

RADIANT COLLEGE
PRE-TEST EXAM-2023
 H.S. 2nd YEAR
 SUB: Mathematics

Time: 3Hrs.

Total Marks: 100

1. Answer the following questions: 1×10=10
- (a) The vector sum of two coinitial vectors is given by the _____ of the parallelogram whose adjacent sides are the given vectors.
- (b) Define Skew lines.
- (c) If $x \begin{bmatrix} 2 \\ 3 \end{bmatrix} + y \begin{bmatrix} -1 \\ 1 \end{bmatrix} = \begin{bmatrix} 10 \\ 5 \end{bmatrix}$. Write the value of x.
- (d) If A is a 3×3 matrix and $|3A|=k|A|$, then write the value of k.
- (e) What is the direction cosine of y- axis?
- (f) Fill in the blank $\lim_{x \rightarrow 0} \frac{\tan 2x}{2x} = \underline{\hspace{2cm}}$
- (g) What are the order and degree of the differential equation $\frac{d^2y}{dx^2} = \sqrt{\cos\left(\frac{dy}{dx}\right)}$.
- (h) If $f(x) = x^3 + 4$ and $g(x) = 2x^2 + 1$ be two real valued function. Find $f(g(x))$.
- (i) Find the principle value of $\sin^{-1}(\sqrt{2})$.
- (j) Is the function defined by $f(x) = e^x$ a continuous function?

2. Let L be the set of all lines in XY plane and R be the relation in L defined as $R = \{(l, m) : l \text{ is parallel to } m\}$. Show that R is an equivalence relation. Find the set of all lines related to the line $y = 2x + 4$. 3+1=4

3. Solve the equation $2 \tan^{-1}(\cos x) = \tan^{-1}(2 \operatorname{cosec} x)$ 4

4. Express the following matrix as a sum of a symmetric and a skew symmetric matrix.

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

OR 4

If $A = \begin{bmatrix} 3 & -4 \\ 1 & 1 \end{bmatrix}$ then prove that $A^n = \begin{bmatrix} 1 + 2n & -4n \\ n & 1 - 2n \end{bmatrix}$ where n is any positive integer.

5. If $x = a(\cos t + t \sin t)$ and $y = a(\sin t - t \cos t)$ find $\frac{d^2y}{dx^2}$ 4

6. A ladder 5 m long is leaning against a wall. The bottom of the ladder is pulled along the ground, away from the wall, at the rate of 2 cm/s. How fast is its height on the wall decreasing when the foot of the ladder is 4 m away from the wall? 4

7. Evaluate the following integrals. 4×2=8

(i) $\int \frac{1}{x^2+3x+2} dx$ OR $\int e^x \sin x dx$ (ii) $\int_0^{2/3} \frac{dx}{4+9x^2}$ OR $\int_0^4 |x-1| dx$

8. Solve the differential equation 4

$$\sec^2 x t \tan y dx + \sec^2 y t \tan x dy = 0$$

OR

$$\cos^2 x \frac{dy}{dx} + y = \tan x$$

9. Solve the differential equation 4

$$x \frac{dy}{dx} + 2y = x^2 \log x$$

10. Let A and B be sets. Show that $f : A \times B \rightarrow B \times A$ such that $f(a,b)=(b,a)$ is bijective function. 4

11. Show that the vectors $(2\hat{i} - \hat{j} + \hat{k})$, $(3\hat{i} - 4\hat{j} - 4\hat{k})$ and $(\hat{i} - 3\hat{j} - 5\hat{k})$ form the vertices of a right angled triangle. 4

12. Given that the two numbers appearing on throwing two dice are different. Find the probability of the event "the sum of numbers on the dice is 4". 4

OR

An insurance company insured 2000 scooter drivers, 4000 car drivers and 6000 truck drivers. The probabilities of accidents are 0.01, 0.03 and 0.15 respectively. One of an insured person meets with an accident. What is the probability that he is a scooter driver?

