F.Y. BSC

Rizvi College Of Arts/Science/Commerce (Bandra-West)

Foundation Course - Paper II

FYBA/COM/BSC SEM II

FYASC-101

2303.29

Duration: 2hrs 30min

Marks:75

Note:1) All the questions are compulsory.
2) Figures to the right indicate full marks

Q1.A. Fill in the blanks with correct options (Any Eight) **08 Marks**

i) The term _____ refers to freedom to business enterprises from excessive government control.
(privatization, liberalization, globalization, disinvestment)

ii) _____ is working with farmers by corporate forms and sharing the rewards.
(Contract farming, Corporate farming, Private farming, Government farming)

iii) Human rights have _____ application.
(universal, limited, maximum, same)

iv) _____ has made primary education a fundamental right.
(Right to Equality, Right to Liberty, Right to Education, Right to Speech)

v) _____ is the abiotic and biotic elements that surround Humans.
(Environment, Ecology, Ecosystem, Ecofeminism)

vi) _____ development focuses on improving the quality of human life without increasing the use of natural resources.
(Economic, Social, Human, Sustainable)

vii) _____ means Per-Judgement.
(Stereotypes, Aggression, Prejudice, Violence)

viii) The _____ stressors are also called job related stressors.
(individual, group, organizational, environmental)

ix) Maslow identified _____ set of needs
(5, 3, 2, 4)

x) _____ are people who conceal their opinions and feelings and do not take any interest in conflict resolution.
(Concealer, Attackers, Addressors, Confronters)

P.T.O

B) State whether the following statements are True or False. **(Any Seven)** **07 Marks**

i) Mass migration refers to the movement of a large group of people from one geographical area to another.

ii) Market liberalization and globalization does not have any effect on the agrarian sector.

iii) The basic human rights help out only in protection but also the prevention of gross violations of human dignity.

iv) Human rights came with the signing of UDHR.

v) Natural environment provides a renewable source of energy.

vi) The composition of the environment is the same everywhere.

vii) Teachers alone are responsible for the development of an individual's personality.

viii) Regionalism causes intergroup conflicts.

ix) All individuals need not have the same sets of needs.

x) There should be proper time management so as to avoid work overload.

Q2. Globalization has resulted in easy movement of people within & across national borders, discuss this with causes & impact of migration. **15 Marks**

OR

Q2. Define the term Globalization. Examine positive & negative impacts of globalization.

Q3. Discuss classification of Human Rights, with special reference to freedom of speech & Expression. **15 Marks**

OR

Q3. Elaborate on the fundamental Rights mentioned in the Indian Constitution.

Q4. Write a detailed note on forms of environmental degradation. **15 Marks**

OR

Q4. Explain the concept of Sustainable Development. Highlight the guidelines of sustainable development.

Q5. Define Socialization. Discuss various agents of socialization. **15 Marks**

OR

Q5. Write short notes on (Any Three)

a) Farmer's Suicide
b) Right to education
c) Environment
d) Significance of ethics
e) Strategies to minimize stress

F.Y.S-102 230401 Lib

S0222 F.Y.B.SC CHOICE BASED) (R-2022-23) SEMESTER II CHEMISTRY: PAPER I

(Time: 3 hours) Total Marks: 100

01/04/23

N.B.: (1) All questions are compulsory.
(2) Figures to the right indicate full marks.
(3) Use of log table/ non-programmable calculator is allowed.

Q1 A Attempt any 12 out of 18 **12M**

1 There pressure P in the ideal gas equation is replaced by _____.
(a) $P + an^2/V^2$ (b) $Pa - n^2/V^2$ (c) $P + 2n^2/V^2$

2 For one mole of a gas the ideal gas equation is _____.
(a) PV = RT (b) PV = 1/2RT (c) PV = 3/2RT

3 $H_{2(g)} + I_{2(s)} \leftrightharpoons 2H^+ + 2I^-$ in this cell reaction _____.
(a) Hydrogen under goes oxidation (b) Hydrogen under goes reduction
(c)Iodine under goes oxidation

4 The SI unit of conductance is _____.
(a) Mho cm (b) S^{-1} cm^{-1} (c) Sm^{-1}

5 The value of equilibrium constant depends on _____.
(a) Temperature (b) Pressure (c) Concentration of reactants

6 Gibbs energy is _____.
(a) Path function (b) State function (c) Constitutive property

7 The colour of bromine gas is _____.
a) violet b) brown c) yellow

8 If a glowing splinter makes pop sound, then the gas is _____.
a) oxygen b) hydrogen c) carbon dioxide

9 Hydrated salts on heating gives _____ gas.
a) H_2O gas b) hydrogen c) carbon dioxide

10 According to Lowry-Bronsted concept, a substance that accepts H^+ ions in is _____ species.
a) acidic b) basic c) neutral

11 $HCl + NH_3 \rightleftharpoons Cl^- + NH_4^+$

The conjugate base of HCl is _____.
a) NH_3 b) NH_4^+ c) Cl^-

12 The correct order of acidity in Fe, Fe^{+2}, and Fe^{+3} is _____.

a) $Fe^{+3} > Fe^{+2} > Fe$ b) $Fe^{+3} < Fe^{+2} < Fe$ c) $Fe^{+3} < Fe < Fe^{+2}$

13 In oxymercuration, if alcohol is used instead of water then it is called _____.
(a) Solvo-mercuration (b) Hydroxy- mercuration. (c) Hydro-oxygenation.

