14/12/16

DOON UNIVERSITY, DEHRADUN

End Semester Examination, First (Odd) Semester, 2016–2017

Department of Chemistry, School of Physical Sciences (SoPS)

Integrated M.Sc. 5 Years (Chemistry)

Course: Skill Enhancement Course–I   **Course Code: CYS–201**

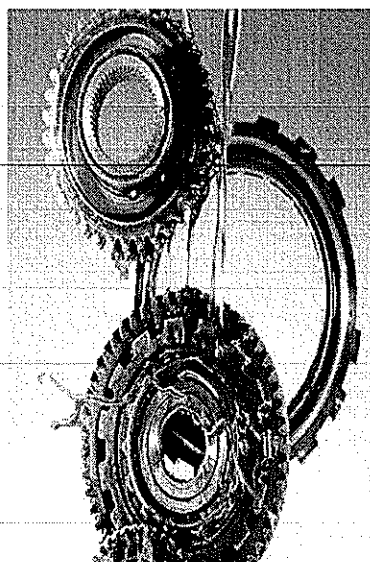*Time Allowed: 03 Hours*   *Maximum Marks: 30*

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

SECTION: A   *(Marks: 6 Q× 1 = 6)*

[1]   Comment on the following image :   [1]
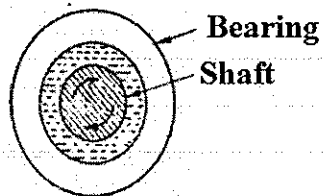

[2]   Explain flash point.   [1]

[3]   What are the advantages of unleaded petrol?   [1]

[4]   What kind of lubricant will be suitable for the following?   Explain.   [1]

[5]   Write a short note on Anti-Knocking agents with example.   [1]

[6]   A gasoline has the same knocking characteristics as a mixture of *iso*-octane and *n*-heptane containing 20% by volume of *n*-heptane. What is the octane number of gasoline.   [1]

SECTION: B   Marks: 12

[7]   (a) What is Viscosity Index?   [1]

       (b) Explain the reason why cracking has to be carried out in the absence of air.   [1]
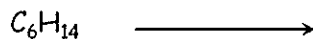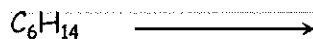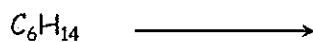   (c) Write a short note on LPG.   [1]

[8]   Define each of the following terms and give an example of each: [3]
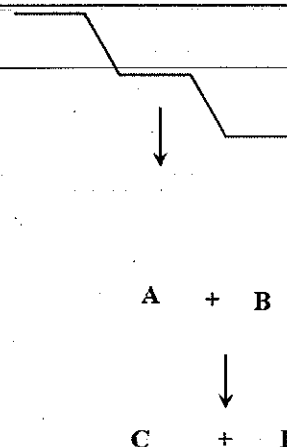   (a) Thermal Cracking   (b) Catalytic Cracking   (c) Reforming

[9]   [3]

(a) What are various possibilities of cracking of C_6H_{14}, a hydrocarbon molecule?	(b) Also explain the mechanism of cracking of the same molecule by filling in the blanks in following.
$C_6H_{14} \longrightarrow$	
$C_6H_{14} \longrightarrow$	
$C_6H_{14} \longrightarrow$	
$C_6H_{14} \longrightarrow$	A + B
$C_6H_{14} \longrightarrow$	C + D

[10] A coal sample (weight = *m* gms) was subjected to ultimate analysis. After that experiment was over, it was noticed that increase in weight of anhydrous calcium chloride tube was *z* gms and increase in weight of KOH tube was *y* gms. Write the chemical reactions, which take place during the experiment related to this analysis. Considering this data, fill in the blanks: [3]

44 gm of CO_2 contain   = ... gm of carbon

1 gm of CO_2 will contain   = ... gm of carbon

y gms of CO_2 will contain   = ... gm of carbon

% Carbon   = ————————————

18 gm of H_2O contain   = ... gm of hydrogen
1 gm of H_2O will contain   = ... gm of hydrogen
z gm of H_2O will contain   = ... gm of hydrogen
% Hydrogen   = ————————————

SECTION: C   Marks: 12

[11] Differentiate between *Proximate Analysis* and *Ultimate Analysis* of Coal. Also explain the reasons why ash-forming constituents in coal are undesirable. In context of *Proximate Analysis*, fill in the blanks: [2+2+2]

% moisture   = ———————— X - - - - -

% Volatile matter   = ———————— X - - - - -

% Ash   = ———————— X - - - - -

% Fixed carbon   =

[12] Write short notes on:
(i) Gross Calorific Value and Net Calorific Value
(ii) Classification of Lubricants with Examples
(iii) (a) *Water Gas*   (b) *Carbonization*