13. Solve the following system of equations by matrix method. 6

$$\begin{aligned} 2x + 3y + 3z &= 5 \\ x - 2y + z &= -4 \\ 3x - y - 2z &= 3 \end{aligned}$$

OR

Using properties of determinants, prove that

$$\begin{vmatrix} \alpha & \alpha^2 & \beta + \gamma \\ \beta & \beta^2 & \gamma + \alpha \\ \gamma & \gamma^2 & \alpha + \beta \end{vmatrix} = (\beta - \gamma)(\gamma - \alpha)(\alpha - \beta)(\alpha + \beta + \gamma)$$

14. Explain Continuity and find all points of discontinuity of f, where 2+4=6

$$f(x) = \begin{cases} \frac{\sin x}{x} & ; \text{ if } x < 0 \\ x + 1 & ; \text{ if } x \geq 0 \end{cases}$$

15. Find two positive numbers whose sum is 16 and the sum of whose cubes is minimum. 6

16. Find the area enclosed by the parabola $4y=3x^2$ and the line $2y=3x+12$. 6

17. (i) Find the vector and Cartesian equations that the line passes through the points $(3,2,-5)$ and $(3,-2,6)$ 3

(ii) Show that the lines are perpendicular $\frac{x-5}{7} = \frac{y+2}{-5} = \frac{z}{1}$ and $\frac{x}{1} = \frac{y}{2} = \frac{z}{3}$ 3

18. Solve the linear programming problem graphically:

Minimize and Maximize $Z=5x+10y$

Subject to $x+2y \leq 120$

$x+y \geq 60$

$x-2y \geq 0; x, y \geq 0$

OR

Maximize and Minimize

$Z=800x+1200y$

Subject to

$3x+4y \leq 60$

$x+3y \leq 30; x, y \geq 0$

19. (i) Find the unit vector perpendicular to each of the vectors $\vec{a} + \vec{b}$ and $\vec{a} - \vec{b}$ where $\vec{a} = 3\hat{i} + 2\hat{j} + 2\hat{k}$ and $\vec{b} = \hat{i} + 2\hat{j} - 2\hat{k}$

(ii) Evaluate $(3\vec{a} - 5\vec{b}) \cdot (2\vec{a} + 7\vec{b})$

OR

Let X denote the sum of the numbers obtained when two dice are rolled. Find the variance and standard deviation of X. 6

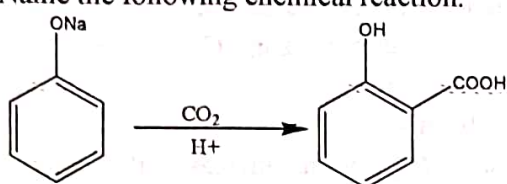
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RADIANT COLLEGE
PRE-TEST EXAM-2023
H.S. 2nd YEAR
SUB: Chemistry

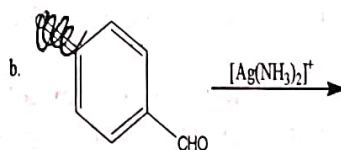
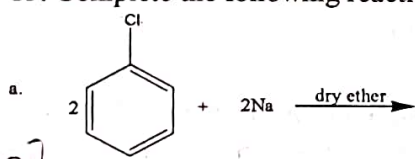
Time: 3Hrs.

Total Marks: 70

1. State Henry's Law. 1
2. Write the difference between order and molecularity of a reaction. 1
3. What are the factors affecting rate of a reaction? 1
4. Define Kohlrausch's Law. 1
5. Write the name of the following compounds. 1
 - a. $[\text{Co}(\text{SCN})_4]^{2-}$
 - b. $[\text{Co}(\text{NH}_3)_4(\text{H}_2\text{O})\text{Cl}]\text{Cl}_2$
6. Write the IUPAC name of the following compound. 1
 $\text{CH}_3\text{-CH}_2\text{-NH}_2$
7. Write the Reimer-Tiemann reaction. 1
8. Name the following chemical reaction. 1



9. What is meant by positive deviation from Raoult's Law? Explain why this deviation is observed. 2
10. Calculate the mass of a compound (Molar mass = 256 g mol^{-1}) to be dissolved in 75g of benzene to lower its freezing point by 48K ($K_f = 5.12 \text{ K gmol}^{-1}$) 2
11. A solution is obtained by mixing 300g of 25% solution and 400g of 40% solution by mass. Calculate mass % (w/w) of water in solution. 2
12. For the reaction $\text{R} \rightarrow \text{P}$ the rate becomes 4 times faster when concentration of the reactant R is doubled at a given temperature. What is the order of the reaction? 2
13. Explain the colour, Magnetic property and geometry of $[\text{Ni}(\text{CN})_4]^{2-}$ on the basis of VBT. 2
14. How to get synthesized aspirin from salicylic acid. 2
15. Complete the following reaction. 1+1=2



