



**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

MAKE-UP EXAMINATION- JAN 2023

Course Code: PET-321

Course Name: Unit Operation

Program : B. Tech

Date: 24-01-2023

Time: 09.30am to 12.30pm

Max Marks: 100

Weightage: 50%

Instructions:

- (i) Read the all questions carefully and answer accordingly.
- (ii) Question Paper has THREE Parts, i.e. Part A, Part B, and Part C.
- (iii) Scientific and nonscientific calculator are allowed

Part A [Memory Recall Questions]

Answer all the Questions. Each question carries TWO marks.

(10Qx 2M= 20M)

1 ASTM, TBP and EFV is related to ----- process. Which is more efficient?

(C.O.No.4) [Knowledge]

2 During sieve analysis process grains are accumulated in the following sieves 200, 250 and 325. The smallest grain will be accumulated in -----and largest grain will be accumulated in -----

--. (C.O.No.1) [Knowledge]

3 What is the relation between boiling point and molecular weight of hydrocarbon?

(C.O.No.4) [Knowledge]

4 "Effectiveness of all screens are 100%". (True or false) Give reason (C.O.No.3) [Knowledge]

5 Mention two dimensionless parameter to characterize the reservoir crude.

(C.O.No.1) [Knowledge]

6 Correlation index of two reservoir crude samples are 95 and 0 respectively. Find the type of crude. (C.O.No.4) [Knowledge]

7 What is SARA analysis? How can you do SARA analysis in Laboratory?

(C.O.No.4) [Knowledge]

8 What are the differences between ADU and VDU? (C.O.No.4) [Knowledge]

9 What are the different trays used in distillation unit? (C.O.No.4) [Knowledge]

10 How can you find the class of crude from ASTM distillation? (C.O.No.4) [Knowledge]

Part B [Thought Provoking Questions]

Answer all the Questions. Each question carries TEN marks.

(4Qx10M=40M)

11 Crude oil distillation is an integral part of oil refinery. Different products can be obtained from crude oil during distillation process based on their boiling point. Draw a typical diagram to show different products during distillation process. How can you differentiate light, medium and heavy distillate? Quality of the product can be increased by Stripping and Rectification during distillation process, justify it. (C.O.No.4) [Comprehension]

12 ASTM, TBP, EFV are the three main process to find the relation between volume of distillate and respective temperature. List the difference and relation among these three process with typical diagram. What are the different parameter you can find from ASTM, TBP and EFV?

(C.O.No.4) [Comprehension]

13 Conveyors are used to transport the solid materials. List the different conveyors used for transportation of solid. Discuss the application of different conveyors along with suitable example.

(C.O.No.2) [Comprehension]

14 Filtration process may be classified based on requirement and load. Large scale industry has a requirement of filtration unit to handle large quantity of solid, while small scale industry handles less quantity of solid. Find the appropriate filtration unit for these two cases. "Six stages are used for continuous filtration process while four stages are used for discontinuous filtration". Justify this statement by taking any filtration system with appropriate diagram. (C.O.No.3) [Comprehension]

Part C [Problem Solving Question]

Answer all the Questions. Question carries TWENTY marks.

(2Qx20M=40M)

15 ASTM, TBP, EFV are the three main process to find the relation between volume of distillate and respective boiling temperature during distillation. Following are the ASTM Distillation data for a reservoir from Upper Assam Basin. What are the parameters you can find from these data to characterize the reservoir rock? Interpret your findings with the help of standard table.

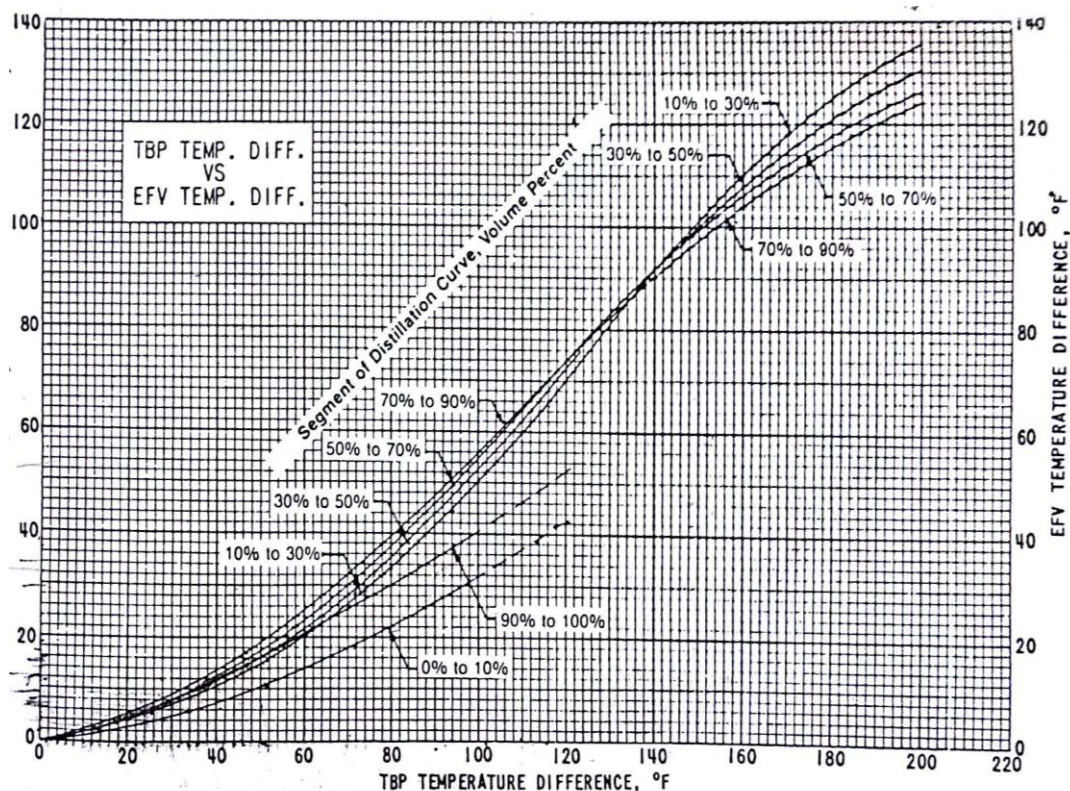
Volume of Distillate (ml)	0	12	18	31	35	44	50	59	62	64	72
Temperature (°C)	68	101	110	126	133	149	167	180	211	250	300

