



Roll No.

**PRESIDENCY UNIVERSITY  
BENGALURU**

**SCHOOL OF ENGINEERING**

**TEST - 1**

**Even Semester:** 2018-19

**Course Code:** PET 217

**Course Name:** Petroleum Refining and Petrochemicals

**Programme & Sem:** B.Tech & VIII Sem (Group-I)

**Date:** 05 March 2019

**Time:** 1 Hour

**Max Marks:** 40

**Weightage:** 20%

**Instructions:**

- (i) *Read the question properly and answer accordingly.*
- (ii) *Question paper consists of 3 parts.*
- (iii) *Scientific and Non-programmable calculators are permitted.*

**Part A**

Answer **all** the Questions. **Each** question carries **four** marks. (3Qx4M=12)

1. In all refinery operations instead of absolute viscosity what is used and write its equation. Write the formula for viscosity index with notations.
2. What is residuum and write Mallison's classification of crude on it.
3. What is performance number?

**Part B**

Answer **all** the Questions. **Each** question carries **eight** marks. (2Qx8M=16)

4. In the order of increasing boiling points, write the main fractions from distillation of crude with examples
5. Any engine during service has to encounter different weather conditions. For smooth running it is better to adjust the octane rating of the fuel under such circumstances. Under following circumstances what RON in fuel quality is permitted?
  - a) Altitude
  - b) Humidity
  - c) Engine speed
  - d) Coolant temperature

**Part C**

Answer the Question. Question carries **twelve** marks. (1Qx12M=12)

6. Explain ASTM distillation.



Roll No.

**PRESIDENCY UNIVERSITY  
BENGALURU**

**SCHOOL OF ENGINEERING**

**TEST - 2**

**Even Semester:** 2018-19

**Course Code:** PET 217

**Course Name:** Petroleum Refining and Petrochemicals

**Program & Sem:** B.Tech & VIII Sem (Group-I)

**Date:** 15 April 2019

**Time:** 1 Hour

**Max Marks:** 40

**Weightage:** 20%

**Instructions:**

- (i) *Read the question properly and answer accordingly.*
- (ii) *Question paper consists of 3 parts.*

**Part A**

Answer **all** the Questions. **Each** question carries **four** marks. (3Qx4M=12)

1. List the various units of refinery process.
2. What are the similarities between Atmospheric Distillation Unit (ADU) and Vacuum Distillation Unit (VDU)?
3. Describe Naphtha splitter and its operating conditions.

**Part B**

Answer **both** the Questions. **Each** question carries **eight** marks. (2Qx8M=16)

4. Explain about the Pre-flash column.
5. Illustrate Moving Bed Reactor (MBR) with labelling.

**Part C**

Answer the Question. The Question carries **twelve** marks. (1Qx12M=12)

6. Explain in detail chemical impurities and methods for treating it.



Roll No																			
---------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

**PRESIDENCY UNIVERSITY  
BENGALURU**

**SCHOOL OF ENGINEERING**

**END TERM FINAL EXAMINATION**

**Even Semester:** 2018-19

**Date:** 21 May 2019

**Course Code:** PET 217

**Time:** 3 Hours

**Course Name:** Petroleum Refining and Petrochemicals

**Max Marks:** 80

**Program & Sem:** B.Tech. & VIII Sem (Group-I)

**Weightage:** 40%

**Instructions:**

- (i) *Read the question properly and answer accordingly.*
- (ii) *Question paper consists of 3 parts.*

**Part A**

Answer **all** the Questions. **Each** question carries **five** marks.

(4Qx5M=20M)

1. Match the following crude fractions with their products

Crude	Products
i. Gas	a. Jet fuels
ii. Kerosenes	b. Lubes
iii. Middle distillates	c. Motor spirits
iv. Heavy distillates	d. Diesel fuels
v. Residuums	e. Bitumen

2. Match the following crude characteristics with their formulae

Characteristics	Formulae
i. Characterization Factor	a. $\frac{G-0.24-0.22 \log(V-355)}{0.755}$
ii. Ring No.	b. <i>smoke point</i> + 0.42 X % distilled at 204°C
iii. Viscosity gravity constant	c. $\frac{\sqrt[3]{T}}{\rho}$
iv. Smoke volatility Index	d. $\frac{\text{Thermo viscosity}}{5} - 10(46 - API)$
v. Hydrogen content fuel	e. 12.99 + 0.04 x <i>smoke point</i>

3. Match the following petrochemical manufacture processes with their operating temperatures

Petrochemical manufacture processes	Operating Temperatures
i. Maleic anhydride from benzene	a. 250 – 300 °C
ii. Ethylene oxide from ethylene	b. 300 – 375 °C
iii. Methanol from synthesis gas	c. 500 – 600 °C
iv. Formaldehyde from methanol	d. 400 – 500 °C
v. Alkylolation of benzene	e. 95 °C

4. Fill in the blanks / Full form of the following:
- i. \_\_\_\_\_ is defined as percentage volume of i-octane in a mixture of i- octane and n-heptane.
  - ii. TBP: \_\_\_\_\_.
  - iii. \_\_\_\_\_ is the ratio of capacity of a capacitor in which oil is dielectric to the capacity of air when it acts as dielectric.
  - iv. VDU: \_\_\_\_\_.
  - v. \_\_\_\_\_ is due to untimely burning of fuel in spark ignition engine.

### Part B

Answer **all** the Questions. **Each** question carries **eight** marks. (5Qx8M=40M)

5. Define flash point, fire point, smoke point and pour point.
6. Explain about the crude desalter.
7. Explain true boiling point analysis (TBP) and draw a figure of TBP apparatus.
8. A. Indicate the reactions in the manufacturing process of styrene from benzene with reaction type, operating conditions, catalyst and also write the uses of styrene.  
B. Explain the manufacture process of hydrodealkylation of toluene.
9. A. What is hydroformylation reaction and various reaction details in Oxo process for converting olefins and synthesis gas to aldehydes (Addition reaction, Dimerization reaction and Hydrogenation reaction)?  
B. The steam cracking of hydrocarbons is an anti-quenching operation, and will involve the participation of water molecule in reactions. Write the reaction details of hydrocarbon steam cracking for petrochemicals (reaction, topology, separation tasks, typical feed stocks and reaction temperature)

### Part C

Answer **both** the Questions. **Each** question carries **ten** marks. (2Qx10M=20M)

10. Explain the manufacture of methanol from synthesis gas in detail with the help of reactions, process and process flow sheet (rough sketch).
11. Vinyl chloride is produced in a two-step process from ethylene. Explain in detail manufacture of only ethylene dichloride from ethylene (reactions, rough flow sheet sketch and process).