241010

C2324

RIZVI COLLEGE OF A/S/C

FOUNDATION COURSE -Paper III (SEM III)

October-2024

Duration:2 1/2 Hours

Total Marks :75

Note: 1.All questions are compulsory.

2. Figures to the right indicate full marks.

Q.1 (A).Explain the following concepts(Any Five) **15 Marks**

a. Forms of violation

b. Senior Citizens

c. Minorities

d. Barriers to communication

e. Superstition

f..Hybrid Disasters

g. Team Building

h. Leadership Styles

OR

(B) Write a comprehensive note on the Foundation Course (Semester III) project submitted by you.

Q.2 (A) How the rights of women are violated in india? What are the different acts implemented to favour them ? **15 Marks**

OR

(B) Discuss the atrocities committed on children. What are the legal rights of them?

Q.3 (A) Examine the impact of any three natural disasters on human life. How can they be managed? **15 Marks**

OR

(B) what kind of problems are faced due to manmade disasters. Suggest some measures to deal with them.

Q.4.(A) Discuss the positive and negative impact of technology on human life. **15 Marks**

OR

(B) Discuss the meaning, objectives, branches and characterisrics of science.

Q.5. (A) Write a detailed note on verbal communication? **15 Marks**

OR

(B) What are the advantages and disadvantages of non-verbal communication?

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S.Y. B.Sc. SEMESTER – III EXAMINATION: OCTOBER 2024

MATHEMATICS PAPER –I: CALCULUS – III

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

NOTE: (1) All questions are compulsory.

(2) Figures to the right indicate full marks.

Qn. (1) Attempt any FOUR questions from the following. ($4 \times 5 = 20$ *Marks*)

(a) Show that if the series $\sum_{n=1}^{\infty} a_n$ *converges then* $a_n \to 0$.

(b) Show that the geometric series $\sum_{k=1}^{\infty} ar^{k-1}$ converges if and only if $|r| < 1$.

(c) Show that if $\sum_{n=1}^{\infty} |a_n|$ converges then $\sum_{n=1}^{\infty} a_n$ *converges.*

(d) If $a_n \geq 0$ *and* $na_n \geq 1$ *for all* $n \in N$, *show that* $\sum_{n=1}^{\infty} a_n$ *diverges.*

(e) Discuss the convergence of the alternating series $\sum_{n=1}^{\infty} \frac{(3n)(-1)^n}{2n-1}$.

Qn. (2) Attempt any FOUR questions from the following. ($4 \times 5 = 20$ *Marks*)

(a) If f is integrable on $[a, b]$, show that $|f|$ is also integrable on $[a, b]$ *and* $\left|\int_a^b f\right| \leq \int_a^b |f|$.

(b) Show that a constant function $f(x) = C$ is integrable on $[a, b]$.

(c) Show that $f: [0,1] \to \mathbb{R}$ defined by $f(x) = 5x$ is integrable and $\int_a^b f(x)dx = \frac{5}{2}$.

(d) *Show that if* f *and* g *are integrable on* $I = [a, b]$ *and* $f(x) \leq g(x)$

$$\text{for all } x \in I \text{ then } \int_a^b f \leq \int_a^b g$$

(e) *If* $a < c < b$ *and if* f *is integrable on both* $[a, c]$*and* $[c, b]$ then show that f *is integrable on* $[a, b]$ *and*

$$\int_a^b f = \int_a^c f + \int_c^b f$$

Qn. (3) Attempt any FOUR questions from the following. ($4 \times 5 = 20$ *Marks*)

(a) Show that if f is Riemann integrable *on* $[a, b]$ and $F'(x) = f(x)$ then $\int_a^b f(x)dx = F(b) - F(a)$.

(b) Find the area of the region bounded by the parabola

$$y = x^2 + 2 \text{ and } y = 2x + 5, x = 0 \text{ to } x = 6$$

(c) Find the arc length of the curves $x = a\cos^3\theta;$

$$y = a\sin^3\theta, 0 \leq \theta \leq \pi$$

(d) *Show that* $\beta(m,n) = 2\int_0^{\pi/2} (\sin^{2m-1}\theta)(\cos^{2n-1}\theta)d\theta.$

(e) Prove that $\Gamma\left(\frac{1}{2}\right) = \sqrt{\pi}$.

Qn. (4) Attempt any THREE questions from the following. ($3 \times 5 = 15$ *Marks*)

(a) Discuss the convergence of $\sum (\frac{n}{8n+1})^n$ by using Root Test.

(b) Discuss the convergence of $\sum [\frac{n!}{n^n}]$ by using Ratio Test.

(c) *Let* $f(x) = 2x + 1, I = [0,2], P = \{0,0.5,1,1.5,2\}.$

Find the value of $L(P,f)$ *and* $U(P,f)$.

(d) Let $f: [a,b] \to R$ defined by $f(x) = \begin{cases} 0, x \text{ is irrational} \\ 1, x \text{ is rational} \end{cases}$

Show that the function is not Riemann integrable on R.

(e) Show that $\int_0^\infty x^{3/2}e^{-x^5}\,dx = \frac{\sqrt{\pi}}{5}$.

(f) *Find the value of the improper integrals* (*i*) $\int_{-\infty}^{\infty} \frac{dx}{1+x^2}$ *and*

(*ii*) $\int_0^1 \frac{dx}{\sqrt{1-x^2}}$.

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SYBSC SEM III EXAMINATION OCTOBER 2024

MARKS : 75 TIME DURATION : 2hr 30min

N.B: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Q.1 Attempt any Four (20)

(i) Find the solution set for the following system of equations. Also interpret the system and its solution geometrically.

$$2x + 3y = 0 \; ; 3x - y = 0$$

(ii) Reduce the following matrix into Row Echelon form.

$$\begin{bmatrix} 1 & -1 & 3 & 4 \\ 2 & 3 & 5 & -1 \\ 1 & 2 & -1 & 2 \\ 3 & 4 & -1 & 5 \end{bmatrix}$$

(iii) Prove that, the sum of any two solutions and scalar multiple of a solution is also the solution of the homogeneous system of linear equations.

(iv) Solve the following equations by Gauss Elimination Method.

$$x - y + z = 4 \; ; 2x - 3y - z = 0 \; ; x - 2y - 2z = -4$$

(v) A homogeneous system of 'm' equations in 'n' unknowns has atleast one non – trivial solution if m < n.

Q.2 Attempt any Four (20)

(i) Let V be a real vector space for any $x, y, z \in V$,
Prove that (a) $x + y = x + z$ then $y = z$
(b) Inverse of an element is unique.

(ii) If V is a real vector space and S is any subset of V, then L(S) is a subspace of V.

(iii) Verify whether the set $\mathbb{R}^3 = \{(x, y, z) \,/\, x, y, z \in \mathbb{R}\}$ is a real vector space with respect to usual addition and scalar multiplication of vectors in it.

(iv) Verify whether the subset $W = \{\, ax^2 + bx / \, a, b \in \}$ is a subspace of $\mathbb{P}_2[x]$.

(v) Check whether the set $S = \left\{\begin{bmatrix} 1 & -1 \\ 3 & 1 \end{bmatrix}, \begin{bmatrix} 4 & 6 \\ -1 & -4 \end{bmatrix}, \begin{bmatrix} 3 & 1 \\ 4 & 0 \end{bmatrix}\right\}$ is linearly dependent or independent.