16. Explain why (any two) 1+1=2
 - a. Phenol is acidic in nature.
 - b. Ethers have lower bp than alcohols.
 - c. Propan-2-ol is more basic than propan-1-ol.
17. What are proteins? Give one eg each of fibrous and globular proteins. 2
18. How are vitamins classified? Name the vitamin deficiency of which causes scurvy. 2
19. Show that integrated rate law for the 1st order reaction is. 3

$$K = \frac{2.303}{t} \log \frac{[\text{R}_0]}{[\text{R}]}$$
20. Write short notes on. 1×3=3
 - a. Ligands
 - b. Chelation
 - c. Double salt

21. Answer the following questions. 1×3=3
- Ag atom has completely filled d-orbitals($4d^{10}$) in its ground state, yet it is considered as transition element. Why?
 - Actinide contraction is greater than lanthanoid contraction. Why?
 - How many stereoisomers are possible for Ma_4b_2 type compounds?
22. What is a lead storage battery? Give reaction at anode and cathode of lead storage battery during discharging. 3
23. How will you bring the following conversion? 1×3=3
- Benzoic acid to aniline
 - Propene to propan-2-ol
 - Ethanol to ~~but-1-ene~~ *ethene*
24. What are carbohydrates? Give the general formula of carbohydrates. Why are polysaccharides called non-sugars? 1×3=3
25. Write short note (any three) 1×3=3
- Sandmeyer reaction
 - Ammonolysis
 - Acetylation
 - Coupling reaction
26. Give reason why? (any three) 1×3=3
- Grignard reagents should be prepared under anhydrous condition.
 - C-Cl bond length in chlorobenzene is shorter than C-Cl bond length in Chloromethane.
 - Haloalkanes easily dissolve in organic solvents.
 - The presence of nitro($-NO_2$) group at o/p positions increases the reactivity of haloarenes towards nucleophilic substitution reaction.
27. Answer the following. 2+1=3
- Write the mechanism of S_N1 reaction with suitable example.
 - Draw the structure of aniline.
28. 2+3=5
- Predict the product of electrolysis in each of the following.
 - An aqueous solution of $AgNO_3$ using Ag electrode.
 - An aqueous solution of $NaCl$ using pt. electrode.
 - Three electrolytic cell A, B, C containing electrolyte $ZnSO_4$, $AgNO_3$ and $CuSO_4$ were connected in a series. A steady current of 1.5 A was passed through them. 1.45 gm 'Ag' were deposited at cathode of cell B.
 - How long did the current flow?
 - What mass of ~~Ag~~ ^{Cu} and Zn were deposited?
 (Given atomic mass of Cu = 63.5u, Zn = 65.3u, Ag = 108u)
29. 2+3=5
- What are Alloys? Name an important alloy of transition metal and mention its uses.
 - Describe the oxidizing action of $K_2Cr_2O_7$ and write ionic equation for its reaction with H_2S .
30. Answer the following. (any five) 1×5=5
- Give a general method of preparation of aldehyde, using a selective oxidising agent.
 - Give an example of Clemmensen reduction reaction.
 - Identify the product A and B in the following reaction.

$$2HCHO + \text{conc. KOH} \xrightarrow{\text{heat}} A + B$$
 - Write complete equation for the transformation of benzamide to benzoic acid.
 - Arrange the following in increasing order of acidity.
 CH_3COOH , CH_3CH_2COOH , C_6H_5COOH , $C_6H_5CH_2COOH$
 - Mention one use of methanoic acid.