14 Hydroboration oxidation is an important method to prepare long-chain primary _____.
(a) Phenols (b) Alcohols (c) Aldehydes

15 Ozone adds across the double bond of an alkene to form an_____.
(a) Ozonide (b) Oxide (c) Ozonium

16 Alkanes undergo _____ reaction.
(a) Double Displacement (b) Elimination (c) Substitution

17 _____ reaction involves alkylation of the aromatic ring.
(a) Wurtz-fittig (b) Arrhenius (c) Wurtz

18 Halogenation of alkanes takes place by____ mechanism
(a) Free radical (b) E1 (c) Chain reaction

Q1 B Match the following (any 4) **04M**

1	Compressibility factor	a) Only aliphatic hydrocarbon
2	$Cd_{(Hg)} \mid Cd^{+2}$	b) Aliphatic and aromatic hydrocarbon
3	F^-	c) Soft base
4	I^-	d) Hard base
5	Wurtz reaction	e) Amalgam electrode
6	Wurtz - Fittig reaction	f) $z = PV/nRT$

Q1 C True or False (any 4) **04M**

1 The speed of the gas molecule at a given temperature does not depend upon its molecular weight.
2 The Gibbs free energy change $\Delta G = \Delta H + T\Delta S$.
3 Ions with negative charge are called anions.
4 A buffer mixture is used to maintain pH constant.
5 Iodination of alkanes is reversible.
6 Alkyne gives elimination reaction.

Q2 Attempt any 4 **20M**

A What are the causes of deviations of gases from the ideal behavior? How are they accounted for in Van der Waals equation?
B What is the critical temperature of a gas whose critical pressure and critical volume are 100 atm and 68 $cm^3\ mol^{-1}$ respectively? [R = 8.314 $Nm\ K^{-1}\ mol^{-1}$].
C If the resistance of the cell is 100 ohms, the length and area of the cell is 0.8 cm & 0.7628 cm^2. Calculate kappa (k) for this cell. What is kappa?
D Complete the cell representation using the given two half cells and write the net cell reaction for the cell representation: -
$E^\circ_{cell Zn^{+2}/Zn(s)} = -0.763$ V
$E^\circ_{cell Al^{+3}/Al(s)} = -1.660$ V
E Define and explain the Law of Mass action.
F Why was second law of thermodynamics needed? State second law of thermodynamics in different ways.

Q3 Attempt any 4 **20M**

A How will you confirm the presence of various ions by detecting their evolutes (give reactions)?
i) CO_3^{-2} ii) Cl^- iii) SO_4^{-2} iv) NO_3^- v) NH_4^+
B i) Give preparation of the following reagent papers? **3M**
a) Starch iodide paper b) Lead acetate paper c) Oxine paper
ii) How will you detect a) SO_4^{-2} and b) Cl^- using reagent paper? **2M**
C i) Define a) Precipitate b) Solubility **2M**
ii) Discuss the solubility product in detail (derivation expected) **3M**
D Discuss the Usanovich concept in detail with suitable examples.
E What are Lewis bases? Classify them and explain the strength of Lewis bases with suitable examples.

F Differentiate between Hard bases and Soft bases (4 points). Classify Cl^-, Br^-, and I^- into the hard base, soft base, and borderline base.

Q4 Attempt any 4 **20M**

A Explain Wurtz & Wurtz Fittig reaction.?

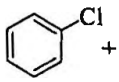
B Explain the dehydration of alcohol with examples. Explain the Saytzeff rule.

C Give mechanism of chlorination of Methane.

D Explain E_1 & E_2 mechanism.

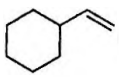
E Complete the following reactions:

$$CH_3\text{-}CH_2\text{-}CH_2\text{-}Cl + CH_3\text{-}CH_2\text{-}CH_2\text{-}Cl \xrightarrow[\text{ether}]{Na} ?$$

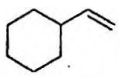


$$+ 2Na + CH_3Cl \xrightarrow{\text{ether}} ?$$

$$CH_2{=}CH_2 + H_2O \xrightarrow[\text{2) Hydrolysis}]{\text{1) } B_2H_6} ?$$



$$+ HBr \longrightarrow ?$$



$$+ HBr \xrightarrow{\text{Peroxide}} ?$$

F Explain the hydroboration and ozonolysis reaction of alkenes.

Q5 Attempt any 4 **20M**

A Calculate the diameter of hydrogen atom, if its excluded volume 'b' is 26.6 cm^3 mol^{-1}. [$N_A = 6.022 \times 10^{23}$ mol^{-1}].

B What are reversible and irreversible reactions? Explain with examples.

C The concentration of Ag^+ ions in a saturated solution of $Ag_2C_2O_4$ is 2.2×10^{-4} M. The solubility product of $Ag_2C_2O_4$ will be _____?
(Molecular weight of $Ag_2C_2O_4$ = 331.8)

D What are conjugate acid-base pairs? Label the conjugate acid-base pairs in the following reactions.

1) $HCl + NH_3 \rightleftharpoons Cl^- + NH_4^+$

2) $HI + H_2O \rightleftharpoons I^- + H_3O^+$

3) $H_2SO_3 + H_2O \rightleftharpoons HSO_3^- + H_3O^+$

4) $CH_3COOH + HCl \rightleftharpoons Cl^- + CH_3COOH_2^+$

E Give the product and write equations for the following.