Q.3 Attempt any Four (20)

(i) Solve the following determinant by Laplace expansion method using 3rd row.

$$\begin{bmatrix} -7 & 1 & -3 \\ 3 & -2 & 5 \\ 6 & 1 & 4 \end{bmatrix}$$

(ii) Find the inverse of the matrix A by adjoint method.

$$A = \begin{bmatrix} 0 & 3 & 0 \\ 4 & 1 & 2 \\ 0 & 1 & 6 \end{bmatrix}$$

(iii) Find the rank of the following matrix. Also find the basis of row space and column space.

$$\begin{bmatrix} 1 & -1 & 3 & 4 \\ 0 & 2 & 0 & 1 \\ 6 & -2 & 0 & 2 \\ 0 & 1 & 1 & 0 \end{bmatrix}$$

(iv) Find the Augmented matrix and verify whether the following system of equations is consistent. If it is consistent then find the solution set.

$$x + y + z = 6\,;\, 2x + y - z = 1\,;\, x - y + z = 2$$

(v) Verify that $\begin{bmatrix} 2 & 6 & 2 \\ -3 & -8 & 0 \\ 4 & 9 & 2 \end{bmatrix} = \begin{bmatrix} 2 & 0 & 0 \\ -3 & 1 & 0 \\ 4 & -3 & 7 \end{bmatrix}\begin{bmatrix} 1 & 3 & 1 \\ 0 & 1 & 3 \\ 0 & 0 & 1 \end{bmatrix}$

and use LU decomposition method to solve the system.

$$2x + 6y + 2z = 2\,;\; -3x - 8y = 2\,;\, 4x + 9y + 2z = 3$$

Q.4 Attempt any Three (15)

(i) Find the inverse of a matrix by Gauss elimination method.

$$A = \begin{bmatrix} 1 & 2 & 5 \\ -1 & 0 & 0 \\ 0 & 1 & 1 \end{bmatrix}$$

(ii) Express the following matrix in the reduced row echelon form.

$$\begin{bmatrix} 1 & 1 & 3 & 5 \\ 2 & 1 & 0 & 3 \\ 3 & 1 & 0 & 3 \\ 4 & 0 & 1 & 3 \end{bmatrix}$$

(iii) Prove that $S = \{1, x, x^2 x^3\}$ is a basis of $\mathbb{P}_3[x]$.

(iv) If V is a real vector space and W_1 , W_2 are any two subspaces of V then, prove that $W_1 \cap W_2$ is also a subspace of V.

(v) Solve the following equations using Cramer's rule.

$$2x + y + 3z = 2\,;\, 3x - 2y + 4z = 2\,;\, x + 4y - 2z = 1$$

(vi) Find for what values of k the following system of equations have non – trivial solutions.

$$x - ky + 3z = 0$$
$$4x + 3y - kz = 0$$
$$3x + y - z = 0$$

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S.Y. B.Sc. SEMESTER – III EXAMINATION: OCTOBER 2024

MATHEMATICS PAPER –III: ORDINARY DIFFERENTIAL EQUATIONS

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

NOTE: (1) All questions are compulsory.

(2) Figures to the right indicate full marks.

Qn. (1) Attempt any FOUR questions from the following. ($4 \times 5 = 20$ *Marks*)

(a) Show that x *and* x^2 are linearly independent solutions of $x^2y'' - 2xy' + 2y = 0$. Hence, write general solution.

(b) Find the general solution of the differential equation $y'' - 3y' + 2y = 0$.

(c) Find the general solution of $y'' + 3y' - 10y = 6e^{4x}$ by using the method of undetermined coefficients.

(d) Solve the differential equation by using Method of Variation of Parameters $y'' + y = cotx$

(e) Show that $y = c_1e^{-4x} + c_2e^{3x}$ is the general solution of $y'' + y' - 12y = 0$ on any interval not containing zero.

Qn. (2) Attempt any FOUR questions from the following. ($4 \times 5 = 20$ *Marks*)

(a) Show that $\begin{cases} x = e^{4t} \\ y = e^{4t} \end{cases}$ *and* $\begin{cases} x = e^{-2t} \\ y = -e^{-2t} \end{cases}$ are the linearly independent solutions of the homogeneous system $\begin{cases} \frac{dx}{dt} = x + 3y \\ \frac{dy}{dt} = 3x + y \end{cases}$

(b) Find the general solution for the linear system of homogeneous equations

$$\begin{cases} \frac{dx}{dt} = -3x + 4y \\ \frac{dy}{dt} = -2x + 3y \end{cases}$$

(c) Find the general solution for the linear system of homogeneous equations

$$\begin{cases} \frac{dx}{dt} = 5x + 4y \\ \frac{dy}{dt} = -x + y \end{cases}$$

(d) Solve the linear system of non-homogeneous equations $\begin{cases} \frac{dx}{dt} = 3x - 4y + 2t - 5 \\ \frac{dy}{dt} = x - y + 3t + 1 \end{cases}$

(e) Solve the linear system of homogeneous equations $\begin{cases} \frac{dx}{dt} = 2x \\ \frac{dy}{dt} = 3y \end{cases}$

Qn. (3) Attempt any FOUR questions from the following. ($4 \times 5 = 20$ *Marks*)

(a) Given $\frac{dy}{dx} = y' = 1 + xy$ *and* $y(0) = 1$, *using Taylor series method compute* $y(0.1)$ *correct to four decimal places.*

(b) Using Picard's Method find the first approximation for $y' = x + y^2$; $y(0) = 1$

(c) *Given* $\frac{dy}{dx} = 1 + y^2; y(0) = 0;\ h = 0.1$, *find* $y(0.2)$ *using Euler's method.*

(d) *Given that* $y' = x^2 + y; y(0) = 1;\ h = 0.05$. Using Modified Euler's method find $y(0.1)$.

(e) Given $\frac{dy}{dx} = y + x; y(0) = 2$. Find the value of $y(0.2)$ *using Runge – Kutta method second order formula with* $h = 0.1$.

Qn. (4) Attempt any THREE questions from the following. ($3 \times 5 = 15$ *Marks*)

(a) Find the general solution of the differential equation $y'' + y' - 6y = 0$.

(b) Find the Particular Integral of $(D^2 + 4D + 4)y = e^{8x}$.

(c) Verify that $\begin{cases} x = 4e^t \\ y = 2e^t \end{cases}$ *and* $\begin{cases} x = e^{-t} \\ y = -e^{-t} \end{cases}$ are the linearly independent or linearly dependent solutions of the homogeneous system

$$\begin{cases} \frac{dx}{dt} = 6x - 2y \\ \frac{dy}{dt} = 5x + 3y \end{cases}$$

(d) Find the general solution for the linear system of non-homogeneous equations

$$\begin{cases} \frac{dx}{dt} = 7x + 6y + 2t - 6 \\ \frac{dy}{dt} = 2x + 3y + 8t - 5 \end{cases}$$

(e) Given $\frac{dy}{dx} = x + y^3; y(0) = 1; h = 0.2$. *Find* $y(0.2)$ *by using Runge – Kutta Method fourth order formula correct four places of decimals.*

(f) Given $\frac{dy}{dx} = 2x + y; y(0) = 2; h = 0.1$ *Find* $y(0.1)$ *by using Runge – Kutta Method second order formula correct four places of decimals.*

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S.Y. B.Sc. Botany-Choice Based- Sem. III
Paper – I

Date:
Duration: 2 1/2 hours **Marks: 75**

Note: 1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Draw neat labelled diagrams wherever necessary.

