Total No. of printed pages = 5

END SEMESTER EXAMINATION-2019

Semester : 4th

Subject Code : Ch-403

FUELS, FURNACE AND REFRACTORIES

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks for the questions.

Instructions :

1. *All* questions of PART – A are compulsory.
2. Answer any *five* questions from PART – B.

PART – A

Marks – 25

1. Fill in the blanks : 1×10=10

   (a) A ——— is basically a source of heat.

   (b) ——— is inorganic residue left when the fuel is completely burnt in air.

   (c) Cetane number is desirable for ——— fuel.

[Turn over

(d) Unit of dynamic viscosity is ——.

(e) Main components of LPG are —— and ——.

(f) One example of acidic refractory is ——.

(g) Cloud point is important for —— fuel.

(h) —— coal has highest calorific value.

(i) Aromatic content increases the —— number.

(j) Blast furnace is used in —— industry.

2. Write true or false : 1×5=5

(a) Pour point is the temperature at which a fluid ceases to flow.

(b) ASTM stands for American Standard for Testing of Minerals.

(c) CNG is obtained from natural gas.

(d) Composition of Producer gas is CH_4 and H_2.

(e) The first stage of coal is peat.

3. Define the following : 1×5=5

(a) API gravity

(b) Char value

(c) Cloud point

(d) Octane number

(e) Diesel index.

4. Choose the correct option : 1×5=5

(a) Pensky-Martin apparatus is used for measuring Flash point / Viscosity.

(b) With increase in oxygen content the calorific value of coal increases / decreases.

(c) Mercaptans / Salts make the crude sour.

(d) The upward migration of crude is prevented by Reservoir rock / Cap rock.

(e) Natural gas mostly contains Methane / Butane.

PART – B

Marks – 45

5. (a) Describe the two stages of distillation of crude oil with neat flow sheet. 5

(b) Define visbreaking, viscosity index, fire point and pulverisation. 4

6. (a) Write briefly about the theories behind the origin of coal. 4

(b) Describe the methods of analysis of coal. 5

7. (a) Write briefly about various renewable energy sources. 5

(b) What are the advantages of renewable energy over conventional energy ? 4

8. (a) Describe briefly about the general manufacturing process of refractories. 5

(b) Describe the construction of blust furnace with neat diagram. 4

9. (a) Describe the production of producer gas with neat diagram. 5

(b) Write short notes on any *two* : 2×2=4

(i) Muffle furnace

(ii) Water gas

(iii) LPG.

10. (a) Classify refractories based upon their chemical nature. 5

(b) Define knocking. How can this be prevented ? 2

(c) What are pour and cloud point ? 2