1. Bromobenzene & 2-chloroethane react with sodium metal in presence of dry ether.
2. Iodoethane & chloroethane reacts with sodium metal in presence of dry ether.
3. Bromobenzene & 2-bromopropane react with sodium metal in the presence of dry ether.
4. Chloroethane & chloroethane reacts with sodium metal in the presence of dry ether.
5. Iodopropane & chlorobenzene reacts with sodium metal in the presence of dry ether.

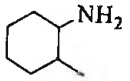
F Complete the following reactions:

$CH_3\text{-}CH{=}CH_2 + H_2O \xrightarrow[2)\ \text{Hydrolysis}]{1)\ B_2H_6} ?$

$CH_3\text{-}CH{=}CH\text{-}CH_2\text{-}CH_3 \xrightarrow{\text{ozonolysis}} ?$

$CH_2{=}CH\text{-}CH_2\text{-}CH_3 + HBr \longrightarrow ?$

$H_3C\text{-}\underset{\displaystyle NH_2}{\underset{|}{CH}}\text{-}CH_3 \xrightarrow[2)\ AgI]{1)\ CH_3I} ?$



$\xrightarrow[2)\ AgI]{1)\ CH_3I} ?$

FYS-103 Chemistry-II 230405

Rizvi Education Society's

RIZVI COLLEGE
OF ARTS, SCIENCE & COMMERCE

F.Y.B.Sc.

APRIL – 2023 (PAPER II) (SEMESTER – II)

Time : 3 hours Total marks: 100

N.B. :

1. All questions are compulsory.
2. Answers to the same question must be written together.
3. Figures to the right side indicate full marks
4. Use of a non-programmable calculator is allowed.

Q1.A. Multiple choice questions (Any 10):- 10 marks

1. _____ hydrocarbons obey the Huckle rule.
   a. Aromatic
   b. Aliphatic
   c. Both a and b
   d. None of these
2. Friedel Craft Acylation is _____.
   a. Introduction of halogen group into an aromatic compound
   b. Introduction of a nitro group into an aromatic compound
   c. Introduction of sulpho group into an aromatic compound
   d. Introduction of acyl group into an aromatic compound
3. Bond angle of cyclo-butane is _____.
   a. 120°
   b. 80°
   c. 109°
   d. 90°
   e.
4. Angle strain is also known as _____.
   a. Bayer's strain
   b. Transannular strain
   c. Eclipsing strain
   d. None of these
5. For _____ electrolytes, the extent of dissociation is generally <10%.
   a. Weak
   b. Strong
   c. Both a and b
   d. None of the above
6. The degree of dissociation depends on _____.
   a. Nature of solvent
   b. Temperature
   c. Concentration
   d. All of the above
7. A photochemical reaction takes place by the absorption of _____
   a. Visible and UV light
   b. IR light
   c. Microwave light
   d. Radiofrequency
8. In a molecule, a vibration is accompanied by several _____.
   a. Transmission
   b. Absorption
   c. Rotation
   d. Radiation
9. The energy in a quantum of radiation is given by the expression _____.
   a. E=hν
   b. E=hθ
   c. E=ρ
   d. E=h

10. A molecule performs rotational motion by absorbing _____.
    a. UV radiation
    b. Visible radiation
    c. NIR radiation
    d. FIR radiation

11. Polar covalent bond forms when two electrons in a molecule is
    a. Shared equally by both the atoms
    b. Not shared equally by both the atoms
    c. Are transferred from one atom to other atom
    d. Both a and b

12. Electronegative and electropositive element together form _____.
    a. Metallic bond
    b. Covalent bond
    c. Ionic bond
    d. None of the above

13. According to VSEPR theory, shape of CH_4 is _____.
    a. Tetrahedral
    b. Trigonal planar
    c. Pentagonal
    d. Trigonal bi-pyramidal

14. Oxidation number of oxygen in OF_2 is _____.
    a. +1
    b. +2
    c. -1
    d. -2

15. An reducing agent is a substance that brings about _____.
    a. Oxidation
    b. Hydrolysis
    c. Reduction
    d. Electron donation

Q1 B Match the following (any 5) **05M**

1	Trigonal plannar bond angle	a.	Obey's Huckle rule
2	Valency of oxygen	b.	Bayer's strain
3	Lone pairs in SO_2	c.	Losing of electrons
4	Aromatic compound	d.	120°
5	Angle strain	e.	2
6	Oxidation reaction	f.	1

Q1 C True or False (any 5) **05M**

1. Radiowaves have more energy than IR
2. The normal pH range of water is between 9 to 11.
3. Two successive crests or trough is known as wavelength.
4. As the temperature increases, the degree of ionization of an electrolyte decreases.
5. A functional group that directs the second incoming substituent to the meta position is known as the Para directing group.
6. The repulsive interaction of lone pairs in decreasing order is given as L.P. – L.P. > L.P – B.P. > B.P. – B.P.

Q2 Attempt any 4 **20M**

A Explain fluorescence and phosphorescence.
B Difference between strong and weak electrolytes.
C Describe Henderson's equation for basic buffer.
D How is quantum yield experimentally determined?

E Explain how wavenumber, wavelength, and frequency interrelated.

F Explain different types of interaction between radiation and matter.

Q3 **Attempt any 4** **20M**

A

B Explain the shape and the bond angle of the following molecules on the basis of VSEPR theory:-

1. BrF_3
2. IF_7

C Balance the following equation by the oxidation number method

$$Cu + HNO_3 \longrightarrow Cu^{2+} + NO_2$$

D Draw the Lewis Dot Structure of the H_2O molecule and also calculate the formal charge.

