

Question Paper-1

Mutan, Arts, commerce & science college, Rajapur.

subject → Botany

Paper-II → Principles of plant science
[Bo-122]

class - F.Y.B.Sc

2019-20

[Marks-30]

Q.1 Attempt any following (any five) 10-marks.

- 1] Define the plant physiology
- 2] What is osmotic pressure?
- 3] Enlist the phases of growth
- 4] Enlist the nitrogen bases of DNA/RNA.
- 5] Enlist types of chromosomes.
- 6] What are the different model of plasma membrane?

Q.2 Write short notes on any four of the following 10 marks.

- 1] stages of meiosis
- 2] Role of plant growth regulators
- 3] osmosis
- 4] characteristics of DNA
- 5] Transcription
- 6] Purine bases

Attempt any two of the following

(10 marks)

- Q-1] Explain ultrastructure & functions of chloroplast, Mitochondrion/Endoplasmic reticulum.

OR

2] What is DNA replication? Explain process of DNA replication.

- B] 1] Explain stages/phases of cell cycle. — 4 marks

OR

Explain a mode of packaging of DNA into chromosomes.

Q.3 Attempt any two of the following (10 marks) Nutan

A] Explain the concept of plasmolysis in plant cell. Add a note on its significance.

or

Write features of Watson and Crick model of DNA.

— 6 marks

B] Explain the scope of molecular biology.

or

Define plasmolysis.

Write a fluid mosaic model of plasma membrane.

4 mark

Question paper 01.

Nutan Arts, Commerce & Science College, Rajapur

Subject = Zoology

Paper I → Animal Diversity - II

Class → F.Y. B.Sc

2019-20

[Max. Marks - 30]

Q. 1) Attempt the following.

(10m)

a) Define the term 'annelida'

b) What is Vermiculture?

c) ~~At~~ Write the distinguishing characters of Class crustacea.

d) Define the phylum - mollusca.

e) Write the names of different types of harmful insect to man (any 4)

Q. 2) Write short notes on...

(10m)

a) Biting & chewing types of mouthparts.

b) Economic importance of Mollusca.

c) Vermicomposting.

Q.3)

(10)

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A) Give an account of water vascular system of Asterias.

(6)

B) Economic importance of Lac insect.

(4)

Question paper 02.

Nutan Arts, Commerce & Science College, Rajapur.

Sub class 01 F.Y.B.Sc

Subject = Zoology.

Paper I 01 Animal Diversity - II

2019-20

[Max. marks = 30]

- Q. 1) Attempt the following. (10m)
- a) Which disease is caused by Ascaris & Wuchereria.
 - b) Why ecdysis or moulting occurs in Arthropods?
 - c) 'Earthworm is friend of farmer?' Explain.
 - d) Which are the sense organs of molluscs?
 - e) Write the distinguishing characters of class Echinoidea of phylum Echinodermata.
- Q. 2) Write short notes on... (10m)
- a) Economic importance of Nematoda.
 - b) Autotomy & regeneration.
 - c) Mouth parts of female Anopheles mosquito.

Q.3)

- A) What are the Aschelminthes? Give an account of salient features of phylum Aschelminthes. (6)
- B) Economic importance of Annelida. (4)

(2)

Electricity And magnetism.

Q.1. Attempt the following questions. (10m)

- 1) State Ampere's circuital law.
- 2) State superposition principle in electrostatics.
- 3) Define magnetization and magnetic intensity.
- 4) What is Curie temperature?
- 5) What is ferrite? State two applications of it.

Q.2. Attempt the following question. (10m)

- 1) An aluminium wire of diameter 0.4 cm carries a current of 25 ampere. Find the magnetic field at the surface of the wire.
- 2) An electric dipole consisting of two opposite charges each of magnitude $2.00 \mu\text{C}$ is separated by a distance of 2.0 cm. The dipole is placed in an external field of intensity $1.0 \times 10^5 \text{ N/C}$. Calculate the maximum torque on the dipole.

Q.3.

Attempt the following questions.

(10m)

1) obtain the relation between $\vec{B}$, $\vec{M}$ and $\vec{H}$.
Discuss qualitatively.

2) calculate the potential and electric field due to a dipole of dipole moment $2 \times 10^{-10} \text{ C-m}$ at a distance of 1 meter from it.

a) on its axis b) on its perpendicular bisector.

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Rajapur.

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Time - 1 hr.

sub physics - II

Roll No -

electricity and magnetism.

Q. 1.

Q. 1. Attempt the following questions. (10 M)

- 1) state Coulomb's law in electrostatics.
- 2) state Gauss's law in dielectrics.
- 3) explain the hysteresis curve.
- 4) A solenoid of 500 turns/m is carrying a current of 2A. If the core is made of iron which has relative permeability of 5000, determine the magnitude of the magnetic intensity.
- 5) what is meant by non-polar, polar molecule? Give example.

Q. 2.

Attempt any two questions. (10 M)

- 1) using Biot-Savart's law, obtain magnetic induction due to circular coil.
- 2) state the comparison between ferromagnetic and antiferromagnetic materials.