RADIANT COLLEGE
PRE-TEST EXAMINATION-2023
H.S. 2ND YEAR
SUBJECT: STATISTICS

Total Marks: 100

Time: 3 Hrs

1. Answer as directed.

1X12=12

- a) If $f(x)$ is a polynomial in x of degree 'n' then what is the value of $\Delta^n f(x)$?
- b) State one use of interpolation.
- c) Can two events be mutually exclusive and independent simultaneously?
- d) If A and B are two independent events, then $P(A/B) = ?$
- e) Under what condition $C(X, Y) = 0$?
- f) Normal distribution is symmetric about _____. (Fill in the blank)
- g) Define Degrees of Freedom.
- h) Let x_1, x_2, \dots, x_{100} be a random sample drawn from a particular population. You are asked to test whether sample mean is significantly different from population mean or not. State the 95% confidence limits for μ for your test.
- i) State one principle of stratification.
- j) Give a suggestion to reduce sampling error.
- k) If standard deviation of a Poisson variate is 2, find the mean of the Poisson variate.
- l) If a and b are constants then $V(ax+b) = ?$

2. Given $U_0=1, U_1=11, U_2=21, U_3=28$ and $U_4=29$. Find $\Delta^4 U_0$. 3

3. Given

$x :$	1	2	7	8
$f(x):$	4	5	5	4

Find the value of $f(6)$ 3

4. State clearly Newton's backward interpolation formula and its uses. 3

5. If A, B and C are mutually exclusive and exhaustive events and $P(A) = \frac{1}{2}P(B)$ and $P(B) = \frac{1}{2}P(C)$. Find $P(A)$, $P(B)$ and $P(C)$. 3

6. Prove that $P(A \cap B) \leq P(A) \leq P(A \cup B) \leq P(A) + P(B)$. 3

7. A die is thrown. Let X denotes the points on the upper most face. Find $E(X)$. 3

8. Let X be a continuous random variable with p.d.f. 3

$$f(x) = \begin{cases} kx, & 0 \leq x \leq 5 \\ 0, & \text{elsewhere} \end{cases}$$

(i) Evaluate k

(ii) Find $P(1 \leq X \leq 3)$

9. A nationalised bank has found that the daily balance available in its savings account follows a normal distribution with a mean of Rs 500 and s.d. of Rs 50. Find the percentage of savings account holders who maintain an average daily balance more than Rs 500. 3

10. X follows binomial distribution. Given $E(X) = 2\sqrt{V(X)}$ and $P(X = 0) = \frac{1}{16}$.

Find $P(X=1)$. 3

11. If X follows the Poisson distribution and $P(X=1)=P(X=2)$. Find $P(X=4)$. 3

12. What are Type-I error, Type-II error and level of significance? 3
13. Explain small sample test for single mean. 3
14. Prove that in case of S.R.S.W.R., $V(\bar{x}) = \frac{\sigma^2}{n}$ where σ^2 is the population variance. 3
15. A coin is tossed 400 times and Head is found 240 times. Obtain the estimate of S.E. of proportion. 3
16. Explain stratified random sampling. 3
17. Write three advantages of sample survey over complete enumeration. 3
18. By using a suitable interpolation formula estimate $f(3)$ from the following data. 5
- | | | | | | |
|-------|---|----|----|----|----|
| x : | 2 | 4 | 6 | 8 | 10 |
| f(x): | 4 | 13 | 25 | 43 | 64 |
19. Estimate the value of $\int_0^1 \frac{dx}{1+x}$ by using Simpson's $\frac{3}{8}$ th rule and hence find an approximate value of $\log_e 2$. 5
20. A continuous random variable has the following p.d.f. 5
- $$f(x) = C(1-x)x, 0 < x < 1$$
- Find (a) C (b) E(X) (c) V(X) (d) E(2X+5) (e) V(2X+5)

21. If $X \sim B(n, p)$, show that 2+3=5

(i) $E\left(\frac{X}{n} - P\right)^2 = \frac{pq}{n}$

(ii) $Cov\left(\frac{X}{n}, \frac{n-X}{n}\right) = -\frac{pq}{n}$

22. The nine items of a random sample have the following values: 45, 47, 50, 52, 48, 47, 49, 53, 51. Test the hypothesis that the mean of the random values is not different from the assumed mean of 47.5 5

$$P(-1.96 \leq Z \leq 1.96) = 0.95$$

Where $Z \sim N(0,1)$, 5% values of t for 8 d.f. is 2.306

23. In an experiment on immunization of cattle from tuberculosis, the following results were obtained. Examine the effect of vaccine in controlling the disease. 5

	Affected	Unaffected
Inoculated	12	28
Not inoculated	14	6

Given $\chi^2_{0.05,1} = 3.861$

24. Draw all possible samples of size 2 S.R.S.W.O.R. from the population given by (3,6,7,9) and show that sample mean is an unbiased estimate of population mean and find its S.E. 5

25. The random variable X follows a binomial distribution with mean 10 and variance 5. Show that

$$P(X > 6) = \left(\frac{1}{2}\right)^{20} \sum_{r=7}^{20} {}^{20}C_r \quad 5$$

RADIANT COLLEGE

PRE-TEST EXAM-2023

H.S. 2nd YEAR

SUB: Alt. English

Time: 3Hrs.