Q.1	**Attempt all 15 of the following: (MCQs)**	15
1	In Phaeophyta, the reserved food material is _____. a) Laminarin b) Fucosan c) Carotene d) Starch	
2	_____ of the following is not a characteristic of thallophytes A) Undifferentiated body B) Presence of vascular tissues C) Lack of seeds D) Autotrophic nutrition	
3	The process of sexual reproduction in thallophytes is called_____ A) Conjugation B) Fragmentation C) Budding D) Parthenogenesis	
4	The body of a thallophyte is called_____ A) Sporophyte B) Gametophyte C) Thallus D) Rhizoid	
5	Bryophytes are commonly known as:_____ A) Moss plants B) Fern plants C) Flowering plants D) Seedless plants	
6	_____ is a thallophyte (a) Fern (b) Moss (c) Algae (d) Flowering plant	
7	Thallophytes are primarily_____ A) Aquatic B) Terrestrial C) Amphibious D) Aerial	
8	The father of modern taxonomy is _____ A) Carl Linnaeus B) Aristotle C) Theophrastus D) Charles Darwi	
9	A group of closely related species is called_____ A) Genus B) Family C) Order D) Class	
10	The study of plant anatomy involves the examination of_____ A) External features of plants B) Internal structures of plants C) Reproductive organs of plants D) Genetic makeup of plants	
11	The study of plant classification based on evolutionary relationships is called_____ A) Taxonomy B) Phylogeny C) Nomenclature D) Systematics	
12	The highest taxonomic rank in plants is_____ A) Kingdom B) Domain C) Phylum D) Division	
13	The first level of classification is_____ (a) Species (b) Genus (c) Family (d) Domain	
14	A herbarium is a collection of_____	

	A) Living plants B) Dried plants C) Plant seeds D) Plant fossils	
15	The resolving power of a microscope is determined by_____ A. The magnification of the objective lens B. The numerical aperture of the objective lens C. The wavelength of light used D. All of the above	
16	The principle of light microscopy is based on_____ A) Reflection of light C) Diffraction of light B) Refraction of light D) Absorption of light	
17	In gel electrophoresis, the direction of migration of a negatively charged molecule is towards the_____ A. Positive electrode (anode) B. Negative electrode (cathode) C. Neutral zone D. Depends on the gel concentrationth B and C	
18	_____type of microscope uses a beam of electrons to create an image. A. Light microscope B. Scanning electron microscope (SEM) C. Transmission electron microscope (TEM) D. Both B and C	
19	A herbarium specimen is typically preserved by_____ (a) Freezing (b) Drying (c) Pickling (d) Salting	
20	The information about a herbarium specimen, including its location, date of collection, and collector's name, is recorded on a_____ (a) Label (b) Voucher (c) Herbarium sheet (d) Specimen card	
Q.2	**Attempt any two of the following**	**15**
a	Describe sexual reproduction of Sargassum	7.5
b	General features of Phaeophyta	7.5
c	Explain in detailed funaria	7.5
d	Give general account of musci	7.5
Q.3	**Attempt any two of the following**	**15**
a	Describe family *Compositae* with classification, neat and labeled diagram and give their floral formula	7.5
b	Economics importance of Compositae	7.5
c	Describe family *Asteraceae* with classification, neat and labeled diagram and give their floral formula	7.5
d	Explain general character of plant taxonomy	7.5
Q.4	**Attempt any two of the following**	**15**
a	What is electrophoresis? Explain principle and technique of horizontal gel electrophoresis.	7.5
b	Describe the principle, construction, working and applications of SEM.	7.5
c	Describe the principle, construction, working and applications of TEM.	7.5
d	Explain in detailed with neat labelled diagram light microscope.	7.5

Q.5	**Write Short notes (any Three)**	**15**
a	Male conceptacle of Sargassum	
b	Reproduction in Anthoceros	
c	*Papilionaceous* corolla	
d	Types chromatography.	
e	Vertical electrophoresis	
f	*Asteraceae*	

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Sem. III	Botany Paper – II	Duration:2 hours	Marks: 75

N.B:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Draw neat labelled diagrams wherever necessary.

Q.1	Attempt any 15 of the following: (MCQs)	15
1.	What is the result of crossing over? a) Increased genetic variation b) Decreased genetic variation c) No genetic variation d) Genetic drift **Answer:** _____	
2.	Which bases are paired together in DNA? a) Adenine (A) - Guanine (G) b) Thymine (T) - Cytosine (C) c) Adenine (A) - Thymine (T) d) Guanine (G) - Uracil (U) **Answer:** _____	
3.	Which RNA type has a cloverleaf secondary structure? a) mRNA b) tRNA c) rRNA d) snRNA **Answer:** _____	
4.	What is the X:A ratio in Drosophila females? a) 1:1 b) 2:1 c) 2:2 d) 1:2 **Answer:** _____	
5.	Which gene is involved in Drosophila sex determination? a) Sxl (Sex-lethal) b) Tra (Transformer) c) Dsx (Doublesex) d) All of the above **Answer:** _____	
6.	What is the significance of the Genic Balance Theory? a) Explains sex determination in Drosophila b) Applies to all organisms c) Supports chromosomal theory of sex determination d) Challenges chromosomal theory of sex determination **Answer:** _____	

7.	Which trait is an example of a sex-linked trait? a) Hemophilia b) Color blindness c) Sickle cell anemia d) Cystic fibrosis Answer:
8.	Which of the following is a common cause of Klinefelter's Syndrome? a) Nondisjunction during meiosis b) Mosaicism c) Deletion of X chromosome d) Translocation of X chromosome Answer:
9.	Which syndrome is associated with a deletion on chromosome 5? a) Wolf-Hirschhorn syndrome b) Cri-du-chat syndrome c) Prader-Willi syndrome d) Williams syndrome Answer:
10.	What is synapsis? a) Pairing of homologous chromosomes b) Separation of sister chromatids c) Crossing over d) Independent assortment Answer:
11.	Y-linked genes are also called Holandric genes Plasma genes Sex- linked genes Cytoplasmic genes Answer:
12.	What was the actual result observed by Meselson and Stahl? a) One heavy band and one light band b) Two hybrid bands c) One light band and no heavy band d) Two heavy bands and no light band Answer:
13.	Drosophila has pairs of chromosomes. a) 3 b) 4 c) 6 d) 8 Answer:
14.	In type of inversion centromere is not a part of inverted segment. Pericentric

	Paracentric Genetic inversion Zygotic inversion Answer:_____	
15.	What are the short, discontinuous segments of DNA synthesized on the lagging strand called? a) Okazaki fragments b) DNA fragments c) RNA fragments d) Replication forks Answer:_____	
16.	Which of the following is a characteristic of mitochondrial membranes? a) Double membrane structure b) Single membrane structure c) Porous membrane d) Impermeable membrane Answer:_____	
17.	Which enzyme synthesizes the lagging strand during DNA replication? a) DNA polymerase α b) DNA polymerase β c) DNA polymerase δ d) RNA polymerase Answer:_____	
18.	How many cell divisions occur during meiosis? a) One b) Two c) Three d) Four Answer:_____	
19.	What is the direction of DNA synthesis on the leading strand? a) 5' to 3' b) 3' to 5' c) 5' to 5' d) 3' to 3' Answer:_____	
20.	Which of the following is NOT a characteristic of meiosis? a) Crossing over b) Independent assortment c) Synapsis d) Binary fission	

	Answer:_____	
Q.2	**Attempt any two of the following:**	**15**
a	Explain the ultra-structure of mitochondrion in detail.	7.5
b	Describe the ultra-structure of eukaryotic ribosome. Add a note on its function.	7.5
c	Differentiate between Mitosis and Meiosis.	7.5
d	Explain B & C forms of DNA.	7.5
Q.3	**Attempt any two of the following:**	**15**
a	Explain translocation in DNA.	7.5
b	What do you understand by Chromosomal aberrations? Elaborate deletion and its types.	7.5
c	Give a detailed account of UV mode of sex determination in *Marchantia* and *Ectocarpus*.	7.5
d	Explain colorblindness in human.	7.5
Q.4	**Attempt any two of the following:**	**15**
a	Give a detailed account on transcriptional unit in Prokaryotes.	7.5
b	Explain bidirectional replication of circular DNA with the help of suitable diagram.	7.5
c	What do you understand by Central Dogma? Explain the process of transcription in eukaryotes.	7.5
d	Describe the Meselsons-Stahls experiment to prove that DNA replication is semi conservative.	7.5
Q.5	**Write Short notes on any Three of the following:**	**15**
a	Chromosomal inversion	
b	Function of ribosomes	
c	Significance of Meiosis	
d	Significance of cytoplasmic male sterility.	
e	Haemophilia	
f	A-DNA	

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S.Y. B.Sc. Botany-Choice Based- Sem. III
Paper - III

Date:
Duration: 21/2 hours **Marks: 75**

N.B:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Draw neat labelled diagrams wherever necessary.