3) i) obtain equation of potential at a point due to electric dipole.

ii) explain magnetic susceptibility.

Q.3. Attempt any two questions. (10m)

1) i) Find the electric potential at a point due to point charge.

ii) A charge of $9 \times 10^{-9} \text{ C}$ is placed inside a cube. calculate the electric flux linked with the cube.

2) i) explain the concept of magnetic field.

ii) write a note on ferrites.

3) i) The maximum value of the permeability of some metals is 0.150 T-m/A . find the value of maximum relative permeability and susceptibility.

ii) A charge of $3.0 \mu\text{C}$ moves with speed $3.0 \times 10^6 \text{ m/s}$ along positive x -axis. A magnetic field of strength $(0.10 \vec{j} + 0.20 \vec{k}) \text{ T}$ exists in space. Find the magnetic force acting on the charge.

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(A)

Time - 1hr (Heat & Thermodynamics) Roll no. _____

Q Attempt the following Question (30 M)

- 1) Derive Vander Waal's equation of state of gas.
- 2) What is thermocouple? Explain use of thermocouple as a thermometer.
- 3) Show that during a reversible adiabatic process, the entropy of the system remains constant.
- 4) What is the change in the internal energy per gram of air if 12 gram of air is heated from 0°C to 5°C at constant volume by adding 120 cal. of heat.
- 5) Calculate the work done when a gram molecule gas expands isothermally at 27°C to double its original volume [$R = 8.3 \text{ J degree}^{-1} \text{ mole}^{-1}$]
- 6) Calculate the work done during an isothermal expansion of 4 mole of an ideal gas from a volume 4 lit to 16 lit at 0°C .

F.Y.B.Sc

(B)

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Sub: Physics I
(Heat & Thermodynamics)

Time -

Roll no. -

Q

Attempt the following question (30M)

- 1) Describe Carnot's engine & show that its efficiency is a function of working temperature only.
- 2) State the function & principle of Bimetallic thermometer.
- 3) Explain Otto cycle with an indicator diagram.
- 4) A refrigerator is working in betⁿ 200K & 300K works at 60% coefficient. Calculate the power for refrigeration effect at 100W.
- 5) The resistance of platinum wire at 0°C is 5.5Ω & at temp t it is 7.5Ω . Find temp of wire if coefficient of temp for platinum $\alpha = 0.0039/^\circ\text{C}$.
- 6) Find the temperature on Fahrenheit scale corresponding to 30°C.

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F.Y. BSc

CHEMISTRY

CH-201 = Inorganic chemistry
[paper I]

2019 - 2020

[Time = 2 Hours]

[Max Marks = 30]

Q.1] Answer the following questions. [10M]

- 1] Define the terms ① Threshold frequency
② Threshold energy
- 2] Ionization potential increases across the period. why?
- 3] What is hybridisation? What is its need?
- 4] Explain covalent bond and ionic bond with suitable example.
- 5] Find the wavelength of carbon dioxide molecule at the velocity of 440 ms^{-1} .

Q.2] Answer the following [any 5] [20M]

- 1] Give the significance of ψ and ψ^2
- 2] Define the term oxidation state. What are the various rules to calculate it and explain example.
- 3] Draw the structure of ① ClF_3 ② XeOF_4 ③ XeO_3
④ PCl_5

- Q] Discuss the merits and demerits of the form of the periodic table.
- Q] State and explain the Heisenberg's uncertainty principle.
- Q] 'H-O-H' bond angle in H_2O is $104^\circ 35'$ while H-N-H bond angle in NH_3 is $107^\circ 2' 8''$. Explain.



F.Y. BSc

CHEMISTRY

CH-201 = Inorganic chemistry

[Paper I]

2019 - 2020

[Time = 2 Hours]

[Max-Marks=30]

Q.1 Answer the following questions. [10M]

- 1] Define ① Metallic bond ② Ionic bond.
- 2] What is electron configuration? Explain in various orbitals.
- 3] Define following terms ① Electronegativity ② Hund's rule.
- 4] Define node. How to determine total number of orbital nodes?
- 5] Calculate the wave number of the spectral line in the Balmer's series when electron jumps from $n = 3$.

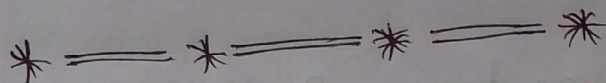
Q.2 Answer the following [any 5] [20M]

- 1] What are the assumptions of VSEPR theory?
- 2] What are the different blocks of the elements named as s, p, d and f-blocks?
- 3] State the time-independent Schrodinger equation for three dimensions and give its significance.

4) The molecule of CH_4 is tetrahedral - NH_3 is pyramidal while H_2O is angular. why?

5) Explain the term crystal radius. How are univalent radii converted to crystal radii? Give one example.

6) what are the nodal planes? sketch the nodal planes of p_x , p_y and p_z -orbitals.



Nutan Arts, Commerce and Science College Rajapur

class :- F.Y. BSc

subject :- Organic chemistry [CBCS pattern]

Academic year :- 2019-20

[30]

Q.1) Answer the following.

