higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE

PATTERN MAKERS' THEORY N2

(11020532)

2 December 2022 (X-paper)
09:00–12:00

This question paper consists of 5 pages.

320Q1E2202

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
PATTERN MAKERS' THEORY N2
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 blue or black pen.
6. Write neatly and legibly.

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QUESTION 1

Machinery – Lathe work

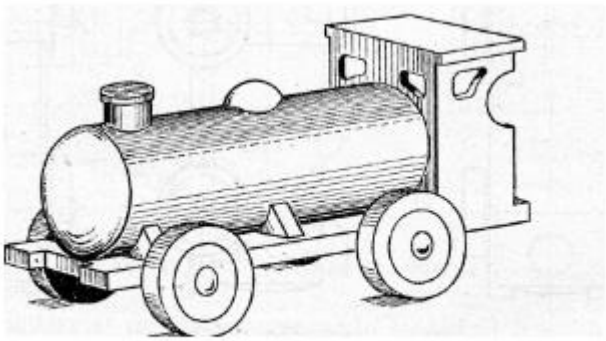
Woodturning by the patternmaker offers many interesting methods of producing circular shapes. It is sometimes impressed upon the apprentice that this unit has certain possibilities, operation-, and control aspects:
Explain these aspects: **[15]**

1.1 Possibilities (5)
1.2 Operation (5)
1.3 Control (5)

QUESTION 2

Name SEVEN factors that govern the manufacturing of a pattern. **[10]**

QUESTION 3



Make a neat layout of the drawing above that shows the following views:

- Front of the object (front elevation)
- Right-hand side at 90° to the front view
- Left-hand side at 90° to the front view
- Directly above (plan view)
- From below (inverted plan view)

(5 × 4) **[20]**

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QUESTION 4

Name the causes of the following defects:

4.1 Rusty, dirty, damp or improperly coated chaplets

4.2 Entrapped air

4.3 Generation of excessive gas from moulding or core sand coupled with poor venting

4.4 Overheating of surfaces

4.5 Use of poor grade blacking – too low pouring temperature

4.6 Excessive moisture in sand

4.7 Careless removal of runners or rises

4.8 Insufficient fluidity in the metal

4.9 Steam prevented from union with oxides

4.10 Bad design – absence of fillets and runners too heavy and wrongly positioned

(10 × 1) **[10]**

QUESTION 5

The PHYSICS OF FEEDING points out that there are five main factors which affect the feeding of castings.
Name the FIVE factors. **[5]**

QUESTION 6

6.1 What are some of the causes of warping in timber? (2 × 1) (2)

6.2 When is metal used for patterns? (2)

6.3 Why is metal better than wood? (2)

6.4 Why should plenty of oil be used on an oil stone? (1)

6.5 Explain with a sketch the method used in casting a small hollow cylinder. (2)

6.6 For which parts of the pattern must the shrinkage rule be used? (2)

6.7 Is the draft always the same on all parts of a pattern? (1)

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6.8	What is the usual allowance for the finish on small castings?	(1)
6.9	When must a greater amount be allowed?	(1)
6.10	Under what conditions will a seasoned board warp?	(1)
6.11	What wood is most commonly used in pattern making?	(1)
6.12	Explain the difference in the manner in which saws cut when ripping and when crosscutting?	(2)
6.13	In what direction should the grindstone revolve when grinding scraping tools or other tools having a short bevel?	(1)
6.14	When is dry parting sand used?	(1)

[20]

QUESTION 7

7.1	Should a shrinkage rule be used when making a core box?	(1)
7.2	Why must the pattern maker know something about mechanical drawing?	(1)
7.3	What portion of the skew chisel does the cutting?	(1)
7.4	What is meant by shrinkage in pattern making?	(1)
7.5	When is it necessary to use mahogany, cherry or maple for patterns?	(1)
7.6	Explain the use of a flask in moulding and give the two principal parts.	(4)
7.7	What allowance must be made on the pattern for shrinkage when the casting is to be made of iron?	(1)
7.8	Explain the use of core prints	(2)
7.9	What is meant by finish in pattern making?	(2)
7.10	When glueing up pattern stock, how is the pressure necessary to bring the glued surfaces in close contact, usually obtained?	(2)
7.11	What are rapping plates?	(1)
7.12	What are fillets and where are they used on patterns?	(2)
7.13	Is it always necessary to make a pattern in TWO parts?	(1)

[20]

TOTAL: 100

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