P P SAVANI UNIVERSITY

Sixth Semester of B. Tech. Examination

November 2022

SECH4030 Petroleum Studies

09.12.2022, Friday **Time: 01:00 P.M. To 03:30 P.M.** **Maximum Marks: 60**

Instructions:

1. *The question paper comprises of two sections.*
2. *Section I and II must be attempted in same answer sheet.*
3. *Make suitable assumptions and draw neat figures wherever required.*
4. *Use of scientific calculator is allowed.*

SECTION – I

				CO	BTL
Q-1	(i)	What is modern theory of origin of petroleum?	**(06)**	**1**	**1**
	(ii)	Explain classification of petroleum on the basis of occurrence.			

OR

Q-1	Write down difference between solid, Liquid and Gaseous fuels. (Any eight)		**(06)**	**1**	**1**
Q-2	Explain: Any five		**(10)**	**2**	**2**
	(i)	Octane Number			
	(ii)	Aniline Point			
	(iii)	Cetane Number			
	(iv)	Softening Point			
	(v)	Flash & Fire Point			
	(vi)	Carbon Residue			

OR

Q-2	A sample of fuel was found to have the following % composition by volume: C = 75 %; H = 5.2 %; O = 12.1 %; N = 3.2 %, and ash = 4.5 %.		**(10)**	**2**	**5**
	The minimum amount of O_2 and air by volume necessary for complete combustion of 1 liter of fuel;				
	(i)	Weight of air required, if 40 % excess air is supplied;			
	(ii)	Gross and net calorific value of fuel sample using Dulongs formula			
Q-3	Differentiate: thermal cracking & catalytic cracking. Effect of temperature and pressure on catalytic reforming.		**(06)**	**3**	**2**
Q-4	(i)	What is viscosity Index? Write down its significance in industries.	**(08)**	**3**	**5**
	(ii)	An oil of unknown viscosity- index has a saybolt universal viscosity of 58 seconds at and 580 seconds at 100 °F. The high viscosity- index standard oil has saybolt universal viscosity of 58 seconds at 210 °F and 430 seconds at 100 °F. The low viscosity- index standard oil has saybolt universal viscosity of			

58 seconds at 780 seconds at 100 °F. Calculate viscosity- index of the unknown oil sample.

(iii) An oil sample under-test has a saybolt universal viscosity same as that of standard Gulf oil (low viscosity standard) and Pennsylvanian oil (high viscosity standard) at 210 °F. Their saybolt universal viscosities at 100 °F are 61, 758 and 420 s respectively. Calculate viscosity- index of the oil sample.

SECTION – II

Q-1 (i) C_nH_{2n} is the general formula for **(05)** **1** **1**
(a) Olefins
(b) Naphthenes
(c) Both (A) and (B)
(d) Neither (A) nor (B)

(ii) Aniline point of high speed diesel may be about _____ °C.
(a) 35
(b) 70
(c) 105
(d) 150

(iii) Electrical desalting of crude oil removes the _____ impurities.
(a) Oleophilic
(b) Oleophobic
(c) Both (A) and (B)
(d) Neither (A) nor (B)

(iv) In sweetening process, solutizer agent used with caustic alkali is
(a) Potassium isobutyrate
(b) Sodium plumbite
(c) Methanol
(d) Phenol

(v) Pressure & temperature maintained in catalytic cracking is about
(a) 2 atm & 500°C
(b) 10 atm & 500°C
(c) 30 atm & 200°C
(d) 50 atm & 750°C

Q-2 Write down the formation of methanol (CH_3OH) from Synthesis gas. Also mention the application of methanol in Industries. **(10)** **4** **6**

Q-3 Write down the formation of phenol (C_6H_6O) from Chlorobenzene (C_6H_5Cl) route. Also mention the application of phenol in Industries. **(10)** **4** **6**

OR

Q-3	Write down the formation of phthalic anhydride ($C_8H_4O_3$) from Naphthalene ($C_{10}H_8$) route. Also mention the application of phthalic anhydride in Industries.	**(10)**	**5**	**6**
Q-4	Write down merits and demerits of thermoplastic and thermosetting polymers.	**(05)**	**5**	**1**

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CO : Course Outcome Number BTL : Blooms Taxonomy Level

Level of Bloom's Revised Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create