(C.O.No.4) [Application]

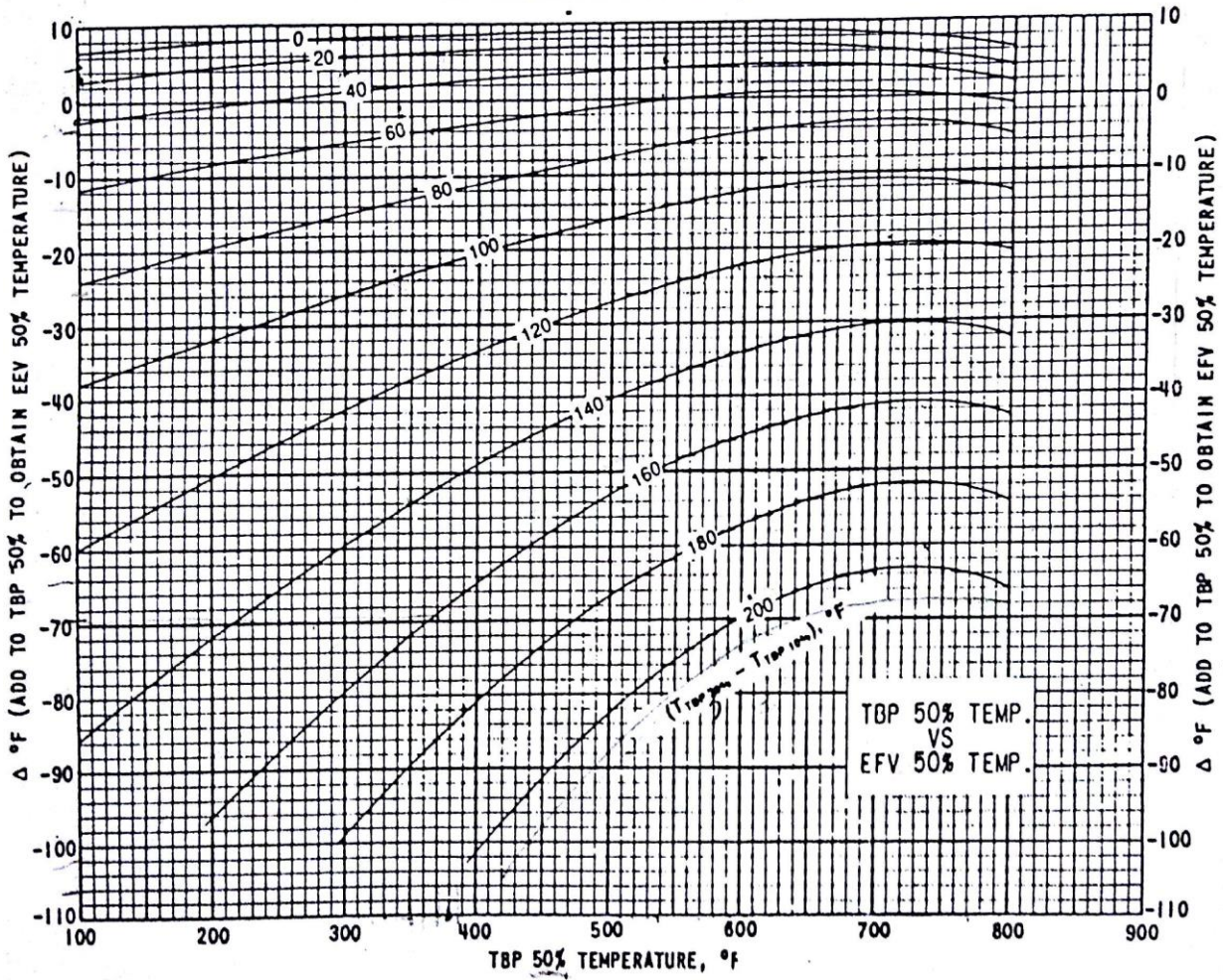
16 Following are the sieve analysis data for a reservoir from Upper Assam Basin. What are the parameters you can find from these data to characterize the reservoir rock? Total weight of the sample is 100 gm. Interpret your findings with the help of standard table.