Total Marks: 100

(Prose - 40)

1. Answer the following : (any nine)

1x9=9

- Who was the editor of "The Assam Tribune"?
- Why did Bhupen Hazarika want to take train from Marseille to Paris?
- What was the first job of the Verger?
- What is bonda?
- Who is termed as the "prince among caterers"?
- "We are both women. If I'm the more fortunate, you ought to expect." who said?
- Who is termed as a "poor little thing"?
- Name the car which is seen in the grassy frontage of "BinaKutir"?
- What is the real name of Saurav Kumar Chaliha?
- "BinaKutir is much more attractive as a proposition, even if the rent is more, or even a hundred rupees", fill in the blanks.
- Who is Bina?

2. Short answer type question : (any six)

2x6=12

- What were the occupations of the two sons mentioned in "BinaKutir"?
- Who was Gopinath Bordoloi? How did he help Mr. Hazarika?
- What did Rosemary offer to the beggar to eat?
- How the beggar is described when the tea-table was carried away?
- Write the name of the fictional South Indian town created by R.K. Narayan? What is the meaning of Martyr?
- Why did the riot break out? Where the leader was stabbed?
- In the course of how many years did Albert Edward own ten shops? What is the meaning of "nipper"?
- What is the name of the dance form of Kamrupa? With which dance form it has similarities?
- What is the name of the younger son's wife and which part of the house are they seen to be engaged in conversation?

3. Answer the following question : (any three)

3x3=9

- Write three features of the house "BinaKutir" as seen by speaker?
- Write three places visited by Bhupen Hazarika on his journey to USA?
- What is the meaning of "enamel"? Write two hobbies of Rosemary Fell.
- What does the bank manager suggest to Albert Edward?
- Write three reasons that lead an end to Rama's business?

4. Long answer type Question -(any one)

2x5=10

- How the narrator's 'imagination' is important for the narrative of the story "BinaKutir"?
- "am I Pretty"-- said Rosemary. Elaborate, this line with suitable example from the text to support your answer.

(Poetry - 30)

5. Answer the following: (any nine)

1x9=9

- What is the reason of P.B. Shelley's death?
- Who discovered Dickinson's poetry in her room?
- Why the mother was suffering in the poem "Night of the Scorpion"?

© At what age did verger start working and give a detailed charact+4

- d) What do you mean by 'tempest'?
- e) "Of that.....Wreck, boundless and....." fill in the blanks.
- f) What is the full name of P.B. Sheley?
- g) Which country does Emily Dickinson belong to?
- h) What kind of an island was Selkirk marooned on?
- i) What is the full name of W.B. Yeats?
- j) What does the port mean by 'chariot wheels'?

6. Short answer type question:

2x5=10

- a) Write the central theme of the poem "Because I Could not Stop for Death" and what is the meaning of 'Horses' Heads'?
- b) Write two important themes reflected in the poem "Night of the Scorpion"?
- c) Who tells the speaker about a ruined statue in the desert and what is the name of the ruler of the statue?
- d) What does the speaker discover in the underworld and write down the meaning of last line of the poet?
- e) Which times of the day are referred to in the poem "The Lake Isle of Innisfree" and why?
- f) What do you understand by the words 'sweet music of speech'? What element of nature does the speaker think of using while trying to connect with civilization?

7. Long Answer Type Question: (any two)

3x2=6

- a) How the theme of death is represented in the poem "Because I Could not Stop for Death"?
- b) Who wrote the poem "The Solitude of Alexander Selkirk"? what message did Selkirk want to convey his friends?
- c) How superstition is reflected in the poem "Night of The Scorpion"? what is the meaning of incantation?

8. Long answer type question. (ANY ONE)

1x5=5

- a) Discuss the strangeness in the poem "Strange Meeting".
- b) How is death personified in the poem "Because I could Not Stop for Death"?