E Define oxidation, reduction, and redox reaction on the basis of the electronic concept

F Calculate the oxidation number of sulphur in the given following compounds.

a. SO_2
b. H_2SO_4
c. $H_2S_2O_7$
d. SO_3
e. H_2SO_3

Q4 **Attempt any 4** **20M**

A Find the angle strain of the following:-

i) Butane

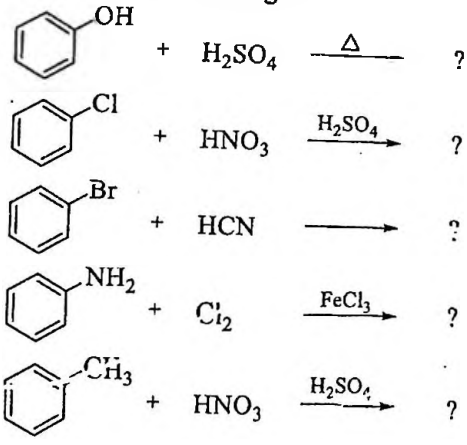
ii) Heptane

B Explain Friedel Craft Acylation and Friedel Craft Alkylation

C Explain the halogenation and sulphonation of benzene

D Write a note on aromaticity.

E Complete the following:-



F Find which of the following is aromatic:-

Q5 **Attempt any 4** **20M**

A A substance absorbs visible radiation of a wavelength is 600nm. Calculate the frequency, wavenumber, and energy associated with the quantum. ($c = 3x10^8 m/s$, $h = 60625x10^{-34} Js$)

B Define the terms:-

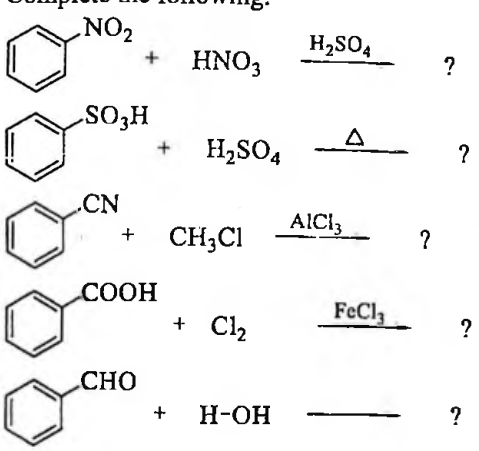
a. pH
b. pOH
c. Buffer
d. Buffer action
e. Buffer capacity

C Draw the Lewis Dot Structure of the NH_4^+ molecule and also calculate the formal charge.

D Obtain an expression for the Ostwald dilution law for a weak acid.

E Explain why the chair form of cyclohexane is more stable than boat form

F Complete the following:-



FYBSC - Sem-II Maths -I

F.Y.B.Sc. SEMESTER – II EXAMINATION APRIL - 2023

MATHEMATICS Paper – I: CALCULUS – II (Revised)

Time: $2\frac{1}{2}$ Hours **Total Marks: 75**

Note: 1. All questions are compulsory.

2. Figures to the right indicate full marks.

Q (1) Attempt any FOUR questions from the following: (4 × 5 = 20 Marks)

a) If $\lim_{x\to a} f(x) = l$ *and* $\lim_{x\to a} g(x) = m$ *then* prove that

$$\lim_{x\to a}\big(f(x) + g(x)\big) = l + m$$

b) Show that $limf(x)$ *as* $x \to 1$ exists, if $f(x) = 6x + 2$ *by using* $\epsilon - \delta$ *definition.*

c) State the Sandwich theorem for limits. Hence find $limf(x)$ *as* $x \to \frac{\pi}{2}$ if

$$8sinx - 11cosecx \leq f(x) \leq 10cosx + 3sin^3x - 6cosecx.$$

d) Examine the continuity of $f(x)$ at $x = 1$ *and* $x = 2$ where $f(x)$ is defined by

$$f(x) = \begin{cases} 2x + 4, & 0 \leq x \leq 1 \\ 3x + 1, & 1 \leq x \leq 2 \\ 8x - 9, & 2 \leq x \leq 3. \end{cases}$$

e) Evaluate $\lim_{x\to\infty} \left[\frac{3x^2+2x+5}{6x^2+8x-4}\right]$

Q (2) Attempt any FOUR questions from the following: (4 × 5 = 20 Marks)

a) If $f: I \to \mathbb{R}$ is differentiable at p ∈ I then show that f is continuous at p. Is the converse true? Justify your answer.

b) Find the n^{th} derivative of $y = (ax + b)^m, m \in \mathbb{N}$

c) If $y = \sin(m\sin^{-1}x)$, *show that* $(1 - x^2)y_{n+2} - (2n + 1)xy_{n+1} + (m^2 - n^2)y_n = 0$

d) When do you say that a function $f(x)$ is differentiable at p∈ I ? Hence show that the function $f: \mathbb{R} \to \mathbb{R}$ given by

$$f(x) = \begin{cases} \frac{1}{x}\sin(x^2), & x \neq 0 \\ 0, & x = 0 \end{cases}$$ is differentiable at 0.

e) Let $f, g: I \to \mathbb{R}$ be the two differentiable functions defined at p ∈ I. Show that $f - g$ and fg are also differentiable at p ∈ I.

