24/11/2025

Printing Pages :2

Paper Code: B020101T C (SVSU:2023-24/R)

Enrollment No.													

Program Name: B.Sc. Botany/Chemistry/Genetics and Genomics/Mathematics/Physics/Zoology

I Semester / 1st Year Examination

Subject Code: B020101T

Subject Name: FUNDAMENTALS OF CHEMISTRY

[Time : 03:00 Hours] **[Max. Marks : 75]**

Note : 1. Attempt all the questions as per given instructions.

1. Multiple Choice Questions (MCQs) **[01×15=15]**

I Which of the following quantum number gives information about the spatial orientation of an atomic orbital?
(a) Principal Q.No (b) Azimuthal Q.NO.
(c) Magnetic Q.No. (d) Spin Q.No.

II 8-bits is equal to---------- byte.
(a) 1 (b) 2 (c) 3 (d) 4

III The bond strength is inversely proportional to
(a) Bond order (b) bond length
(c) bond angle (d) bond energy

IV - R-effect is shown by
(a) $-CH_3$ (b) C_2H_5 (c) CH_2CH_3 (d) -COOH

V The bond angle present in BeF_2
(a) 180° (b) 120° (c) 107° (d) 104°

VI The bond energy will be highest in
(a) triple bond (b) double bond
(c) single bond (d) all will be equal

VII The general electronic configuration of nitrogen family
(a) $ns^2 np^1$ (b) $ns^2 np^2$ (c) ns^2np^3 (d) ns^2np^4

VIII Which of the following reactions does not required any reagent?
(a) addition (b) pericyclic (c) condensation (d) substitution

IX Which of the following will be chiral
(a) CH_3CHCl_2 (b) CH_2ClBr (c) $CH_3CHClBr$ (d) None

X Inductive effect is shown by
(a) sigma bond (b) pi bond (c) Hydrogen bond (d) ionic bond

XI The bond order of oxygen molecule
(a) 0 (b) 1 (c) 2 (d) 3

XII Dipole moment is a ---------- quantity.
(a) vector (b) scalar (c) both (d) none

XIII Cyclobutadiene is
(a) Aromatic (b) Antiaromatic (c) Both (d) None

XIV Pinacol-pinacolone is a type of
(a) Rearrangement reaction (b) Pericyclic reaction
(c) Condensation reaction (d) Addition reaction

XV The total number of orbital for l=2
(a) 3 (b) 5 (c) 1 (d) 7

2. Answer in long (any three) **[10×3=30]**

I Discuss VSEPR theory along with its limitations.

II Describe electrophilic, nucleophillic and free radical addition reactions and discuss their mechanisms.

III Discuss hybridization by taking sp, sp^2 and sp^3 hybridizations.

IV Briefly discuss the postulates of Molecular Orbital Theory (MOT).

V What are intermolecular forces? Explain by giving suitable examples.

3. Answer in short (any five) **[6x5=30]**

I Briefly discuss the arrow notations with examples.

II Differentiate between electronegativity and electron gain enthalpy.

III What are the stereoisomers? Explain optical and geometrical isomers.

IV What is Aufbau Principle?

V Write a third law of algorithm and give its equation.

VI Discuss CPU? What are main components of CPU?

VII What is dipole moment? Explain by giving suitable examples.

VIII Draw the MO diagram of O_2 molecule and predict its bond order.

IX Discuss Pincol-Pinacolone rearrangement reactions. Give mechanism.

X What are the characteristics of s block elements?

28/11/2025

Printing Pages: 2
Paper Code: M-DIS-SM B (SVSU:2025-26/R)

Enrollment No.													

Program Name: B.Sc. BT/MB/BI
1st Semester / First Year Examination
Subject Code- M-DIS-SM
Subject Name- Soil Microbiology

[Time : 03:00 Hours] **[Max. Marks : 70]**

Note: 1. Attempt all the questions as per given instructions.

1. Multiple Choice Questions (MCQs) **[01×15=15]**

I Jeevamrit is prepared from:
(a) Only soil
(b) Cow dung, urine, and jaggery
(c) Chemical fertilizer (d) Compost

II Cyanobacteria fix nitrogen in:
(a) Root nodules
(b) Specialized cells called heterocysts
(c) Mycorrhizal fungi (d) Phyllosphere

III Soil microbial activity increases with:
(a) Low temperature (b) High pH
(c) Optimum moisture and organic matter (d) Salinity

IV The microbial group that bridges bacteria and fungi is:
(a) Protozoa (b) Actinomycetes
(c) Cyanobacteria (d) Mycorrhizae

V Rhizosphere is:
(a) Region of leaf surface (b) Region surrounding roots
(c) Stem surface (d) Seed coat

VI Allelopathy is caused by:
(a) Physical barriers (b) Chemical substances released by plants
(c) Light (d) Soil texture

VII The base of natural farming is:
(a) Jersy animal (b) Buffalo (c) Indigenous Cow (d) All

VIII Phosphate solubilization is carried out by:
(a) Bacillus and Pseudomonas (b) Nitrosomonas
(c) Clostridium (d) Methanobacterium