GRAMMAR

9. Add question tags to the following. (any five)

1x5=5

- a) No man is immortal,.....?
- b) Could you elaborate on the intricacies,.....?
- c) The solution to this complex problem requires a deep understanding ,.....?
- d) Precision in measurement is not crucial for accurate conclusion,.....?
- e) Hand me the bottle,.....?
- f) Let her live her life,.....?
- g) He rarely visits his parents,.....?

10. Correct the errors in these sentences and rewrite them. :

1x5=5

- a. She is allergic from seafood.
- b. The committee is divided in its opinions about the proposal.
- c. The company's success is due to its innovative strategies.
- d. Despite of his efforts, he couldn't solve the complex equation.
- e. Each of the participants get a certificate.
- f. The luggages were loaded onto the conveyor belt?

11. Choose a topic from below and write an essay

1x10=10

- a. Your favourite author.
- b. Gender roles in 21st century.
- c. G20 summit 2023 in India.
- d. ODI men's Cricket World Cup 2023.

12. Read the following conversation and answer the questions given below:

Title: A Meeting of Minds at the Terminal

In the bustling terminal of an international airport, Alex, laden with a carry-on, spotted an inviting empty seat next to someone deeply engrossed in "Autobiography of a Yogi." Intrigued by the book choice, Alex decided to strike up a conversation.

Alex: "Excuse me, couldn't help but notice you're reading 'Autobiography of a Yogi.' It's one of my all-time favorites."

Stranger: "Oh, really? I just started, but it's already fascinating. Yogananda's early experiences are quite extraordinary."

(Alex settled into the seat, and the conversation unfolded organically.)

Alex: "The journey Yogananda describes is truly transformative. It's like a mystical adventure that blends spirituality and personal growth"

Stranger: "Exactly! I was drawn to it after hearing about its influence on some notable figures. Steve Jobs was a fan, right?"

Alex: "Yes, he was. The book had a profound impact on him, shaping his perspectives on life and spirituality. Have you read any other spiritual or philosophical books that left an impression?"

Stranger: "I've delved into 'Siddhartha' by Hermann Hesse and 'The Alchemist' by Paulo Coelho. They share that same sense of tapping into something beyond the ordinary."

Alex: "Those are fantastic choices. 'Siddhartha' is a classic exploration of self-discovery, and 'The Alchemist' has this magical, universal appeal."

Stranger: "Absolutely. It's refreshing to read stories that transcend time and culture, touching on the essence of human existence."

(As their conversation deepened, they shared insights and personal reflections on various spiritual texts).

Alex: "What I love about these books is how they invite us to reflect on our own spiritual journeys. Have you found any practical insights that resonate with you?"

Stranger: "Yogananda's emphasis on meditation and mindfulness struck a chord with me. It's a reminder of the importance of inner peace amidst life's chaos."

Alex: "Well said. The application of these teachings in our daily lives is what makes them truly transformative. It's not just about reading; it's about embodying the wisdom."

Their discussion continued, weaving through topics of meditation practices, the interconnectedness of all things, and the universal quest for meaning.

As the airport announcements signaled boarding for their respective flights, Alex and the stranger exchanged contact information, recognizing the serendipity of their encounter. In the midst of the transient chaos of an airport, a profound connection had been forged through shared appreciation for the spiritual wisdom found within the pages of a book. They promised to continue their conversation over email, acknowledging the potential for a meaningful friendship that transcended the confines of the airport terminal.

- a) Name two other spiritual or philosophical books mentioned in the conversation besides "Autobiography of a yogi". 2
- b) According to Alex, what makes the books like "Siddhartha" and "The Achemist" special? 2
- c) What themes did Alex and the stranger discuss during their conversation as indicated by the story? 2
- d) Write two important notions of this story. 2
- e) What the book "Autobiography of a yogi" is about? 1
- e) What is the antonym of chaos? 1

RADIANT COLLEGE
PRE-TEST EXAM-2023
H.S. 2nd YEAR
SUB: English

Time: 3Hrs.

