Roll.No. | 20UFMAT1001

SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai - 600 044.
B.Sc.NFSMD - END SEMESTER EXAMINATIONS - NOVEMBER 2025
SEMESTER - I
20UFMAT1001 -Allied Chemistry - I

Total Duration : 2 Hrs.30 Mins. Total Marks : 60

Section B

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. Summarize the concept of buffer solutions and illustrate their action using a simple example of a weak acid–conjugate base system.
2. Demonstrate the classification of reactions (addition, substitution, elimination, condensation, polymerization) using one example for each.
3. Analyze the physical and chemical properties of pyrrole and pyridine. Justify how their structure affects these properties.
4. Demonstrate the hydrogen–chlorine photochemical reaction and explain the role of light in initiating the reaction.
5. Summarize the types of fuels (water gas, natural gas, semi-water gas) and their common uses.
6. Analyze the differences between electrophiles, nucleophiles, and free radicals. Justify their role in organic reactions with suitable examples.
7. Classify the heterocyclic compounds and illustrate the structures of furan, thiophene, pyrrole, and pyridine.
8. Justify the differences between fluorescence, phosphorescence, and chemiluminescence. Illustrate each phenomenon with suitable examples.

Section C

Answer any **THREE** questions $(3 \times 10 = 30$ Marks)

9. Apply the Henderson–Hasselbalch equation to calculate the pH of a buffer solution containing 0.1 M acetic acid and 0.05 M sodium acetate. Demonstrate each step clearly.
10. Differentiate between temporary and permanent hardness of water. Justify the methods used for softening hard water and illustrate how chlorine, ozone, and UV-light are used in water purification.

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11. Evaluate the mechanism of electrophilic substitution reactions in benzene for nitration and sulphonation.Illustrate each step and justify why the reaction occurs at specific positions on the benzene ring.
12. Summarize the preparation and properties of furan, thiophene, pyrrole, and pyridine. Illustrate the key reactions of each and justify their reactivity differences based on electronic structure.
13. Justify the differences between photo sensitization and photosynthesis. Illustrate their significance in chemical and biological systems and explain the role of light in each process.

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