Q (3) Attempt any FOUR questions from the following: (20 Marks)

a) Verify Cauchy's Mean value theorem for the function $f(x) = x^2$ *and* $g(x) = x^3$, $x \in [1, 2]$

b) Find the local maximum and minimum of $f(x) = x^4 - 8x^2 + 16$

c) Find the point of inflection on the curve $y = x^3 - 9x^2 + 7x - 6$

d) Find the approximate value of $(255.97)^{\frac{1}{4}}$ upto four places of decimals using Taylor's theorem.

e) State and prove Rolle's Mean Value Theorem.

Q (4) Attempt any THREE questions from the following: (15 Marks)

a) If $f(x) = x^3 + 1$ *and* $g(x) = \frac{2x+4}{x-6}$ then find $f \circ g(x)$*and* $g \circ f(x)$ *as* $x \to 1$.

b) Show that the function $f(x) = cosx$ is continuous for all $x \in \mathbb{R}$.

c) Find $\frac{dy}{dx}$ for the function $\sin(x + y) = y^2 sin\, x$

d) Find the n^{th} derivative of $y = \sin(ax + b)$.

e) Find the expansion of $f(x) = \cos x$

f) Evaluate $\lim_{x \to 0} \left[\frac{e^x - e^{-x} - 2\log(1+x)}{x\, sinx}\right]$

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FYBSC SEM II REGULAR MARCH 2023

MATHEMATICS II

FYS-106

230411

MARKS:75

TIME DURATION: 2 Hrs. 30 Min.

Q.1 Attempt any Four. (20)

(i) How many bit strings are there of length 8? How many of them begins with1? How many of them ends with 00?

(ii) Prove that, $S(n, 2) = 2^{n-1} - 1$, $n > 1$

(iii) Write all partitions of a 4-set into k parts, k = 2, 3.

(iv) A student is given total 60 hours to study. He can distribute these in 37 days with at least 1 hour a day. Show that there is a succession of days during which he studies for 13 hours.

(v) Prove that the set of integers Z is countable.

Q.2 Attempt any Four. (20)

(i) Find the coefficient of $x^4y^3z^5$ in the expansion of $(x + y + z + w)^{12}$.

(ii) If a school has 100 students with 50 students taking French, 40 students taking Latin, and 20 students taking both languages, how many students take no language?

(iii) Show that the numbers of integers from the set 1 to 100, which are not divisible by 4, 6 and 10 is 64.

(iv) Calculate the number of derangements D5 of 5 objects.

(v) Find the number of arrangements of the letters of the word ANTARTICA.

Q.3 Attempt any Four. (20)

(i) Find an inverse permutation of $\begin{pmatrix} 1 & 2 & 3 & 4 \\ 4 & 2 & 3 & 1 \end{pmatrix}$.

(ii) If $\sigma_1 = \begin{pmatrix} 1 & 2 & 3 \\ 1 & 3 & 2 \end{pmatrix}, \sigma_2 = \begin{pmatrix} 1 & 2 & 3 \\ 3 & 1 & 2 \end{pmatrix}, \sigma_3 = \begin{pmatrix} 1 & 2 & 3 \\ 3 & 2 & 1 \end{pmatrix}$

Find $\sigma_1 . \sigma_2 . \sigma_3$

(iii) Find the sign of the permutation $\begin{pmatrix} 1 & 2 & 3 & 4 \\ 3 & 4 & 1 & 2 \end{pmatrix}$, using the definition.

(iv) Find the solution to the recurrence relation

$$\mathbf{a_n = 4.\ a_{n-1} - 4.\ a_{n-2},\ n \geq 3,\ a_1 = 1,\ a_2 = 7}$$

(v) Prove that $D_n = n!\left[1 - \frac{1}{1!} + \frac{1}{2!} - \frac{1}{3!} + - - - - - + (-1)^n \frac{1}{n!}\right]$

Q.4 Attempt any Three. (15)

(i) Construct a table showing the values of S(n, k), n = 1,2, ----,7 and k = 1, 2,3, ---, 7.

(ii) Show that among any 10 points inside an equilateral triangle of side length 1, there exist two points whose distance is at most $\frac{1}{3}$.

(iii) State and Prove Pascal's identity.

(iv) Find the number of solutions to the equation $x_1 + x_2 + x_3 + x_4 = 17$, where x_1, x_2, x_3, and x_4 are nonnegative integers?

(v) Find the solution to the recurrence relation

$$\mathbf{a_n = 5.\ a_{n-1} - 6.\ a_{n-2},\ n \geq 3,\ a_1 = 11,\ a_2 = 31}$$

(vi) Verify $(\alpha\beta)^{-1} = \beta^{-1}\alpha^{-1}$ for $\alpha = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 2 & 5 & 1 & 6 & 4 & 3 \end{pmatrix}$ and $\beta = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 3 & 5 & 2 & 6 & 1 & 4 \end{pmatrix}$

FYBSc Sem-II 8/4/2023

Botany -I

Paper/ Subject Code: USBO201/ Botany: Paper I

SYS -105

230408

[Time: Three Hours] **[Marks: 100]**

Please check whether you have got the right question paper.

