NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF SCIENCE AND TECHNOLOGY EDUCATION

DEPARTMENT OF TECHNICAL TEACHER EDUCATION

WOOD CHEMISTRY

PTE 1185

Special Examination Paper

April 2019

This examination paper consists of 4 pages

Time Allowed: 3 hours

Total Marks: 100

Special Requirements:

Examiner's Name: Mr Donatus Dube

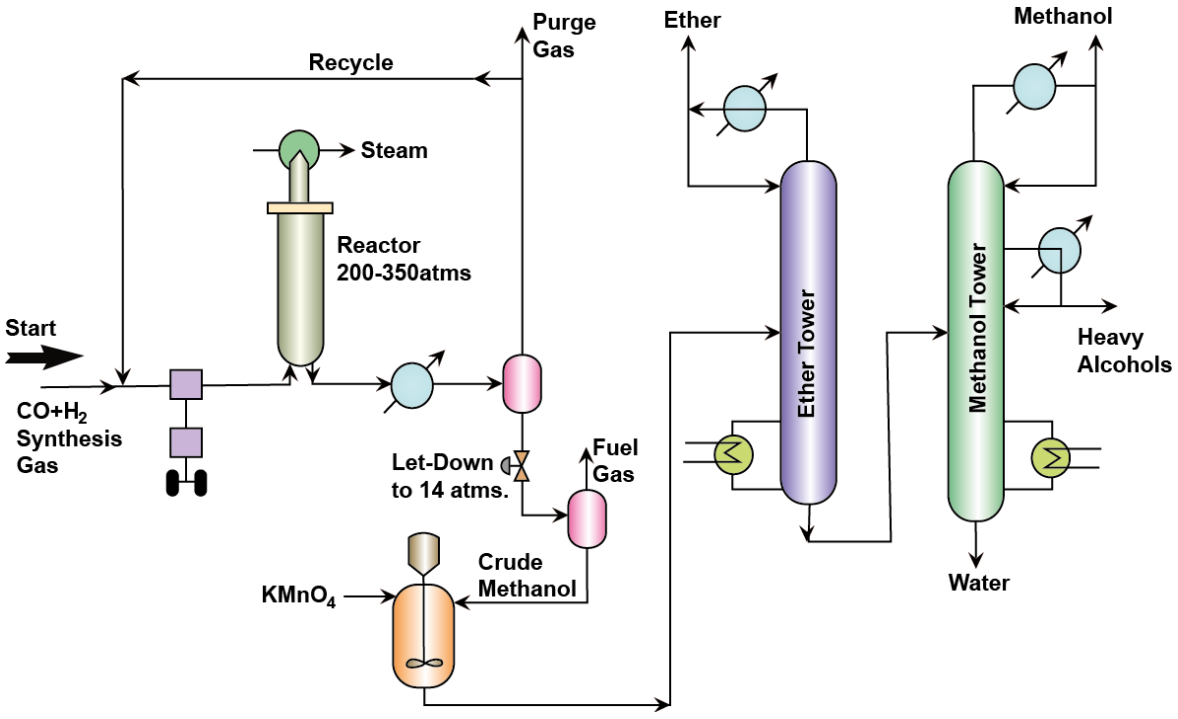
INSTRUCTIONS

1. Answer **ALL** four (4) questions
2. Each question carries 25 marks
3. Use of calculators is permissible

MARK ALLOCATION

QUESTION	MARKS
1.	**25**
2.	**25**
3.	**25**
4.	**25**
TOTAL Possible Marks	**100**

1. Study the manufacturing flow chart shown below and answer the questions that follow:



a) Write a general description of the process shown (10 marks)
b) How is synthesis gas produced? (6 marks)
c) Explain the difference between methanol and ethanol (4 marks)
d) Write down the chemical reaction taking place in the reactor (3 marks)
e) Name two uses of methanol. (2 marks)

2. a) Write the average wood gas composition (4 marks)

b) Explain how the high amounts of carbon monoxide (CO) can be reduced in the wood gas (4 marks)

c) During extraction of methanol from wood gas, carbon dioxide is removed by bubbling the gas through monoethanolamine (mea). Write down the reaction equation and explain how it is dependent upon reactor temperature. (6 marks)

d) Explain three uses of wood charcoal (9 marks)

e) What is tall oil and how is it produced from wood (4 marks)

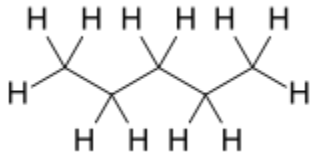
3. a) Draw the manufacturing process flow chart for wood pulp indicating the control parameters of the digester. (12 marks)

b) Calculate the molecular mass of the following compound

$C_{15}H_{20}O_6$ (rosin) (4 marks)

c) Name 3 uses of rosin (3 marks)

d) Name the following compound and indicate its uses (3 marks)



e) Draw the chemical structure of benzene explaining why it is a closed ring. (3 marks)

4. Write short notes on production and uses of the following products

i. Cellophane
ii. Bond paper
iii. Turpentine
iv. Lignin
v. Oleoresin (25 marks)

End of question Paper!!!