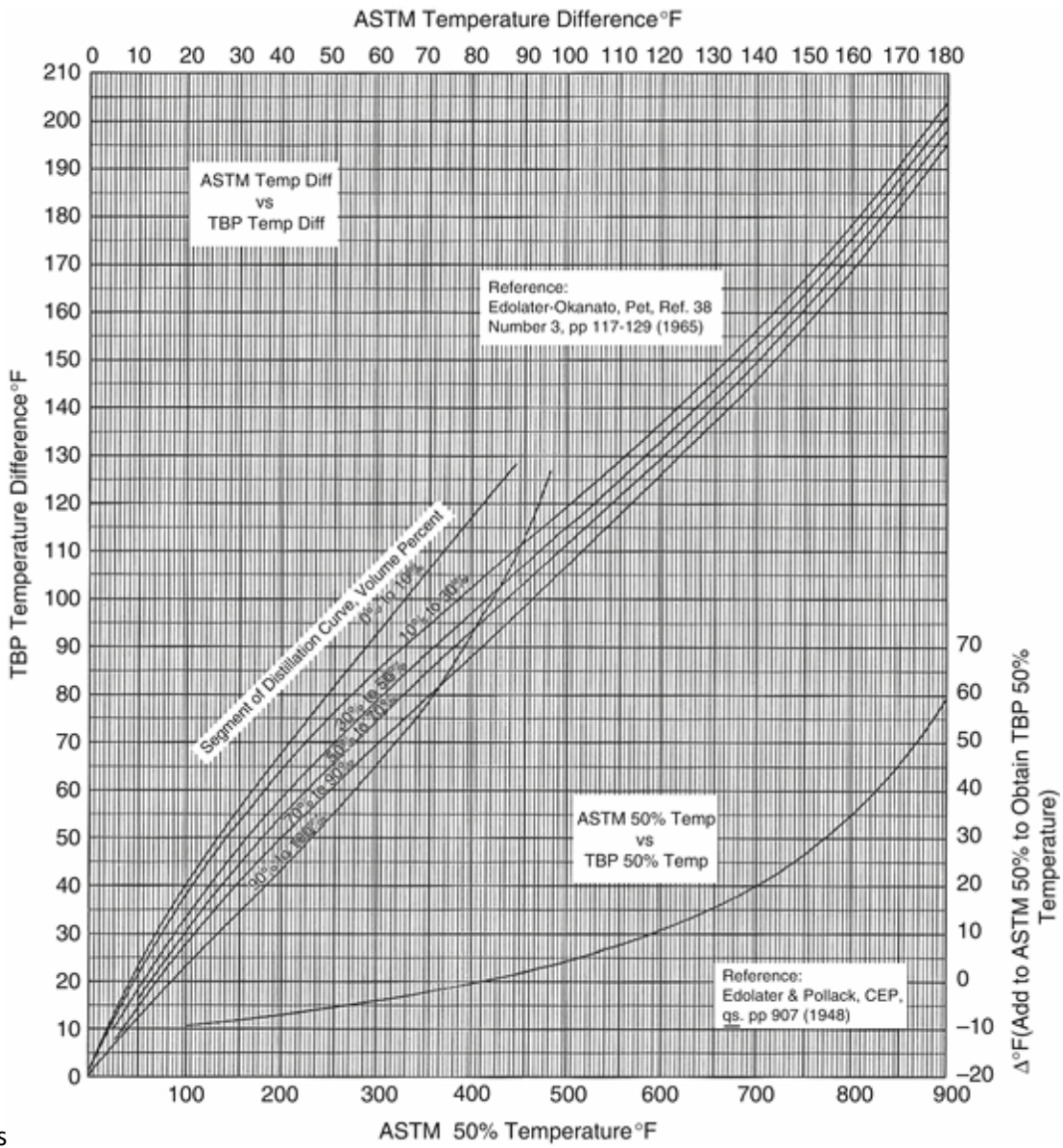
Sieve Mesh	Size Grade (φ)	Screen opening Dpi in mm	Weight retained (gm)
25+	0.5	0.7	3.98
35+	1	0.4	22.31
45+	1.5	0.3	9.97
60+	2	0.25	21.38
80+	2.5	0.17	10.88
120+	3	0.12	15.69
170+	3.5	0.08	7.74
325+	4.5	0.02	6.74
Pan	5		0.4

If the density of sandstone rock is 2700 kg/cubic m, the shape factor is 1.5 and sphericity 0.7. For the material between 25 mesh and 170 mesh in particle size, calculate (a) Specific surface area (b) total no of particles in mixture (c) volume mean diameter (d) volume surface mean diameter (e) mass mean diameter. (C.O.No.1) [Application]



TBP TEMPERATURE DIFFERENCE, °F





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