

higher education & training

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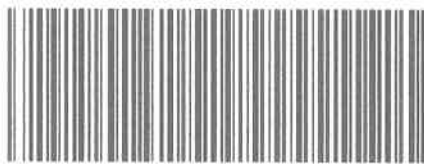
NATIONAL CERTIFICATE (VOCATIONAL)

**MACHINE MANUFACTURING
NQF LEVEL 3**

(6030203)

**28 February 2024 (X-paper)
09:00–12:00**

This question paper consists of 9 pages.



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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA
NATIONAL CERTIFICATE (VOCATIONAL)
MACHINE MANUFACTURING
NQF LEVEL 3
TIME: 3 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer all the questions.
 2. Read all the questions carefully.
 3. Number the answers according to the numbering system used in this question paper.
 4. Start each question on a new page.
 5. Use only a black or blue pen.
 6. Write neatly and legibly.
-



QUESTION 1

1.1 Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (1.1.1–1.1.5) in the ANSWER BOOK.



1.1.1 Two people can operate a lathe machine.

1.1.2 It is safe to reach over a rotating chuck on a lathe machine.

1.1.3 It is the artisan's responsibility to check whether a machine is in a safe working condition.

1.1.4 No person should work alone on a machine in a workshop.

1.1.5 A fixed guard that covers rotating pulleys is painted dark brown. (5 × 1) (5)



1.2 Demarcation lines are important in a workshop to avoid accidents.

What other things in a workshop can be indicated by demarcation lines? (4)

1.3 A trainee is working on a centre lathe. He is wearing loose clothes.

Use a formula to perform a machine risk assessment of this workshop situation by means of a rating scale. (3)

1.4 What is the difference between a *minor*, *major* and *very serious accident*? Give an example of each. (3)

[15]



QUESTION 2

2.2 Explain each of the following terms:

2.2.1 Interference fit (2)

2.2.2 Running fit (1)

2.2.3 Push fit (1)

2.2.4 Driving fit (1)



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2.3 The size of a workpiece is given as $150^{+0,03}_{-0,03}$.



Determine each of the following:

2.3.1 Upper limit (1)

2.3.2 Lower limit (1)

2.3.3 Tolerance (2)

2.4 Choose an item from COLUMN B that matches a description in COLUMN A. Write only the letter (A–D) next to the question number (2.4.1–2.4.4) in the ANSWER BOOK.



COLUMN A		COLUMN B	
2.4.1	Parallel lay	A	
2.4.2	Perpendicular lay		
2.4.3	Circular lay	B	
2.4.4	Radial lay		
		C	
		D	

(4 × 1)

(4)

2.5 Draw the symbol of each of the following surfaces of materials:



2.5.1 Burnished

2.5.2 Tinned

(2 × 1)

(2)

[15]



QUESTION 3

3.1 Various options are given as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question number (3.1.1–3.1.4) in the ANSWER BOOK. ★

3.1.1 The following sketch shows an angle of a lathe cutting tool.



Identify the angle at X:

- A Top rake
- B Side clearance
- C Side rake
- D Front clearance



3.1.2 The following sketch shows an angle of a lathe cutting tool.



Identify the angle at X:

- A Side clearance
- B Top rake
- C Side rake
- D Front clearance



3.1.3 The following sketch shows an angle of a lathe cutting tool.



Identify the angle at X:

- A Side clearance
- B Top rake
- C Side rake
- D Front clearance



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3.1.4 The following sketch shows an angle of a lathe cutting tool.



Identify the angle at X:

- A End-cutting edge angle
- B Side-cutting edge angle
- C Front clearance
- D Top rake

(4 × 1) (4)

3.2 What is the purpose of a drill grinding gauge? (2)

3.3 Draw a sketch to illustrate a block being clamped using an angle plate. (4)

3.4 A 40 mm diameter cutter is used on a milling machine.



Calculate the r/min cutting speed 70 m/min.

(5) [15]

QUESTION 4

4.1 Choose a term from COLUMN B that matches a description in COLUMN A. Write only the letter (A–E) next to the question number (4.1.1–4.1.4) in the ANSWER BOOK.



COLUMN A		COLUMN B
4.1.1	Housing situated on the left side of the lathe machine that contains the gears	A tailstock
4.1.2	The drill chuck or a centre fits in a ...	B carriage
4.1.3	What is an assembly of various parts on a lathe that can be traversed along the bed?	C headstock
4.1.4	The compound slide is screwed onto the ...	D saddle
		E top slide

(4 × 1) (4)



4.2 Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (4.2.1–4.2.4) in the ANSWER BOOK. ★

4.2.1 A four-jaw chuck has three independent jaws.

4.2.2 A faceplate does not need to be balanced with counterweights when an irregular shaped workpiece is clamped.

4.2.3 There are various types of mandrels.

4.2.4 A hexagon bar can be clamped in a three-jaw chuck. ★



(4 × 1) (4)