Q.1	**Attempt any 15 of the following: (MCQs)**	15
1	The word Pharmacopoeia means _____ a) Drugs b) Marketing c) Committee d) Unity	
2	Alkaloids are _____type of substances. a) Acid b)Neutral c) chemical d) Basic nitrogenous	
3	IP stands for_____ a) Indian Pharmacopoeia b) Institute of Pharmacopoeia c) International Pharmacopeia d) Ireland Pharmacopoeia	
4	Glycosides are condensation products of _____. a) Sugar+ aglycone b) Sugar+ protein c) Protein + aglyconed d) Fats + aglycone	
5	_____is NOT a natural source of drugs. a) Animals b) Plants c) Minerals d) Synthetic chemicals	
6	_____ is an example of primary metabolite. a) Sugar b) Carotenoids c) Vinblastin d) Alkaloid	
7	Alkaloids are a group of naturally occurring chemical compounds which contains basic_____atoms. a) Helium b) Oxygen c) Nitrogen d) Carbon	
8	Jute belongs to family_____ a. *Oryza sativum* b. *Corchorus capsularis* c. *Cocos nucifera* d. *Pisum sativum*	
9	Saffron is produced from _____ a. roots of Indigofera b. petals of Rosa c. stamens of Hibiscus d. Style and stigma of Crocus	
10	_____is the most widely planted species of cotton in the world. *a. Gossypium hirusutum b. Cocos nucifera c. Mangifera indica d. Centella asiatica*	
11	_____forests are mostly evergreen natural forest of conifers. a. Temperate b. Alpine c. Dry tropical d. River rain	
12	_____ is a major product of forestry. a) Coal b) Timber c) Plastic d) Iron	
13	Fibers utilized for the manufacture of fabrics, netting and cordage is called _____. a) Textile fiber b) Filling fiber c) Brush fiber d) Fiber	
14	_____ has been described as the management of public and privately owned lands in and adjacent to urban centers. a) Urban forestry b) Agroforestry c) Multiple forestry d) extension forestry	
15	_____used Myrrh and cedar wood oil to preserve mummies. a) Russians b) Americans c) Egyptians d) Indians	
16	Aromatherapy uses _____ as the therapeutic agent.	

	a) Seeds b) Leaves c) Bark d) Essential oil	
17	Jojoba oil is primarily extracted from which part of the plant. _____ a) Leaves b) Seeds c) Flowers d) Roots	
18	Fire wood, wood chip and pellets generally used for cooking or heating are _____. a) Primary biofuels b) Secondary biofuels c) Organic biofuels d) Inorganic biofuels	
19	In aromatherapy, jasmine oil is most commonly known for its properties as a: a) Stimulant b) Relaxant and aphrodisiac c) Antimicrobial agent d)Stress free	
20	Papain is used to tenderize _____ a) Milk b) Meat c) Bones c) Fats	
Q.2	**Attempt any two of the following:**	**15**
a	Define the term metabolites and Explain in detailed types of Secondary metabolites.	7.5
b	Describe Indian Pharmacopoeia and its significance.	7.5
c	Explain in detail Sustainable and Adulteration *of Polyalthia longifolia.*	7.5
d	Define term Volatile oils. Explain in detailed Sources, properties, uses of Volatile oils	7.5
Q.3	**Attempt any two of the following:**	**15**
a	Explain in detail classification of forests in India.	7.5
b	Define Social forestry and its Application's	7.5
c	Explain in detailed cotton and jute with respect to its sources, properties and uses.	7.5
d	Describe Agroforestry and its types.	7.5
Q.4	**Attempt any two of the following:**	**15**
a	Describe in detail Aromatherapy.	7.5
b	Explain in detail branches of Aromatherapy with example	7.5
c	Describe in detail about *Jatropha curcus.*	7.5
d	Define term Enzymes and its types	7.5
Q.5	**Write Short notes on any Three**	**15**
a	Cellulose.	
b	Uses of Resins	
c	Functions of Secondary metabolites	
d	Types of forests in India.	
e	Alpine forests.	
f	Biofuel.	

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S2324

RIZVI COLLEGE OF ARTS, SCIENCE & COMMERCE
S.Y.B.Sc. (PHYSICS) SEM – III
PAPER – I, SET-II , (USPH301)

Time : 2.30 hrs. **Marks : 75 M**

INSTRUCTIONS:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Use of simple non-programmable calculator is allowed.
4. Draw a diagram wherever necessary.

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

1. Give the Kelvin – Planck and Clausius statements of the 2nd law of thermodynamics. Show that equivalence between these two statements.
2. Explain the principle of working of an Otto engine with the help of an indicator diagram and obtain an expression for its efficiency.
3. Describe steam engine with neat diagram and determine its power and efficiency.
4. Calculate the latent heat of steam, when water boils at a temperature of 101 °C at a pressure of 787 mm of Hg. 1 gm of water occupies 1601 on evaporation.

   [Given : Specific volume of water = $0 \cdot 001\ cm^3/gm$] and Find the efficiency of Diesel engine for which the adiabatic compression ratio is 17 and adiabatic expansion is 5.
   [Given : $\gamma = 1 \cdot 4$]

Q. 2 Attempt any Two of the following. (20)

1. Show that the total change in entropy is zero for any reversible cycle.
2. Show that the change in entropy of a perfect gas is

$$S_2 - S_1 = c_v ln\frac{T_2}{T_1} + (c_p - c_v) ln\frac{V_2}{V_1}$$

3. Explain Kelvin's thermodynamic scale of temperature.
4. Explain the followings:
   i) concept of negative temperature and ii)concept of heat death of universe.

Q. 3 Attempt any Two of the following. (20)

1. Explain the THERMISTOR by means of i) R vs T ii) V-I and iii) I vs time curves.
2. Write a note on thermocouple and thermopile. Draw suitable graphs to support it's working.
3. Explain the working of a semiconductor diode as temperature sensor.
4. What is radition pyrometer? Explain the total radition pyrometer with the help of a neat diagram.

Q. 4 Attempt Any THREE of the following (15)

1. Distinguish between Otto and Diesel cycles.
2. Derive an expression for cooling by adiabatic expansion with the help of Maxwell equation.
3. 50 gm of water at 0°C is mixed with an equal mass of water at 80°C . Calculate the resultant increase in entropy.
4. One gram of a gas expands isothermally to four times of its volume. Calculate the change in its entropy in term of the gas constant.
5. Write a short note on IC-type temperature sensor.
6. A thermistor has a resistance temperature coefficient of -5% over a range of 25^0 C To 50^0C. If the it's resistance at 25^0 C is 200Ω, find the resistance at 35^0 C?

----------THE END ----------

241014 S2324

RIZVI COLLEGE OF ARTS, SCIENCE & COMMERCE
S.Y.B.Sc. (PHYSICS) SEM – III (Reg + ATKT)
PAPER – II, SET-II, (USPH302)

Time : 2.30 hrs. **Marks : 75 M**

INSTRUCTIONS:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Use of simple non-programmable calculator is allowed.
4. Draw a diagram wherever necessary.

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

1. Explain the emitter bias circuit of transistor biasing with circuit analysis. What are the advantages and disadvantages of the emitter bias circuit?
2. What do you mean by stabilization obtain expression for the stability factor.
3. Explain black box representation of a general amplifier. Explain amplifier notations.
4. Explain frequency response of an amplifier. Show that decibel gain at cut off frequency is 3 dB less than the decibel voltage gain in mid frequency region.

Q. 2 Attempt any Two of the following. (20)

1. Explain the construction and working of a Colpitt's oscillator.
2. What is oscillator? Explain the RC-phase shift oscillator with phase diagram.
3. Explain the use of OP-AMP as an inverting amplifier. Obtain the expression for it's gain.
4. How will you use an OP-AMP as an averaging amplifier of the TWO d.c voltages?

Q. 3 Attempt any Two of the following. (20)

1. Explain construction and working JK FF with suitable circuit diagram and truth table.
2. Explain master slave FF with circuit diagram and truth table.
3. Explain the working of serial in serial out shift register.
4. Explain with diagram the working of Asynchronous 3 bit counter.