[10]

1) Explain S_N1 reaction.

2) Preparation of ~~alkenes from~~ Alkyl halide from alkenes.

Q.2) Answer the following.

[10]

1) What are alcohols? Give the classification of alcohols.

2) Explain the Aldol Condensation?

Q.3) Answer the following.

[10]

1) Explain the Sulphonation reaction of Benzene.

2) What is Benzene? Explain Friedel-Craft's alkylation reaction.

———— Best of Luck ————

Nutan Arts, Commerce and Science College Rajapur

Class : F.Y.Bsc

Subject : Organic chemistry [CBCS Pattern]

Academic year : 2019-20

[30]

Q.1) Answer the following. [10]

1) Explain the nitration reaction of Benzene.

2) What is S_N^2 reaction? Explain with suitable example.

Q.2) Answer the following. [10]

1) Explain the Electrophilic substitution reaction of ~~nitration~~ halogenation of Benzene.

2) Preparation of of alcohols (secondary alcohols) ~~by~~ using Grignard reagent from aldehydes.

Q.3) Answer the following. [10]

1) Explain the Cannizzaro's reaction with suitable examples.

2) What is phenol? Explain Reimer-Tiemann reaction on phenol.

———— Best of Luck ————

Instruction :- 1) All question are Compulsary.
2) Figure to right indicate Full marks.

Q.1. Attempt the following

- 1) IF Under rotation of axes, without shifting origin the expression $ax^2 + 2hxy + by^2$ is transformed to $a'x'^2 + 2h'x'y' + b'y'^2$ then prove that $ab - h^2 = a'b' - h'^2$
- 2) Show that line whose d.c.s are connected by $a^2l + b^2m + c^2n = 0$, $lm + ln + mn = 0$ are parallel if $a \pm b \pm c = 0$
- 3) Show that line $\frac{x-1}{4} = \frac{y-8}{7} = \frac{z-4}{6}$ lies in the plane $x+2y-3z=5$
- 4) Find equation of Circle lying on sphere $x^2 + y^2 + z^2 + 8x - 2y + 1 = 0$ and having Centre $(-4, 0, -1)$
- 5) Show that product of semi axes of Conic $(x-2y+1)^2 + (4x+2y-3)^2 - 10 = 0$
- 6) Show that line whose d.c.s are $-3, 4, -2$ $1, -2, 0$ and $1, 0, 2$ are coplanar.

Instruction :- 1) All question are Compulsary.
2) Figure to right indicate full marks.

Q.1. Attempt the Following.

- 1) Verify Cauchy Mean Value theorem for the function $f(x) = \cos x$, $g(x) = \sin x$, IF so, Find Value of c in the interval (a, b) .
- 2) Find point of relative extrema and interval on which function is increasing or decreasing.

$$f(x) = x^4 + 2x^2 - 4$$

- 3) Using Taylor Series prove that

$$\log \tan\left(x + \frac{\pi}{4}\right) = 2x + \frac{4}{3}x^3 + \frac{4}{5}x^5 + \dots$$

- 4) Evaluate following limit

$$\lim_{x \rightarrow \infty} x^{1/x} \quad (0, \infty)$$

- 5) Solve initial Value problem

$$xy' + \left(1 + \frac{1}{\ln x}\right)y = 0, \quad y(e) = 1$$

- 6) Solve $14x^2y^3dx + 21x^2y^2dy = 0$.

Instruction :- 1) All question are Compulsary.
2) Figure to right indicate Full marks.

- Q.1. Attempt the following.
- 1) Solve the Bernolli's equation.

$$7xy' - 2y = -\frac{x^2}{y^6}$$
 - 2) Solve $x^2yy' = (y^2 - 1)^{3/2}$
 - 3) Using Taylor series expansion Find the Value $\sqrt{25.15}$
 - 4) Find Maclaurine Series of $\sin^2 x$
 - 5) Verify Mean Value theorem for $f(x) = \frac{x}{x+1}$
on $[1, 3]$ IF so, find Value of c on interval $(1, 3)$
 - 6) Solve

$$y' = \frac{x^2 + y^2}{\sin x}$$

Time - 1 Hour

Instruction: All questions are compulsory.
Figure to right indicate full marks.

Q. 1 Attempt the following

- 1) Reduce equation $7x^2 - 6xy + 7y^2 + 30x + 10y + 35 = 0$ to standard form.
- 2) Find angle between the plane $2x - y + 2z + 1 = 0$ and $3x + 2y + 6z - 5 = 0$.
- 3) Find the equation of plane passing through points $(2, 0, -1)$, $(1, 2, 1)$ and $(-3, 1, 2)$.
- 4) Prove that section of sphere by the plane is Circle.
- 5) Reduce eqn of line $ax + by + cz + d = 0$ and $a'x + b'y + c'z + d' = 0$ to symmetrical form.
- 6) Show that two lines are $\frac{x-1}{-1} = \frac{y-8}{7} = \frac{z-2}{2}$ and $\frac{x+1}{1} = \frac{y-2}{-1} = \frac{z+4}{1}$ are coplanar and find equation of plane containing them.