



**2023/TDC(CBCS)/EVEN/SEM/  
CHMSEC-401T/338**

**TDC (CBCS) Even Semester Exam., 2023**

**CHEMISTRY**

**( 4th Semester )**

Course No. : CHMSEC-401T

**( Fuel Chemistry )**

Full Marks : 50

Pass Marks : 20

Time : 3 hours

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

**SECTION—A**

Answer any *fifteen* of the following questions :

1×15=15

1. Define biogas.
2. Mention two uses of wind energy.
3. What are fossil fuels?

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*( Turn Over )*



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4. What is the fuel source for nuclear energy?
5. Give the composition of coal.
6. What are the products obtained on high temperature carbonization of coal?
7. Mention two uses of producer gas.
8. Define water gas.
9. What is crude oil?
10. What catalyst is used during catalytic cracking?
11. Give two examples of non-petroleum fuels.
12. What are synthetic fuels?
13. What are petrochemicals?
14. Write the reaction for preparation of vinyl acetate.
15. Draw the structures of propylene oxide and butadiene.
16. Mention two uses of xylene.

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( ( 3 ) )

17. How are lubricants classified?
18. Write the names of two solid lubricants.
19. What are semisolid lubricants?
20. Give two examples of synthetic lubricants.

SECTION—B

Answer any *five* of the following questions :  $2 \times 5 = 10$

21. Write a brief note on solar energy.
22. Give the classification of fuels.
23. What is meant by carbonization of coal?
24. Give the composition and uses of coal gas.
25. What is meant by cracking of petroleum?
26. Explain the term 'LNG' and mention its composition.
27. Give one method for preparation of propylene oxide and mention its uses.

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( Turn Over )



( ( 4 ) )

28. Mention the natural source of toluene and its uses.
29. What are non-conducting lubricating oils?
30. Mention the conditions for using semisolid lubricants.

SECTION—C

Answer any five of the following questions :  $5 \times 5 = 25$

31. Give a brief account on non-renewable energy sources.
32. (a) What is calorific value of fuels? Why is net calorific value always less than gross calorific value of fuels?  $1+2=3$   
(b) 2 kg of a coal sample was burnt in a calorimeter. The heat liberated was found to be 14114 kcal. Calculate the calorific value of the coal sample.  $2$
33. Discuss briefly the advantages of coal as a fuel.
34. What are the various fractions obtained by distillation of coal tar? Write their uses.  $3+2=5$

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35. Define CNG. What are the advantages of CNG over conventional fuels?  $1+4=5$
36. Discuss briefly about fuels derived from biomass.
37. How is isoprene manufactured from propylene? Mention its industrial importance.  $3+2=5$
38. Describe the method of production of butadiene using *n*-butane as the feed stock.
39. What is meant by viscosity index of a lubricating oil? How is viscosity index of a lubricating oil determined?  $2+3=5$
40. Discuss the following terms with reference to lubricants :  $2\frac{1}{2} \times 2 = 5$   
(a) Pour point  
(b) Cloud point

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