Q. 4 Attempt Any THREE of the following (15)

1. An amplifier has voltage gain of 10dB. If the input signal voltage is 1 V. then find the out put voltage.
2. In voltage divider circuit $V_{CC} = 15$ V, $R_1 = 6$ K, $R_2 = 3$ K , $R_C = 470$ ohm, $R_E = 1$ K, $V_{BE} = 0.6$ V, $\beta = 100$. Find stability factor.
3. A Wien Bridge oscillator has frequency 3KHz, If $R_1 = R_2 = 330K\Omega$, find the value of both capacitors.
4. Write a short note on OP-AMP as COMPARATOR.
5. Explain D type FF.
6. Explain edge trigger SR FF.

----------THE END ----------

241015

S2324

RIZVI COLLEGE OF ARTS, SCIENCE & COMMERCE
S.Y.B.Sc. (PHYSICS) SEM – III (Regular + ATKT)
PAPER – III, SET-I, (USPH303)

Time : 2.30 hrs. **Marks : 75 M**

INSTRUCTIONS:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Use of simple non-programmable calculator is allowed.
4. Draw a diagram wherever necessary.

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

1. Determine whether the following equation is exact, and find its solution if it exact
$$x(x^2 + 2y^2)dx + y(2x^2 + y^2)dy = 0$$
2. Discuss the general first order linear differential equation with reference to complementary function and particular integral. Obtain its general solution.
3. Discus second order homogeneous linear differential equations with constant coefficients with roots of the equation real and distinct.
4. Solve the following differential equations:-
   i) $\frac{dy}{dx} + y = e^{-x}$
   ii) $y'' + 2y' + 4y = 0$

Q. 2 Attempt any Two of the following. (20)

1. Consider the equation of the form
$$\frac{d^2y}{dx^2} + p_0\frac{dy}{dx} + q_0y = f(x)$$
Obtain its general solution using method of successive integration.
2. Solve two dimensional Laplace's equation
$$\frac{\partial^2\emptyset}{\partial x^2} + \frac{\partial^2\emptyset}{\partial y^2} = 0$$
3. Solve one-dimensional wave equation
$$\frac{\partial^2\emptyset}{\partial x^2} = \frac{1}{v^2}\frac{\partial^2\emptyset}{\partial t^2}$$
For $\emptyset(0,t) = 0$ & $\emptyset(L,t) = 0$
4. Solve the following equations:-
   i) $\frac{\partial u(x,y)}{\partial x} = 4\frac{\partial u(x,y)}{dy}$
   and find the solution subject to $u(x,0) = 2e^{-2x}$
   iii) $\frac{d^2y}{dx^2} + 2\frac{dy}{dx} + y = x$

Q. 3 Attempt any Two of the following. (20)

1. Explain the block diagram of electronic communication system.
2. Explain the various types of NOISE present in communication system.
3. Explain Amplitude modulation and obtain expression for modulation index. Draw suitable waveforms.
4. What is FM. Obtain an expression for the spectrum of FM. Draw suitable graph?

Q. 4 Attempt Any THREE of the following (15)

1. A radioactive isotopes decays in a such a way that the number of atoms present at a given time, obey the equation

$$\frac{dN}{dt} = -\lambda N$$

If there initially N_0 atoms present, find $N(t)$.

2. Solve the differential equation $y'' + 2y' + 4y = 0$
3. Write some important partial differential equations in Physics.
4. Show that $u = \cos x \cos at$ is a solution of

$$\frac{\partial^2 u}{\partial t^2} = a^2 \frac{\partial^2 u}{\partial x^2}$$

5. Explain PPM with suitable diagram.
6. An audio tone amplitude modulates a carrier wave of peak value of 10 V. The percentage modulation is 40%. Calculate the peak value of the upper and the lower side band frequencies.

----------THE END ----------

24101 SYBSc. ZOOLOGY SEMESTER III PAPER I (COURSE V)

Time : 2.30 hours

S2324

Total Marks : 75

N.B :

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

Q.1) Multiple Choice Questions (MCQ) (attempt 15 out of 20) 15

1. Term used for gene as unit of transmission
   (Cistron, Recon, Muton, Genome).
2. Mendelian phenotypic ratio for monohybrid cross
   (9:3:3:1, 3:1, 1:2:1, 15:1)
3. Individual with Blood group B will have
   (A antigen, B antigen, A& B antigen , no antigen)
4. Polygenic inheritance meaning
   (trait is produced from the cumulative effects of many genes,one gene controls many traits, multiple genes occupy same loci,genes are linked)
5. The location of a particular gene on chromosome is called as
   (genotype, locus, trait, phenotype)
6. An individual possessing recessive lethal trait dies if he is
   (heterozygous dominant, homozygous dominant, homozygous recessive, heterozygous recessive)
7. If both allele fully expressed
   (co-dominance, incomplete dominance, lethal dominance, complete dominance)
8. XX-XO mechanism of sex determination is commonly found in
   (birds, human, grasshopper, cattle)
9. Number of Barr bodies in individual with Turner's syndrome
   (zero, one, two, three)
10. _____occurs at both ends of each chromosome
    (heteropycnosis, telomere, nucleic acid, proteins)
11. The chromosome puff contain large amount of _____
    (DNA, t-RNA, r-RNA, m-RNA)
12. Histone protein attached with linker DNA_____
    (H1, H2A,H2B, H3)
13. Green colour blindness is also called _____
    (Anemia, deutoranopia, protonopia, hemophilia)
14. Y- linked genes are transmitted from _____
    (father to son, mother to son, father to daughter, mother to daughter)
15. Experimental model in Hershey and Chase experiment
    (mouse, bacteriophage, monkey, protozoa)
16. A virulent strain of *Diplococcus pneumonae*
    (SIII, heat killed SIII, RII, heat killed RII)

a. Diameter of a chromatid
   (10nm, 30nm, 400nm ,1400nm)
b. Distance between nucleotide in A-DNA
   (2.7 A^0, 3.4 A^0, 3.75 A^0,10 A^0)
c. In t-RNA ___ also called as extra arm
   (amino acid acceptor arm, T loop, anticodon loop, variable arm)
d. Enzyme helps for unwinding of DNA strand.
   (primase, polymerase, helicase, ligase)

Q.2 A) Explain chromosomal theory of linkage 07

OR

A) Describe X-linked inheritance with suitable examples

Q.2 B) Write short note on any two. (4 marks each) 08

a. Recessive lethals

b. Incomplete dominance

c. Law of independent assortment

d. Classical concept of gene

Q.3 A) Describe the role of environment in sex determination 07

OR

A) Describe the types of chromosomes.

Q.3 B) Write short note on any two. (4 marks each) 08

a. Freemartin

b. Heterochromatin

c. Colour blindness in human

d. Gyanandromorph

Q.4A) Characteristics of the genetic code 07

OR

A) Discuss structure and function of m-RNA

B) Write short note on any two. (4 marks each) 08

a. Biological significance of double helical model of DNA

b. Polysomes

c. Termination of transcription

d. Difference between DNA & RNA

Q.5 Write short note on any three. (5 marks each) 15

a. Recessive epistasis

b. Chromosome theory of inheritance

c. Sex determination in *Drosophila*

d. Polytene chromosome

e. Proof reading and error correction in DNA

f. DNA polymerase in eukaryotes

SYBSc. ZOOLOGY SEMESTER III PAPER II (COURSE VI)