4.3 Show, by means of a sketch, the difference between a *half centre* and a *pipe centre*. (2 + 2) (4)

4.4

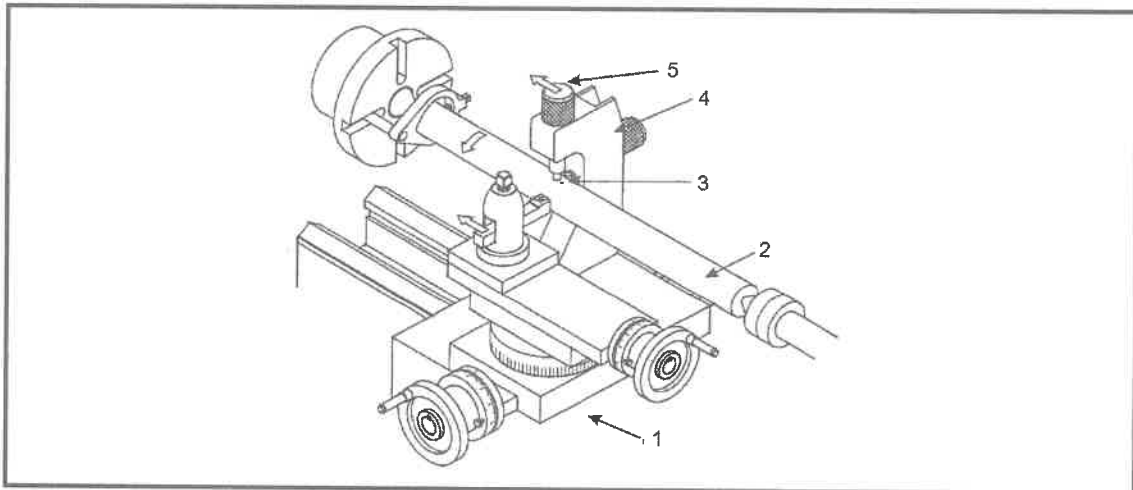


FIGURE 1 ★

Identify the components of the travelling steady shown in FIGURE 1 by writing only the answer next to the number (1–5) in the ANSWER BOOK. (5 × 1) (5)

4.5 Name THREE types of milling machines. (3)

4.6 You are required to machine two grooves on a shaft by using a milling machine. The grooves are separated at an angle of 35°. Use the Cincinnati dividing head to calculate the indexing required, turning the workpiece at the required angle. ★

Side 1	24	25	28	30	34	37	38	39	41	42	43
Side 2	46	47	49	51	53	54	57	58	59	62	66

(5)



4.7 FIGURE 2 shows three precision-measuring instruments.

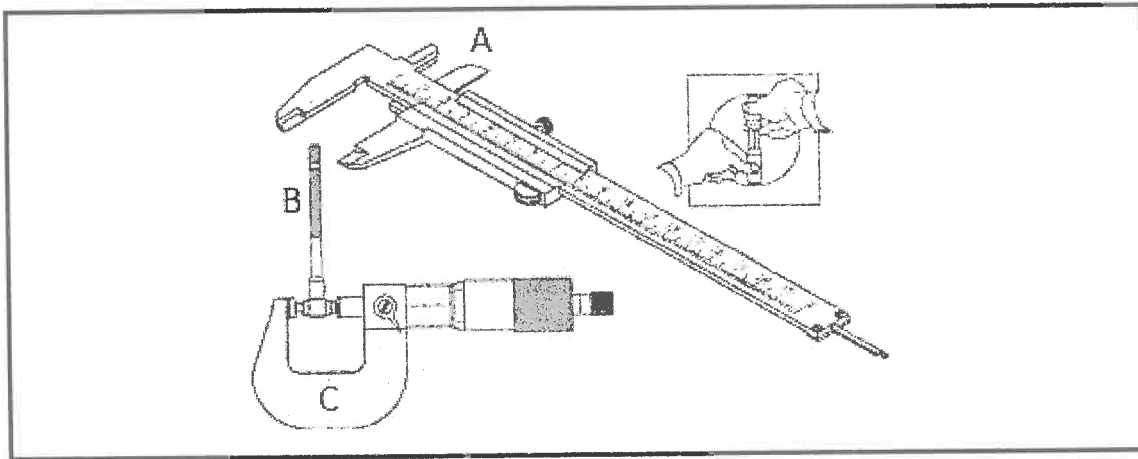


FIGURE 2



Name the three precision-measuring instruments by writing only the answer next to the letter (A–C) in the ANSWER BOOK. (3 × 1)

(3)

4.8 Complete the following paragraph by choosing a word or words from the list below and writing it next to the question number (4.8.1–4.8.4) in the ANSWER BOOK.

cutting tool; clamped; vice; dividing heads; milling



On a milling machine the workpiece that is to be shaped is (4.8.1) ... to the table of the (4.8.2) ... machine; either directly or by means of a (4.8.3) ... and other fixtures namely (4.8.4) ... (4 × 1)

(4)

4.9 Show, by means of a simple sketch, the difference between a *T-slot cutter* and a *dovetail cutter*. (2 + 2)

(4)

4.10 Compare a milling machine to a lathe by explaining the FOUR types of operations that can be done on both.

(4)

[40]



QUESTION 5

5.1 Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (5.1.1–5.1.6) in the ANSWER BOOK.



5.1.1 The *Ellipse* command can also be used to draw a circle.

5.1.2 The *Polygon* command can draw up to ten sides.

5.1.3 The *Hatch* command is used for sectional views.

5.1.4 Selecting a line and then clicking the *Erase* icon will delete the line.



5.1.5 Different line weights are important in a drawing.

5.1.6 The *Copy* command cannot duplicate a drawing.

(6 × 1) (6)

5.2 Give FOUR disadvantages of running a CAD in the industry. (4)

5.3 Give the FIVE steps to produce a CAD drawing. (5)

[15]

TOTAL: 100







