



14-12-2017

DOON UNIVERSITY, DEHRADUN

End Semester Examination, 3rd Semester, 2017–2018

Department of Chemistry, School of Physical Sciences (SoPS)

Integrated M.Sc. 5 Years (Chemistry)

Course: *Skill Enhancement Course: Fuel Chemistry*

Course Code: *CYS-201*

Time Allowed: *03 Hours*

Maximum Marks: *30*

Note: *Attempt All Questions from Sections A, B and C.*

SECTION: A

(Marks: $6 Q \times 1 = 6$)

- [1] Classify the lubricants with examples. [1]
- [2] Describe various types of mechanisms/types of lubrication. [1]
- [3] Write a short note on Producer Gas. [1]
- [4] Define chemical fuels with at least three examples. [1]
- [5] Discuss the process of ultimate analysis of Sulphur in coal and also derive formula for determining Sulphur in coal. [1]
- [6] Differentiate between renewable and non-renewable sources of energy. [1]

SECTION: B

Marks: 12

- [7] (a) Write short notes on water gas or blue gas and Natural Gas? [2]
(b) Explain why cracking has to be carried out in the absence of air. [1]
- [8] (a) Explain carbonization in detail. [2]
(b) Coal Tar and Its Fractionation. [1]

[9] Describe petroleum refining in detail. Also give a brief account (including boiling point, number of carbon atoms in the molecules and uses) of typical fractions obtained by fractional distillation of petroleum. [3]

[10] Describe Octane Number, Knocking, Anti-knocking agents and Unleaded petrol. [3]

SECTION: C

Marks: 12

[11] Describe the following in detail: [2+2+2]

- (a) Reforming
- (b) Thermal Cracking
- (c) Catalytic Cracking

[12] Derive the formula for calculating NCV of such a fuel, the value of GCV of which is known to you: [6]

- (a) Saponification Number
- (b) Neutralization Point
- (c) Cloud Point and Power Point
- (d) Flash Point and Fire Point
- (e) Drop Point
- (f) Iodine Number