241014

S 2324

Time : 2.5 Hrs **Total Marks : 75**

Q 1.	Multiple Choice Question (MCQ) (attempt any 15 out of 20) (1 mark each)	15 Marks

a. _____ is chemosynthetic autotroph.
(Leech, *Chilomonas*, Hookworm,Lizard)

b. In _____ gizzard grinds the food particles.
(Cockroach, *Amoeba*, *Hydra*, Man)

c. *Amphioxus* is_____
(Graminivorous, Filter feeder, Omnivorous, Terrestrial)

d. _____ are known as flame cells.
(Protonephridia, Nephron, Neuron, Vein)

e. Too much of _____ may form kidney stones.
(Ammonia, Oxygen, Uric Acid, Mucus)

f. _____constantly monitors water level in blood.
(Henle's loop, Hypothalamus, Cortex, Blood)

g. Respiratory organ of earthworm is _____.
(book lungs, gills, skin, buccopharyngeal membrane)

h. Number of alveoli in human lungs_____.
(750 million, 450 million, 500 million, 150 million)

i. Total carbon dioxide transported by plasma is about _____.
(7%, 20%, 55%, 45%)

j. In crocodile, mixing of oxygenated and deoxygenated is blood is carried out by
(foramen of panizza, thebesian valve, eustachian valve,semilunar valve)

k. Hormone that increases heart rate in man _____.
(adrenaline, acetylcholine, calcitonin, insulin)

l. Accessory respiratory organ arborescent is found in _____.
(*Anabus, Clarius*, Shark, Rohu)

m. Number of hearts in earthworm is _____.
(4, 13, 7, 1)

n. Ammonotelic animal is_____
(fishes, birds, mammals, lizards)

o. Sol-Gel theory was proposed by
(Huxley, Hyman, Darwin, Robert Hooke)

p. The splitting of the parent organisms into two or more daughter cells is_____
(fission, budding, fragmentation, gemmule formation)

q. Reptiles and birds are_____
(oviparous, viviparous, ovoviviparous, vivo-oviparous)

r. Neurotrasmitter is _____.
(acetylcholine, adrenaline, heparine,sodium)

s. Type of symmetry in star fish is_____
(bilateral, radial, asymmetry, biradial)

t. During binary fission the division of the nucleus is called_____
(cytokinesis, karyokinesis, meiosis, fertilization)

Q 2.	A. Describe the digestive system of pigeon. OR A. Describe the process of filtration and selective reabsorption in man.	7 Marks
	B. Write short note on any two. (4 marks each) a. Digestion in stomach with respect to man. b. Ruminant stomach. c. Malpighian tubules in cockroach. d. External morphology of kidney.	8 Marks
Q 3.	A. Explain different types of circulating fluid. OR A. With suitable diagram explain structure of human lung.	7 Marks
	B. Write short note on any two. (4 marks each) a. Air sacs in pigeon b. Mechanism of respiration in frog c. Closed circulation d. Leucocytes	8 Marks
Q 4.	A. Describe the types of fins in fish. OR A. Describe of conduction of nerve impulse.	7 Ma
	B. Write short note on any two. (4 marks each) a. Action potential b. Multiple fission in *Plasmodium*. c. Types of fertilization. d. Irritability in *Paramoecium*.	8 Marks
Q 5.	Write short note on any three. (5 marks each) a. Physiology of digestion in cockroach. b. Uricotelic animals. c. Propelling organs of earthworm d. Transport of carbon dioxide during respiration in human. e. Structure of human egg. f. Types of neurons on the basis of structure.	15 Marks

241015 S2324

SYBSc. ZOOLOGY SEMESTER III PAPER III (COURSE VII)

Time : 2.5 Hrs **Total Marks : 75**

Q 1. Multiple Choice Question (MCQ) (attempt any 15 out of 20) (1 mark each) 15 Marks

1. The construction of nest by tailor bird is _____ behavior.
   (Learned, Insight, Mimicry, Innate)
2. _____ is time dependent form of learning.
   (Habituation, Imprinting, Waggle dance, Ritualization)
3. Salivation to food is _____.
   (Unconditioned response, Conditioned response, Conditioned stimulus, Unconditioned stimulus)
4. _____ behavior in ants strengthen social bond.
   (Chemical mode, Touch and tap, Colouration, Migration)
5. _____ shows anadromous migration.
   (*Hilsa, Chanos,* Anguilla sps., Asian milk - fish)
6. Gorilla and spider monkey form _____ group.
   (Monogamous, Polygamous, Polyandrous, Bisexual)
7. Head louse belongs to order_____
   (Acarina, Anoplura, Hemiptera, Cimicidae)
8. Mite is _____
   (ectoparasitic, endoparasitic, endophytes, saprophytes)
9. *Plasmodium vivax* is a _____ parasite.
   (Ectoparasite, Obligatory, Hyperparasite, Extracellular)
10. Infections transmitted from man to vertebrate animals _____ .
    (Anthropozoonoses, Zooanthroponoses, Amphixenoses, Causative agent)
11. *Fasciola hepatica* attacks on_____.
    (RBC, WBC, liver, intestine)
12. Rabies is caused by _____
    (virus, bacteria, fungi, protozoa)
13. Competent reservoir host of *Leishmania donovani* is ____
    (snail, fish, domestic dog, sheep)
14. Drongo is a _____.
    (Ants, wasps, bee eater, wax moth)
15. Amongst honey bees the workers are
    (female,male, both female and male, hermaphrodite)
16. Temperature used in UHT processing of milk_____
    (72°C, 115°C, 138°C, 62°C)
17. Which of the following methods uses earthworm during composting_____
    (vermicomposting, vertical composting, windrow composting, burning)
18. Father of apiculture is_____.
    (Darwin, L.L Langstroth, Carl Linnaeus, A.S Atwal)
19. Which of the following is a benefit of vermiculture _____
    (soil erosion, improves soil fertility, decreases soil microorganisms, soil compaction)
20. Which of the following is the most abundant protein in milk_____
    (casein, whey, albumin, lactose)

Q 2.	A. Describe instrumental learning and give its significance. OR A. Describe retualization and give its significance.	7 Marks
	B. Write short note on any two. (4 marks each) a. Innate behavior. b. Communication in ants. c. Habitat selection. d. Advantages and disadvantages of living in social group.	8 Marks
Q 3.	A. Explain the life cycle and treatment of *Wucheria bancrofti* OR A. Describe the different types of parasite with examples.	7 Marks
	B. Write short note on any two. (4 marks each) a. Structure adaptation in endoparasite. b. Control measures of filariasis c. Control measures and treatment of head louse. d. Causative agent and mode of transmission of Anthrax.	8 Marks
Q 4.	A. Describe any two methods of vermiculture. OR A. Describe the advantages and disadvantages of traditional apiculture.	7 Ma
	B. Write short note on any two. (4 marks each) a. Recombined milk preparation b. Advantages of the modern method of apiculture c. Composition of ice-cream and flow diagram for ice-cream preparation d. Types of cooler with diagram	8 Marks
Q 5.	Write short note on any three. (5 marks each) a. Classical conditioning. b. Kin Recognition. c. Pathogenicity of *Fasciola hepatica* d. Structural specificity of host parasite relationship. e. Migration (self-harvesting) method f. Chalk brood disease	15 Marks

241010 S2324

RIZVI COLLEGE OF ARTS, SCIENCE AND COMMERCE

S.Y.B.Sc. Chemistry choice based (Regular 2024-25)

Semester III

Paper III

Time: 2 hr 30 Minutes

Total Marks: 75 Marks **Date:**

N. B: 1. All questions are compulsory

2.Figures to the right indicate full marks

3.Use of log table/ Non programmable calculate is allowed.