IX Which microbial enzyme plays a role in nutrient turnover?
(a) Catalase (b) Dehydrogenase (c) Amylase (d) Lipase

X Bioremediation is:
(a) Use of microbes to degrade pollutants
(b) Use of chemicals to clean soil
(c) Physical filtration
(d) Heat treatment

XI Trichoderma spp. act as:
(a) Nitrogen fixer (b) Biocontrol agent (c) Pathogen (d) Alga

XII Biofertilizers are:
(a) Chemical fertilizers b) Living microbial inoculants
(c) Pesticides (d) Organic waste

XIII Which of the following best describes soil as a habitat?
(a) Static and lifeless medium (b) Dynamic system full of life
(c) Only mineral particles (d) Only air and water

XIV The dominant microorganisms responsible for nitrification are:
(a) Nitrosomonas and Nitrobacter (b) Pseudomonas
(c) Clostridium (d) Azotobacter

XV How many bacteria found in 1gm of soil?
(a) 10-100 Cr (b) 1-10 Cr (c) 0.1-1 Cr (d) .01-10 Cr

2. Answer in long (any three) **[10×3=30]**

I Explain the soil with its complete microbial population and types.

II Describe the carbon, and phosphorus cycles with microbial involvement.

III Discuss the dangerous effects of pesticides and chemical fertilizers on soil and human health.

IV Explain types and importance of biofertilizers with examples.

3. Answer in short (any five) **[5x5=25]**

I Mention two microbial indicators of soil health.

II What is the role of mulching in microbial activity?

III What is the rhizoremediation?

IV Explain microbial degradation of pesticides.

V Write a note on Bioenzymes.

VI Define soil types on the bases of different climate.

VII List factors influencing soil microbial population.

28/11/2025

Printing Pages: 2
Paper Code: M-DIS-FCP **C** **(SVSU:2025-26/R)**

Enrollment No.													

Program Name: B.Sc. Chemistry/ Zoology
I Semester / 1st Year Examination
Subject Code: M-DIS-FCP
Subject Name: Chemistry of Foods, Cosmetics and Perfumes

[Time : 03:00 Hours] **[Max. Marks : 70]**

Note : Attempt all the questions as per given instructions.

1. Multiple Choice Questions (MCQs) **[01×15=15]**

I Essential oils are extracted by:
(a) Steam distillation (b) Fermentation
(c) Crystallization (d) Filtration

II The main cleansing agent in shampoos is:
(a) Alcohol (b) Soap or detergent
(c) Waxes (d) Glycerin

III Which of the following is a natural hair colorant?
(a) Ammonia (b) Lead acetate
(c) Henna (d) Hydrogen peroxide

IV Muscone is a major component of:
(a) Musk (b) Sandalwood (c) Clove (d) Geranium

V Metallic adulteration involves:
(a) Lead, mercury, arsenic (b) Salt and sugar
(c) Sand and stone (d) Oil and fat

VI Malachite green is used to color:
(a) Spices (b) Fruits (c) Sweets (d) Vegetables

VII Accidental adulteration can occur due to:
(a) Pesticide residues (b) Intentional mixing
(c) Both a & b (d) Pesticide residues

VIII Artificial flavours are used to:
(a) Increase shelf life (b) Enhance taste and smell
(c) Improve color (d) Reduce cost

IX Chalk powder is sometimes added to:
(a) Sugar (b) Milk (c) Salt (d) Rice

X Hair dyes act by:
(a) Removing natural pigment
(b) Coating hair shaft with color
(c) Both a and b
(d) None of these

XI The purpose of emulsifiers in creams is to:
(a) Mix oil and water (b) Provide color
(c) Prevent bacterial growth (d) Improve fragrance

XII The main purpose of perfumes in cosmetics is:
(a) Providing color (b) Masking unpleasant odor
(c) Acting as preservative (d) Increasing pH

XIII The function of glycerin in cosmetics is to:
(a) Reduce pH (b) Provide color
(c) Act as a humectant (d) Increase viscosity

XIV Which type of cream forms an oily layer to prevent moisture loss?
(a) Cold cream (b) Vanishing cream
(c) Shaving cream (d) Astringent cream

XV Milk adulteration with starch can be detected using:
(a) Acids (b) Litmus test
(c) Benedict's reagent (d) Iodine test

2. Answer in long (any three) **[10×3=30]**

a) Mention the role of humectants, surfactants and preservatives in cosmetics along with appropriate examples.

b) Highlight the different methods of food adulteration. Also, discuss their harmful effects in detail.

c) Discuss the importance of euganol, eucalyptus and rose oil in perfumes. Discuss their therapeutic potential.

d) Analyze the reasons behind the rise of food adulteration in India.

3. Answer in short (any five) **[5x5=25]**

a) Explain the role of water in the formulation of cosmetics.

b) Why food adulteration is considered harmful to human health?

c) How do you synthesize 2-phenyl ethyl alcohol used in cosmetics? Give appropriate mechanism.

d) Distinguish between geraniol and jasmone based on their chemical structures and applications.

e) Distinguish between immediate and long term impact of food adulteration.

f) What are sandalwood oils? Discuss their main components and important applications.

g) Describe how milk adulteration can be detected using a simple tests?