higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

PROCESS CHEMISTRY
NQF LEVEL 4

(6050444)

12 November 2018 (Y-Paper)
13:00–16:00

This question paper consists of 6 pages.

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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. Write neatly and legibly.

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QUESTION 1

1.1 Synthetic polymers are produced in large volumes globally and they have a variety of properties and applications.

1.1.1 State FOUR properties of polyvinyl chloride. (4)

1.1.2 What does the abbreviation PTFE stand for? (1)

1.1.3 Draw the structure of PTFE. (3)

1.2 Lubricants are called processing aids because they help during processing of polymers.

1.2.1 Distinguish between external and internal lubricants. (4)

1.2.2 What is the primary challenge that is associated with the use of internal lubricants? (1)

1.3 Safripol is a main supplier of polymers to plastic converters.

Name TWO types of these polymers. (2)
[15]

QUESTION 2

2.1 Draw a labelled process flow diagram for a vinyl chloride monomer production process. (11)

2.2 List THREE ingredients that are used during solution polymerisation of SBR. (3)

2.3 Name the type of reactor that is used during solution polymerisation of SBR. (1)
[15]

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QUESTION 3

3.1 Cobalt is one of the base metals produced in South Africa.

State THREE uses of cobalt. (3)

3.2 Briefly discuss the grinding process. (3)

3.3 List THREE types of surfactants that are used during froth flotation in the mineral processing of base metals. (3)

3.4 State TWO properties of PGMs that make them popular in manufacturing industries. (2)

3.5 List FIVE sequential processes used in the processing of PGMs. (5)

3.6 Implats is one of the four main producers of precious metals and PGMs in South Africa.

3.6.1 State a method used by Implats to separate and purify the PGMs. (1)

3.6.2 Briefly explain how gold is recovered at Implats refining. (4)

3.7 What is a fluidized bed furnace? (2)

3.8 Name TWO conventional exothermic processes used to produce ferrovanadium. (2)

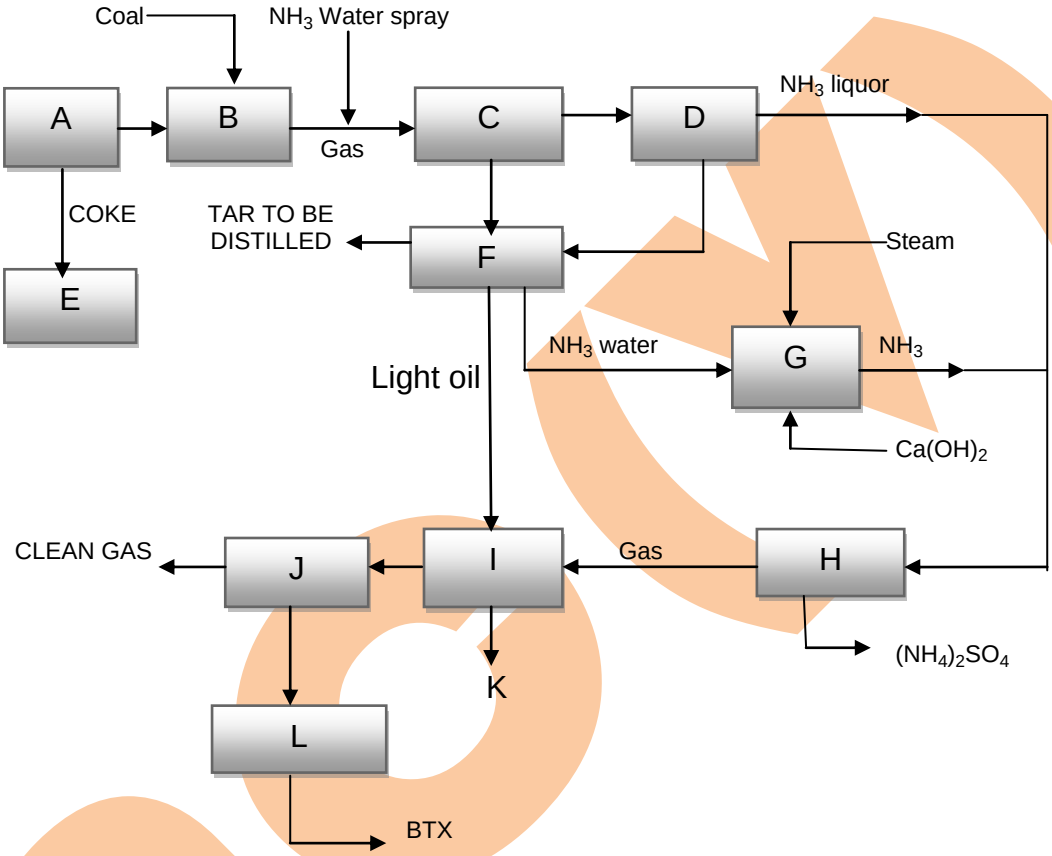
[25]

nc(v)

QUESTION 4

4.1 Name and write the THREE formulae of inorganic fertilisers produced from ammonia. (3)

4.2 The diagram below represents the coking process and how chemicals derived from coke are recovered. Complete the diagram by filling in the missing words. Write only the answer next to the letter (A–L) in the ANSWER BOOK.



(12)
[15]

QUESTION 5

5.1 Differentiate between high- and low-temperature Fischer-Tropsch processes. (2)

5.2 Product work-up is the final process in the production of coal-based chemicals.

5.2.1 Give THREE examples of fuels produced from product work-up. (3)

5.2.2 What does the acronym *PONA* stand for? (4)

5.3 Give FOUR examples of catalysts that are used during catalytic cracking. (4)

5.4 Name TWO types of cracking processes. (2)
[15]

QUESTION 6

6.1 Who are the THREE main manufacturers of pesticides in South Africa? (3)

6.2 List THREE raw materials that are used during beer brewing. (3)

6.3 Give FOUR designs used in pneumatic malting. (4)

6.4 Name TWO types of ingredients that could be added to the wort kettle during boiling in beer brewing. (2)

6.5 Aspen Pharmacare is one of the top 20 producers of generic medicines globally.

List THREE products produced by Aspen Pharmacare in the East London plant. (3)
[15]

TOTAL: 100

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