Q1A	**Attempt any 3 out of 5** **(15 Marks)**
1.	What is meant by sampling? Explain different types of sampling.
2.	Explain briefly different types of determinate errors.
3.	Define analytical chemistry and give its significance.
4.	Explain different methods to minimize determinate errors.
5.	In the estimation of chromium in the sample of steel, the results of eight replicate measurements gave the following percentage of chromium. Calculate the standard deviation, variance. relative standard deviation and coefficient of variation. 15.52,15.56, 15.62, 15.51, 15.53, 15.48, 15.54 and 15.53
Q2	**Attempt any 3 out of 5** **(15 Marks)**
1.	Define titration. Give condition suitable for Titrimetry.
2.	Write note on neutralization and redox titrations with example.
3.	Define Titrant. How will you to calibrate burette.
4.	What is standard solution. Give condition to be satisfied by primary standard.
5.	Calculate the normality of a solution of nickel nitrate made by dissolving 2.00 g of pure nickel metal in nitric acid and diluting the solution to 500 ml. The nickel to be titrated with KCN the following reactions occurring: $Ni^{2+} + 4CN^- \longrightarrow Ni(CN)_4^{2-}$ Also calculate the molarity. (Eq.wt of nickel is 58.70 g/eq.)
Q3.	**Attempt any 3 out of 5** **(15 marks)**
1.	State and derive mathematical expression for Lambert's law.
2.	Write schematic diagram of single beam photometer. Discuss its instrumentation and working.
3.	Explain the function of monochromators in optical instrument.
4.	What is photoelectric cells? Describe the photomultiplier tube and photovoltaic cells.
5.	The molar absorptivity of a solute is $1.4 \times 10^4\ dm^3\ mol^{-1}\ cm^{-1}$. If a solution of the substance has an absorbance of 0.85 in a 1 cm cell. Calculate, i) the transmittance and ii) concentration of the solution.
Q4	**Attempt any 3 out of 5** **(15 Marks)**
1	Write note on Instrumental error and personal error.
2	Give difference between determinate and Indeterminate error.
3	Give difference between equivalence point and end point.
4	Write note on complexometric and precipitation titration.
5	The absorbance of a 5×10^{-3} g. dm^{-3} of a solute in a 1 cm cell is 1.0 calculate, I) absorptivity and ii) Molar absorptivity of the solution. The molecular weight of solute is 125.

Q5 A	**Multiple choice question (Any 5)**	**(5 Marks)**
1.	In------analysis, only elemental composition of the sample is determined.	
	a)Trace analysis b) Complete Analysis c) Proximate Analysis d) Proximate analysis	
2.	An error pH measurement due to wrong calibration is--------	
	a)Random error b) Systematic error c)Instrumental error d) Personal error	
3.	In semi-micro analysis, the amount of sample taken is ----to------.	
	a)1mg to 10 mg b) 100 mg to 200 g c) 10 mg to 100mg d)0.1mg to 10 mg	
4.	The point at which the reaction between titrant and analyte is stoichiometrically complete is known as----------	
	a)End point b) Low Point c) Equivalence point d) None	
5.	In complexometric titration, there is formation of a complex between----and----	
	a)Ligand and Metal ion b) Metal and indicator c) Both d) None	
6	------is secondary standard	
	a)Sodium hydroxide b) Potassium chromate c) Succinic acid d) None	
7.	Spectrophotometers use ------- as monochromators	
	a)filters b) Grating c) Both d) None	
8.	For analysis in the UV region, the cuvette should be made up of -------	
	a)Glass b) Transparent plastic c) Quartz	
9	The photomultiplier tube is basically-------	
	a)A photo emissive cell b) A photovoltaic cell c) Both d) None	
B	**Match the following (Any 5)**	**(5 Marks)**
	A	**B**
	1. Accuracy	1. Most frequent observation
	2. Mode	2.Absolute error
	3. pH change	3. Eosin
	4. Turbidity	4.Phenol red
	5. Colorimeter	5.Shift to longer wavelength
	6. Photocell	6.Conversion of radiation energy to electrical
	7. Prism	7.Dispersion
	8. Conjugated compound	8.Visible region
C	**True and False (Any 5)**	**(5 Marks)**
1.	In qualitative analysis purity of substance is measured.	
2	Solution in the burette is called Titrant.	
3	Colloidal precipitate is easily filterable.	
4	In gravimetric analysis drying and ignition are one and the same.	
5	The unit of radiant power is Js.	
6	Absorbance is reciprocal of transmittance.	
7	The roll of collimating lens to obtain parallel beam of a light.	
8	Cuvette is made of a glass.	

241009

S2324

Rizvi College of Arts, Science & Commerce

(Time: 2½ hour) Total Marks: 75

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 Attempt any 3 15M

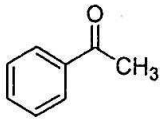
A Differentiate between addition polymerization and condensation polymerization **(5 points)**.
B Distinguish between linear and branched polymers **(5 points)**.
C Explain the thermal chain reaction involved in the formation of HBr.
D Explain with suitable example **(i)** Parallel reaction **(ii)** Consecutive reaction
E Differentiate between Ideal and non-ideal solutions **(5 points)**.

Q2 Attempt any 3 15M

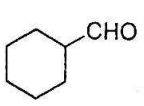
A Give preparation of diborane. Discuss the structure and bonding involved in diborane
B What are electron deficient compounds? Explain.
C Give preparation, properties and structure of i) N_2O ii) NO
D Explain the structure of silica. Give its properties and uses.
E Discuss zone refining process for purification of germanium and silicon.

Q3 Attempt any 3 15M

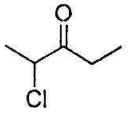
A Give the IUPAC of the following



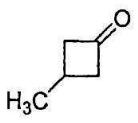
(i)



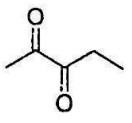
(ii)



(iii)

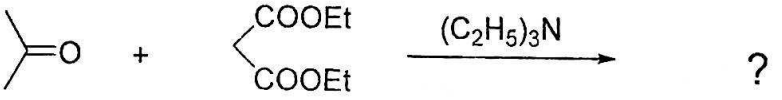


(iv)

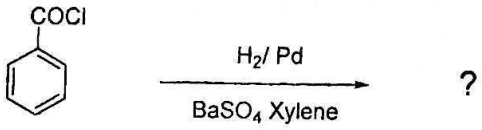


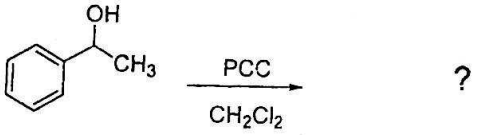
(v)

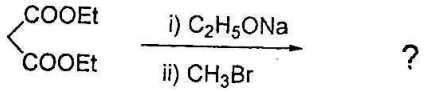
B Give the structure of Methyl magnesium bromide and give its action on (i) formaldehyde (ii) acetone
C Identify and Complete the reaction. Also give mechanism.

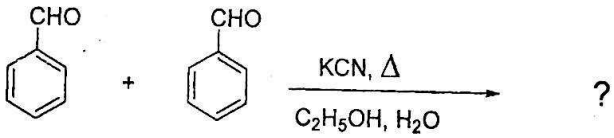


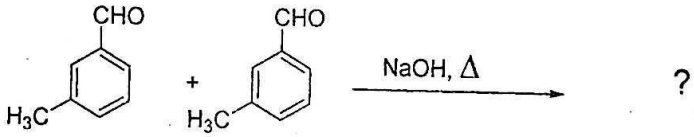
D Complete the following reactions

(i) 

(ii) 

(iii) 

(iv) 

(v) 

E Give reactions for the following
i) Action of HCN on acetaldehyde followed by hydrolysis
ii) Action of $NaBH_4$ on Acetophenone
iii) Action of $LiAlH_4$ on formaldehyde
iv) Action of hydroxylamine on benzaldehyde
v) Action of PCC on 2-propanol

Q4 Attempt any 3 **15M**

A In a polymer sample 30% of molecules have a molecular mass of 20000 , 40% have 30000 and the rest 60000 . What is the number average molecular mass of the polymer?

B What is the formula for borax? Give 2 preparations

C Give the electronic configuration for the elements of group 14.