N.B:

i. **All questions are compulsory**
ii. **Figures to the right indicate full marks**
iii. **Draw neat and labeled diagrams whenever necessary**

Q.1 A.Choose the correct option from the following **10**

1. In _____ _____ type of stele the central xylem core has radiating arms.

   a) actinostele b) eustele c) atactostele d) dictyostele

2. The indusium in *Nephrolepis* is _____ shaped.

   a) arrow b) spiral c) kidney d) sporangia

3. Pollination in *Cycas* is exclusively by_____.

   a) water b) wind c) insect d) man

4. Gymnosperms are characterized by _____.

   a) winged seeds b) multiple sperms c) seeds enclosed on fruits d) naked seeds

5. The free lateral stipules are found in_____.

   a) *Hibiscus* b) *Ficus* c) Rose d) *Vinca*

6. The swollen leaf base in _____ is called pulvinus leaf base.

   a) Mango b) *Datura* c) Guava d) *Pisum*

7. Trifoliate leaf found in _____.

   a) *Aegle* b) *Datura* c) *Sapota* d) Mango

8. There are _____ types of leaves in *Cycas*.

   a) foliage and woody b) scaly and fibrous

   c) scale and foliage. d) fibrous and foliage

9. _____ shows decompounds leaf.

   a) Coriander b) *Crotolaria* c) Sunflower d) Mango

10. When carpels are fuse such condition is said to be _____.

    a) polypetalous b) gamopetalous c) syncarpous d) apocarpous

Q.1.B Answer the following in one sentence. **10**

1. Give types of stele.
2. Examples of blue green algae present in coralloid roots of *Cycas*.
3. Give the types of leaves in *Cycas*.
4. Define inflorescence.
5. Enlist typical part of a leaf.

Q.2 Answer any two from the following **20**

1. What is protostele? Describe different types of protostele.
2. Give the detailed account of prothallus in *Nephrolepis*.
3. Explain transverse section of rachis in *Nephrolepis*.
4. Write a detailed note on gametophyte of *Nephrolepis*.

Q.3. Answer any two from the following: **20**

1. Write a detailed note on megasporophyll of *Cycas*.
2. Describe the transverse section of *Cycas* stem.
3. Explain the structure of seed and germination of seed in *Cycas*.
4. Describe the external morphology of *Cycas* plant.

Q.4. Answer any two from the following: **20**

1. Classify, describe and give the economic importance of family *Malvaceae*.
2. Explain the types of leaf margin with suitable examples.
3. What is inflorescence? Describe the different types of cymose inflorescences.
4. What is venation? Describe different types of venation in leaf.

Q.5. Write short notes on (any four) **20**

1. Ramentum
2. Systematic position of *Cycas*
3. Capitulum inflorescence
4. Sporangium in *Nephrolepis*
5. Economic importance of ***Amaryllidaceae***
6. transverse section of *Cycas* root

11/04/:

F.Y.B.Sc. (Botany)'
Semester-II; Paper-II

230411

FYS - 107

[Time: Three Hours] **[Marks: 100]**

N.B:

- **All** questions are compulsory.
- **Figures** to the right indicate full marks.
- Draw **neat and labelled** diagrams wherever necessary.

Q. 1 A) Choose the correct option from the following and rewrite the sentence **10 M**

1. Simple tissues are _____.
   a) Parenchyma, xylem & collenchyma
   b) Parenchyma, collenchyma & sclerenchyma
   c) Parenchyma, xylem & sclerenchyma
   d) Parenchyma, xylem & phloem

2. Ground tissue includes _____.
   a) All tissues external to endodermis
   b) All tissues except epidermis and vascular bundles
   c) Epidermis and cortex
   d) All tissues internal to endodermis

3. Epidermal outgrowths are known as _____.
   a) Trichomes b) Flower buds c) Stomata d) Leaves

4. Pith is usually composed of _____.
   a) Aerenchyma b) Collenchyma c) Parenchyma d) Sclerenchyma

5. In chloroplast, photochemical reactions occurs in
   a) thylakoid membrane b) thylakoid lumen
   c) stroma d) inner chloroplast membrane

6. The individual (or individuals) who demonstrated using isolated chloroplasts, that splitting of water by light could reduce a dye solution as well as releasing oxygen is/are
   a) R. Hill b) Ruben and Kamen c) F.F. Blackman d) Melvin Calvin

7. In C_4 pathway, the site for oxidative decarboxylation is
   a) cytoplast of bundle sheath b) chloroplast of bundle sheath
   c) chloroplast of mesophyll cell d) cytoplasm of mesophyll cell

8. _____helps to maintain the heart in good condition.
   a) Aloe b) Tulsi c) Ginger d) Adulsa

9. _____is used to control dandruff.
   a) *Curcuma longa* b) *Aloe vera* c) *Santalum album* d) *Adhatoda vasica*

10. Sandalwood oil is derived from_____
   a) leaves b) flower c) bark d) heartwood

Q.1 B) Answer in one or two sentences **10 M**

a) Explain the role of hypodermis in dicot stem.
b) Which is the outermost layer of stele?
c) What is the primary acceptor of Carbon dioxide in CAM Plants?
d) What is Emerson Effect?
e) Give two main chemical constituents of Sandalwood.

Q.2 Answer any two from the following **20 M**

a) What is simple tissue? Give an account of simple tissues.
b) What are complex tissues? Give an account of complex tissues.
c) Write a detailed note on epidermal outgrowths studied by you.
d) With the help of a neat and labeled diagram, describe T. S. of Dicot stem.

Q.3 Answer any two from the following **20 M**

a) Describe Chlorophyll, xanthophyll and caretonoids with reference to their role as important plant pigments.
b) Describe the Calvin pathway of carbon fixation in C_3 plants.
c) Schematically represent the process of Cyclic and Non cyclic photophosphorylation.
d) Describe the process of fixation of carbon dioxide in CAM plants. Add a note on its significance.

