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TEVETA
Technical Education, Vocational and Entrepreneurship Training Authority

DIPLOMA IN PRODUCTION AND OPERATIONS MANAGEMENT

LEVEL 6 YEAR I EXAMINATIONS

FINAL INTEGRATED SUMMATIVE EXAMINATIONS

SITTING: JULY/AUGUST 2025

SUBJECT: MANUFACTURING TECHNOLOGY I

TIME: THREE (3) HOURS **TOTAL MARKS: 100**

PASS MARK: 50

INSTRUCTIONS TO CANDIDATE

1. Write your examination number and national registration card number on the answer booklet provided. Ensure to append your signature in the space provided on the answer booklet.
2. Write your answer SCRIPT SERIAL NUMBER on the examination register provided and the entry slip.
3. There are TWO (2) sections in this paper, Sections A and B.
4. Section A consists of twenty (20) multiple choice question carrying one (1) mark each. Answer all questions.
5. Section B has SIX (6) questions. Answer question TWO (2) which is compulsory and any other three (3) questions of your choice from the remaining FIVE (5).
6. Use pencils and graph papers (provided) for drawings and graphs.
7. Cell phones are not allowed in the examination room.

DO NOT TURN THIS PAPER UNTIL YOU ARE TOLD TO DO SO

SECTION A: MULTIPLE CHOICE - ANSWER ALL QUESTIONS

QUESTION 1

Write the letter of the correct answer in the answer booklet provided.

1.1 Mutinta is a first-year student at college and is required to wear full PPEs as he goes to the workshop. Which one of the following speak about the importance of wearing PPEs? (1 mark)

a) Prevents accidents
b) Protects the student from getting injured
c) Helps to identify the student
d) Student feel safe in PPE (1 mark)

1.2 Which of the following is an operation on the drilling machine?

a) Reaming
b) To cut threads
c) To shape and turn cylindrical parts
d) To grind surfaces (1 mark)

1.3 Which manufacturing process involves removing excess stock from a workpiece on a machine.

a) Welding
b) Cutting
c) Forging
d) Machining (1 mark)

1.4 Banta is removing material from a work piece using a rotating abrasive wheel and he is asked to identify this process. This process can then correctly be identified as ...

a) Grinding
b) Milling
c) Drilling
d) Abrasing (1 mark)

1.5 Wood is used for industrial purposes. Which of the products is for industrial purposes?

a) Railway slippers
b) Block boards
c) Plywood
d) Laminated wood (1 mark)

1.6 Students have been assigned to fit correct bearing on a shaft. Help them by deciding which bearing would be suitable for carrying a high radial load.

a) Plain bearing
b) Ball bearing
c) Bearing races
d) Roller bearings (1 mark)

1.7 Mumbi is preparing a work piece in the workshop to be worked on the Drilling machine. Identify one of the basic processes he does in preparation from the following:

a) Marking out
b) Drawing
c) Punching
d) Designing (1 mark)

1.8 Which of the following is not a common hand tool operation?

a) Marking out
b) Tapping
c) Grinding
d) Filing (1 mark)

1.9 Which of the following is a welding technique?

a) Lateral ward welding
b) Down ward welding
c) Left ward welding
d) Upward welding (1 mark)

1.10 Which of the following is the greatest benefit of specialization?

a) Increased profitability
b) Improved quality
c) Increased innovation
d) Increased productivity (1 mark)

1.11 Brazing is like soldering except .....

a) It is also used to clean the metal surface

b) It is used apply heat to the metal

c) It is done at a higher temperature

d) Is used strengthen the solder joint (1 mark)

1.12 Which of these woods is indigenous hard wood?

a) Oak

b) Mukula

c) White pine

d) Mahongany (1 mark)

1.13 Student working on a work piece by first marking out the work piece. Which of the following is a type of marking tool?

a) Drill bit

b) Saw

c) File

d) Center punch (1 mark)

1.14 Which of the following is a common type of welding?

a) Soldering

b) Wind welding

c) Arc welding

d) Gas welding (1 mark)

1.15 Ceramic is a common material in manufacturing. What is the main advantage of ceramics in manufacturing?

a) High strength-to-weight ratio

b) Corrosion resistance

c) High thermal conductivity

d) Electrical insulation (1 mark)

1.16 Which of the following is the industrial application of spot welding?

a) Vehicle manufacturing industry
b) Desks manufacturing industry
c) Roofing trusses
d) Door frames and window frame manufacturing industry (1 mark)

1.17 Which of the following best describes a type of plastic moulding?

a) Thermoset
b) Thermoplastic
c) Extrusion moulding
d) Conventional moulding (1 mark)

1.18 What is the main purpose of calibration?

a) To ensure quality and ensure consistency
b) To reduce costs and increase efficiency
c) To improve safety and reduce risk
d) To enhance customer satisfaction (1 mark)

1.19 What is the term for the amount of clearance or interference between two mating parts?

a) Fit
b) Tolerance
c) Limit
d) Clearance (1 mark)

1.20 Haazele is tasked to make external and internal threads. Which tool set is available for this task?

a) Tips and dies
b) Taps and dugs
c) Taps and Dies
d) Taps and threads (1 mark)

Total (20 marks)

SECTION B

ATTEMPT QUESTION TWO (2) AND ANY OTHER THREE (3) QUESTIONS

QUESTION 2 (COMPULSORY)

a) The measurement of P is 100 mm accurate to 0.25 and the measurement of the pin is 4000 mm accurate to 0.35. Determine the expected error of D, using the following formula:

$$\delta D = \left(\frac{P}{4Q}\right)\delta P + \left(1 - \frac{P^2}{8Q^2}\right)\delta Q$$

(4 marks)

b) Describe the process to be considered when fitting together two (2) parts that are difficult to be made to their nominal size. (6 marks)

c) Distinguish a jig from a fixture by affirming **four (4)** uses of each of them. (10 marks)

Total (20 marks)

QUESTION 3

a) Describe the types of Self Tapping Screws (4 marks)

b) Explain the following operations on the drilling machine with the aid of diagrams:

i) Spot facing (4 marks)

i) Counter boring (4 marks)

ii) Counter sinking (4 marks)

iii) Reaming (4 marks)

Total (20 marks)

QUESTION 4

a) State **four (4)** types of drive systems. (4 marks)

b) Draw a well labeled drill bit. (4 marks)

c) Explain **three (3)** welding defects. (6 marks)

d) With the aid of a well labelled diagram, describe an engineer's hammer. (6 marks)

Total (20 marks)

QUESTION 5

a) Wood is usually divided into two (2) groups. State **three (3)** examples of each group. (6 marks)

b) Students are assigned to machine turn a work piece on the lathe. Explain the turning process. (8 marks)

c) Describe **three (3)** properties of plastics that allows it to be used in manufacturing. (6 marks)

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Total (20 marks)

QUESTION 6

a) A grinding machine is a useful machine tool in the workshop. The new students were asked to look at the grinding machine different parts. Describe **five (5)** grinding operations. (10 marks)

b) Explain the process of cutting external threads. (10 marks)

Total (20 marks)

QUESTION 7

a) State **three (3)** advantages and **three (3)** disadvantages of machine tools over the hand tools. (6 marks)

b) Explain precautions that must be taken when manual lifting. (8 marks)

c) Explain **three (3)** advantages of jigs and fixtures. (6 marks)

Total (20 marks)