D Convert the following names to structure
i) Ethyl magnesium bromide
ii) Propanal
iii) cyclopentanone
iv) 3-nitrocyclohexanone
v) Ethyl methyl ketone

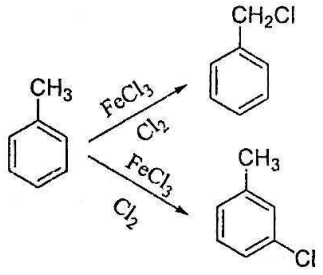
E State the type of reaction.

i) $2\,HI \rightleftharpoons H_2 + I_2$

ii) $CO + NO_2 \rightleftharpoons CO_2 + NO$

iii) $H_3C-O-CH_3 \longrightarrow CH_4 + HCHO \longrightarrow H_2 + CO$

iv)



v) $\triangleright O \longrightarrow CH_3CHO \longrightarrow CH_4 + CO$

Q5 A **Multiple choice question (any 5 out of 9)** 5M

1 _____ reaction is known as sequential reactions.
a) parallel **b)** reversible **c)** consecutive

2 _____ molecular weight is determined using sedimentation velocity
a) number average **b)** z-average **c)** weight average

3 $\Delta H_{mix} < 0$ indicates _____ deviation from Raoult's law.
a) negative **b)** positive **c)** no

4 _____ belongs to group 14
a) Arsenic **b)** Gallium **c)** Germanium

5 NO is called _____
a) Nitrogen dioxide **b)** Dinitrogen trioxide **c)** Nitric oxide

6 In group 14, as we go down the group _____ decreases
a) electronegativity **b)** metallic character **c)** atomic radii

7 _____ is not a reducing agent.
a) $LiAlH_4$ **b)** $NaBH_4$ **c)** PCC

8 _____ is an acyclic ketone
a) cyclobutanal b) hexanone c) cyclohexanone

9 In _____, acyl halide is converted to aldehyde.
a) Benzoin condensation b) Cannizaro reaction c) Rosenmund reduction

Q5 B Match the columns (any 5 out of 8) 5M

1	$\Delta V_{mix} = 0$	a)	Hydrazine derivative
2	$\Delta V_{mix} \neq 0$	b)	Aromatic aldehyde
3	boron	c)	Metal
4	tin	d)	Non ideal solution
5	Aldehyde + hydroxylamine	e)	Non-metal
6	Aldehyde+ phenylhydrazine	f)	Aliphatic aldehyde
7	benzaldehyde	g)	Ideal solution
8	pentanal	h)	Oxime derivative

Q5 C True or False (any 5 out of 8) 5M

1 In addition polymerization, no by product is formed
2 Ideal solution is also known as perfect solution
3 Tetraborane has no BHB bonds
4 SiO_2 is reactive
5 PCC oxidizes 1°-alcohol to ketone
6 Gattermann-Koch reaction is used for formylation of benzene
7 Reduction of formaldehyde using $LiAlH_4$ gives 2°-alcohol
8 Formaldehyde can be used for Cannizaro reaction

241008

RIZVI COLLEGE OF ARTS, SCIENCE AND COMMERCE ST030324

S.Y.B.Sc. CHOICE BASED (Regular 2024-25) SEMESTER-III CHEMISTRY: PAPER I

(Time: 2½ Hours) Total Marks: 75

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. Answer the following attempt (any three) 15 M

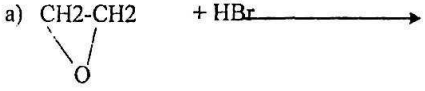
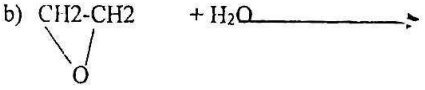
1. Draw the molecular orbitals diagram of oxygen molecule and answer the following question.
   a) Bond order in O_2, O_2^{-1}.
   b) Magnetic behaviour of O_2, O_2^{-1}.
2. Write the hybridization, and shape and number of lone pair present in the following molecules.
   a) $SiCl_4$
   b) XeF_2
3. Calculate the formal charge in the following molecules.
   a) N_2O.
   b) CO.
4. Calculate lattice energy of NaI molecule from the following data.
   Heat of formation of NaI = - 287.9 KJ/mol.
   Heat of sublimation of Sodium = 108.4 KJ/mol.
   Heat of dissociation of Iodine = 106.7 KJ/mol.
   Ionization energy of Sodium = 495.4 KJ/mol.
   Electron affinity of Iodine = -306.4 KJ/mol.
5. Draw all possible resonating structure for the following molecule.
   a) Benzene.
   b) CO_3^{-2}.

Q2. . Answer the following attempt (any three). 15 M

1. Explain the following terms with suitable examples.
   a) Closed system. b) Extensive properties.
2. What are electrolytes? Explain any three difference between strong and weak electrolytes.
3. Explain how Gibbs free energy is related to enthalpy and entropy by a mathematical equation. Predict the reaction when
   a) ΔG = negative. b) ΔG = Positive. c) ΔG = Zero.
4. Explain the concept of fugacity. activity and activity coefficient.
5. Using Kohlrausch law of independent migration of ions at infinite dilution, the molar conductivity of electrolytes for the following will be.
   a) $\lambda^{\circ}_m(BaCl_2)$ = _____ + _____.

   b) $\lambda^{\circ}_m(Na_2SO_4)$ = _____ + _____.

Q3. Answer the following attempt (any three). 15 M.

1. Explain the difference between SN^1 and SN^2 reaction.
2. What are Grignard reagents? Explain what happens when Methyl Magnesium Bromide is reacted with Ethanol and acetone.
3. Complete the following reaction.
   a) p-ChloroNitrobenzene and Sodium Hydroxide react with each other.
   b) Chlorobenzene and Sodium amide ($NaNH_2$) react in presence of Potassium amide and ammonia (KNH_2, NH_3).
4. What happens when?
   a) Phenol is reacted with Bromine at low temperature in dry Carbon disulphide.
   b) Phenol is reacted with Chloroethane in presence of base like K_2CO_3.
5. Complete the following reaction.
   a) 
   b) 

Q4. Answer the following attempt (any three). 15 M

1. What are chemical bond? Explain any three difference between Ionic and Covalent bonds.
2. sp and sp^3 hybridization. Explain.
3. The equilibrium constant for a gaseous reaction is 1.21×10^{-4} at 1800K and 4.08×10^{-4} at 2000K. Find the heat of reaction. Given R= 8.314 J/Kmol.
4. What is transport number? Calculate transport number of cation H^+. If the transport number of anion Cl^{-1} is 0.174 in 0.01 N HCl solution under given condition.
5. Ethanol reacts with Thionylchloride ($SOCl_2$) in presence of Potassium Carbonate.

Q5. A. Multiple choice questions. Attempt (any five). 05 M

1. The geometry and type of hybridization present about the central Boron atom in BF_3
   a) Linear & sp b) Trigonal planar & sp^2 c) Tetrahedral & sp^3.
2. Bond order for H_2 molecule is _____.
   a) One b) Two c) Zero.
3. Sigma molecular orbitals _____ about the bond axis
   a) can freely rotate b) cannot freely rotate c) none of the above.
4. At infinite dilution molar conductance is represented as _____.
   a) λ'_m b) λ_m c) M^∞.
5. Electrolytic conductance is due to which of the following species?
   a) Electron b) Proton c) Ions.
6. For an ideal gas activity coefficient (γ) is always _____.
   a) One b) Two c) Zero.
7. Ethanol is a/an _____ alcohol.
   a) Primary b) Secondary c) Tertiary.
8. IUPAC name of  is a _____.

a) 1,2-Epoxypropane b) 1,3-Epoxybutane c) Propanal.

9. Phenols are _____ compounds.
   a) Aromatic b) Cyclic c) Aliphatic.

B. State the given statement is True or False. (any Five) 05 M

1. Bond angle in sp hybridization is 120°.
2. Li_2 has bond order of one.
3. Ostwald's dilution law is not applicable to strong electrolytes.
4. Mass and Volume are intensive properties.
5. Alcohols are more acidic than Phenols.
6. Ferrocene is an organometallic compound.
7. Primary alcohols on oxidation first gives Ketone.
8. Williamson's synthesis is used to prepare esters.

C. Match the columns A & B. (any Five) 05 M

A	B
1. Lithium Aluminium Hydride	a) Non-electrolyte
2. Tetraethyl lead	b) $CH_3\text{-}CH_2\text{-}\underset{\displaystyle Br}{\underset{\vert}{C}}=CH_2$
3. 2-Bromobutene	c) Fugacity
4. 2-Bromo-1-propanal	d) Electrolyte
5. Escaping tendency	e) Organometallic compound
6. Chemical potential	f) $CH_3\text{-}\underset{\displaystyle Br}{\underset{\vert}{CH}}\text{-}CHO$
7. Urea	g) Partial molal free energy
8. Sodium Chloride	h) Reducing agent