Steadies (3 marks)

Question THREE

a) Sketch the quick-return mechanism of the shaping machine, and explain its principle of operation. (7 marks)

b) A shaping machine is set to operate with a cutting speed of 8 mm/min, a return stroke-to-cutting stroke ratio of 1:4, and a feed of 2 mm/double stroke; the clearance at each end of the stroke is 70mm. Given that the surface of the workpiece to be machined is 600mm by 800mm, work out the time that the shaping machine will take to complete machining this surface. (*Take the 600mm side as the job/cutting length (L_j) and the 800mm side as the surface width (w) in the feed direction*). (8 marks)

Question FOUR

a) Apart from drilling, list any other three operations that can be performed on a drilling machine. (3 marks)
b) For the three operations listed in (a) above, give an account, including sketches, of how each one is performed. (12 marks)

Question FIVE

a) What is a Computer Numerical Control (CNC) Lathe Used For?. (6 marks)

b) Distinguish between Traditional Manual Lathes and CNC Lathes. Traditional Manual Lathes (9 marks)

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