Q.4 Answer any two from the following **20 M**

a) Give an account on Botanical name, family, active constituents and medicinal uses of Adulsa.
b) Give an account on Botanical name, family, active constituents and medicinal uses of Ginger.
c) Give an account on Botanical name, family, active constituents and medicinal uses of Sandalwood.
d) Discuss about primary metabolites with reference to their types and functions with examples.

Q.5 Write short notes on: (any four) **20 M**

a) Structure of vascular bundles in Monocot stem
b) Phloem as complex tissue
c) Role of Rubisco
d) Difference between PS I and PS II
e) Medicinal uses of Sandalwood
f) Medicinal uses of Adulsa

X-------X-------X

F.Y.B.Sc (Physics) Sem - II

Paper-I: Optics (USPH201)

FYS-108

Time: (2 1/2 Hours)

230415

[Total Marks : 75]

N.B. : (1) **All** questions are **compulsory**.

(2) **Figures** to the **right** indicate **full** marks.

(3) Draw **neat** diagrams wherever **necessary**.

(5) Symbols have usual meaning unless otherwise stated.

(5) Use of **non-programmable** calculator is allowed.

1.	Attempt any **Two of the following.**		
	(i)	With the help of a neat diagram derive Newton's lens equation.	**10**
	(ii)	**For a thin lens show that,** $\frac{1}{v} - \frac{1}{u} = (\mu - 1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$	**10**
	(Iii)	Show that the deviation produced by convex lens and concave lens is independent of the position of an object.	**10**
	(iv)	Obtain an expression for the equivalent focal length of the two lenses separated by finite distance.	**10**
2.	Attempt any **Two of the following:**		
	(i)	Explain Ramsden's eyepiece with the help of a diagram.	**10**
	(ii)	Draw a neat diagram of a reflecting telescope. Explain it's working.	**10**
	(iii)	Give the necessary theory of colour of thin films. Explain the constructive interference.	**10**
	(iv)	Show that the radius of the n^{th} dark ring is proportional to square root of a natural number.	**10**
3.	Attempt any **Two of the following.**		
	(i)	Explain total internal reflection and critical angle with proper diagram in fiber optics.	**10**
	(ii)	Explain single-mode and multi-mode step index fibers.	**10**
	(iii)	Explain important element, construction, working and relevant energy diagram of Ruby laser.	**10**
	(iv)	What is pumping? Explain different types of pumping and pumping scheme.	**10**

4.	Attempt any **Three of the following**		
	(i)	A plano convex lens has radius of curvature 30 cm. if the focal length of the lens is 60 cm Calculate the R. I of the material of the lens.	**05**
	(ii)	Calculate the position of the image if a star marked on the surface of a glass sphere of radius 25 inches is observed through glass but from an opposite side. Given R. I = 1.5	**05**
	(iii)	A wedge shaped film used a light of 6000 A.U .if the angle of wedge is $1.07 X10^{-4}$ degree, find R.I. of a liquid, if the fringe width is 2mm.	**05**
	(iv)	A parallel beam of 5890 A.U. incident on a thin glass plate of R.I = 1.5. If the angle of refraction into the plate is 60° Find the thickness of a glass plate which will appear dark by reflection.	**05**
	(v)	Find the ratio of population of the two energy states of the active medium producing laser transition between which has wavelength 700nm. Assume temperature 27 °C.	**05**
	(Vi)	Explain use of optical fibers in medicine.	**05**

RIZVI COLLEGE OF ARTS, SCIENCE & COMMERCE
F.Y.B.Sc (Physics) - II
Paper-II (USPH202)

FYS-110 230418

Time : 2 ½ Hrs **Marks : 75**

Note : 1.All questions are compulsory.
2. Figure to the right indicates full marks.
3. Use of non-programmable calculator is allowed.
4. Symbols have their usual meanings.

Q.1 A) Attempt any TWO of the following. **(20)**

1) An alternating emf is applied to a resistance R and capacitance C in series. What will be the impedance, the current and the phase difference between applied emf and current
2) Determine the current in a series LCR circuit connected to a source of an alternating emf. Hence obtain the condition for resonance.
3) Find the condition of balance for Maxwell's L/C bridge.
4) What is an A.C. bridge? Obtain the conditions required to balance an AC bridge.

Q.2 A) Attempt any TWO of the following. **(20)**

1) State and explain Norton's theorem with suitable example.
2) State and explain Thevinin theorem with suitable example.
3) Explain with circuit diagram the working of Full wave rectifier.
4) Explain Zener diode. How it is used as zener regulator?

Q.3 A) Attempt any TWO of the following. **(20)**

1) Convert $(1234)_{10} = (\ )_2 = (\ )_{16}$
2) Show that NAND gates are basic building blocks with neat diagram.
3) State and prove De Morgan's theorem.
4) Convert $f(A, B, C) = \Sigma m(1, 3, 5)$ into SOP forms and draw logic circuits.

Q.4 A) Attempt any THREE of the following. **(15)**

1) In a Wien's bridge, if $R_1 = R_2 = 10\ K\Omega$, $C_1 = C_2 = 0 \cdot 22\mu F$ and $R_4 = 1 \cdot 2\ K\Omega$. Find the value of R_3 to balance the bridge and frequency of the ac input voltage.
2) Find the condition of balance for Maxwell's inductance bridge with neat diagram?
3) Write a short note on Kirchoff's current law.
4) Find the value of series resistance connected in series with 6V zener diode produces 140 mA current when connected to 20 V supply.
5) What is Ex. – OR gate? Explain parity checker.
6) Convert Hexadecimal number into binary. $(3AC \cdot 2A)_{16} = (\ )_2$

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FYBSc Semester II

FYS-109 **Zoology Paper I (Course III)** 230415

Time: 3 hrs **Marks: 100**

N.B: 1. All questions are compulsory
2.All questions carry equal marks
3.Draw neat labelled diagram wherever necessary

Q1. A) Fill in the blanks **(05)**

a) The _____ phase is characterized by exponential growth.
(lag, log, death)

b) _____habitat is standing water habitat
(Lentic, Lotic, Limnetic)

c) Interactions between living organisms of different species are called _____ interaction
(Negative, intraspecific, interspecific)

d) Pangolin is categorized as_____species.
(Vulnerable, endangered, extinct)

e) Azadirachtin is found in various parts of _____tree.
(Neem, Mango, Jamun)

Q1. B) Match the column **(05)**

A		B	
A	Natality	i	Bengal tiger
B	Euglena	ii	10°C to 45°C
C	Biokinetic zone	iii	Rusty spotted cat
D	Humming bird of the cat family	iv	Birth rate
E	*Panthera tigris tigris*	v	Photoautotroph

Q1.C) State whether true or false **(05)**

a) Urn shaped age pyramid denotes a growing population.
b) The Nitrogen cycle is a gaseous type of biogeochemical cycle.
c) Pyramid of number represents qualitative relationship.
d) Rainforest of corals is in Tadoba National Park.
e) The identification feature of one horned rhino is single black horn.

Q1.D) Answer in one sentence **(05)**

a) Define population density.
b) Name the 2 types of mortality
c) Give reason why mammal body parts are shorter in cold climates than in warm regions.
d) Define consumers.
e) Define endangered species.

Q2.A) Describe in detail 3 types of survivorship curves with relevant diagrams **(10)**

OR

A) Discuss the concept, mechanism, and significance of human census

Q2.B)Explain the following (any two) **(10)**

a) Bell-shaped age pyramid
b) The 3 patterns of population distribution
c) Mortality and types of mortality
d) Age pyramid of a growing population

Q3.A) What are biogeochemical cycles? Explain oxygen cycle. **(10)**

OR

A) Explain lentic habitat in detail.

Q3.B) Explain the following (any two) **(10)**

a) Abiotic component of ecosystem
b) Detritus food chain.
c) The effect of light on colouration and morphology
d) Commensalism

Q4.A) Explain the following (any two) **(20)**

a) Sanjay Gandhi National Park
b) An account of representative animal spices of Gir National Park
c) Pirotan Island Marine Park
d) Ecotourism in Konkan

Q5.Write short notes on (any four) **(20)**

a) J-shaped growth curve
b) Methods of measuring population density
c) Significance of food web
d) Rapid and pool zone of lotic habitat
e) Project Tiger
f) Biopiracy in India

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FYS III

FYBSc Semester II

Zoology Paper II (Course IV)

23 04 18

Time: 3 hrs **Marks: 100**

N.B:
1. All questions are compulsory
2. All questions carry equal marks
3. Draw neat labelled diagram wherever necessary

Q. 1 A) Fill in the blanks (05)

a) Anaemia is characterized by low _____.
(protein, WBCs, hemoglobin)

b) Rickets is caused by a deficiency of _____.
(vitamin A, vitamin B, Vitamin D)

c) India permits handsets with SAR value of ____ W/Kg averaged over 1 gram of human tissue
(1.6, 7, 2)

d) Ice occupies ____ of earth's water
(0.01%, 1%, 2%)

e) AIDS is caused by _____ Virus.
(H1N1, Virola, HIV)

Q. 1B) Match the column (05)

A		B	
A	Rickets	i	*Treponema pallidum*
B	Safe radiation	ii	*Mycobecterium leprae*
C	Leprosy	iii	Sudden terror feeling
D	Panic disorder	iv	Brittle bones
E	Syphilis	v	0.5 milliwatts/sq.m.

Q.1 C) State whether true or false (05)

a) Swine flu is a bacterial disease.
b) Goitre can be prevented by iodine fortification.
c) Typhoid is a symptomatic bacterial infection due to *Salmonella typhi.*
d) Water that is not safe to drink is sa id to be potable.
e) Well is a natural water resource

(Q. 1 D) Answer in one sentence (05)

a) What is Kwashiorkor?
b) What is psychotherapy?
c) Define the anomalous behavior of water.
d) Write the name of the causative agent of AIDS.
e) Write the full form of "PPIP".

Q. 2 A) Write a detailed note on the two types of dietary fibers (10)

OR

A) Write a note on the causes, symptoms, and treatment of Constipation

Q. 2 B) Explain any two of the following (10)

a) Symptoms and treatment of Dengue fever
b) Causes of obesity
c) Causes and symptoms of goiter
d) Types of anemia

Q. 3 A) Explain the concept, eradication program, and outcome of malaria in India (10)

OR

A) Describe sources and properties of water in relation to human consumption

Q. 3 B) Explain any two of the following (10)

a) Blood bank
b) Non-thermal effects
c) Personal hygiene practices.
d) Small pox eradication program.

Q. 4 Explain any two of the following (20)

a) Anxiety
b) Tuberculosis
c) Hepatitis
d) Bronchitis

Q. 5 Write short notes on any four of the following (20)

a) Benefits of breastfeeding to the mother
b) Marasmus
c) Ill effects of self-medication
d) Radiation risk from electronic gadgets
e) Gonorrhea
f) Hepatitis