Total Marks: 100

Section: A
Reading Skill: 10 Marks

1. Read the following passage carefully and answer the questions that follow:

(a) The word "depressed" in common usage means sad, frustrated, fed up, bored up and pessimistic. The mood of a depressed person is much lower at his or her best moments than the mood of the normal person at his or her worst. Depression is a state of mind. It is specifically a mental disorder characterised by a lowering of the individual's vitality, his mood, desires, hopes, aspirations and of his self esteem.

(b) Depression arising out of environmental factors is called reactive depression whereas depression arising out of some biochemical changes in the brain is called endogenous depression. If depression is mild or moderate and if the individual is in touch with his surroundings, it is known as neurotic depression. If the individual is severely disturbed and is not able to comprehend what is happening around, such a state is called psychotic depression.

(c) Old age is one of the stages of human development, where a person attains wisdom, maturity, social and economic stability with social recognition and emotional fulfillment. Generally, societies show a great respect and consideration for the aged. In ancient times old people were considered as the guiding stars in Indian families, since they were symbols of tradition, respect, wisdom and experience. In primitive, ancient and medieval cultures, old persons had a recognize social rôle. They were of great value because they could impart knowledge and skill to youngster. The old people were considered as repositories of wisdom and traditions and were not perceived as problems.

(d) At present, social structures and values are undergoing transformation from traditional to modern. There is a rapid stride in urbanization and industrialization leading to the breaking up of joint families and property. This has ultimately weakened the traditional families, social position and status of the aged in the family. From time to time changes in the institutions of marriage and family have diminished the control of parents over their children. It has increased the freedom of entity. Modernization has eventually led to the degradation of their status and authority. Consequently the integrity of the family and the existence of the elderly as an integral part of the family are being uprooted. The importance of their functional positions thus declines and consequently their authority and much of the respect and prestige that they enjoyed earlier get faded. These changes generally bring about depression in older people.

(e) As old age advances events at home may also contribute more to their problems. The "empty nest" feeling arising as a result of the grown up children leaving the home, daughters departing as a result of wedlock and sons leaving station in pursuit of higher education or jobs may make the aged more lonely. The loneliness also arises because of premature lose of spouse. This would deprive the person of a long standing emotional bond that had provided plenty of emotional succor and security. The loss wherever it might occur in the later years leaves the individual terribly lonely and at the mercy of the sons and daughters-in-law. Added to these the increasing gap and interactional stress and strain in the family may leave the elderly without peace of mind. The elderly as a result of these developments feel marginalized, alienated and left out of the main stream. The foregoing are the common problems faced by most of the elderly. These either directly or indirectly lead to a state of depression and make ageing for many and unwanted and unpleasant even to be abhorred.

(f) Usually, the mild depression which caused due to environmental factors is temporary. The person reconciles within a short time and tries to forget the loss. Kind words and timely support of friends, relatives and family members help one recover from depression.

Answer the following:

- i. What does 'depressed' mean in common usage? 2
- ii. What are the different type of depression? 1
- iii. What is endogenous and psychotic depression? 2
- iv. What have led to break up of joint families and property? 2
- v. How can one recover from mild depression? 2
- vi. Pick out the words from the passage that mean the same as the following: $\frac{1}{2} \times 2 = 1$
Reduced, (b) Marriage

Section: B

(Advanced writing skills: 25 Marks)

2. You are Radha/ Rajesh, the general secretary of ArunodoiAcadamyDibrugarh. Your school is going to organize an inter school quiz competition. Write a notice inviting teams from your neighbouring schools to joint in the competition.

Or 5

You are the personal Manager of Hotel TajMahal International, Delhi. You need two lady receptionists and five security guards for the hotel. Write out an advertisement for the posts which is to be published in an English daily.

3. You attended the Educational fair, 2023 organized by the Assam Tribune Pvt. Ltd. in Guwahati in which same top colleges and universities of India participated. Write a detailed account of the fair you are Parveen / Pravin.

Or 10

You are an eye witness to a road accident in which a school going boy was killed and many passengers were injured. Write a report about accident. You are Nitu / Saurav.

4. You are Raja / Sunita. You want to study Bachelor of Business Management (BBM) under Krishna KantaHandique State Open University (KKHSOU), Guwahati. Write a formal letter to the Registrar of KKHSOU to get necessary information about the course, duration of the course, fee structure, mode of Learning, evaluation etc.

Or 10

You are Sanjay / Ayesha. You have seen the advertisement for the post of Games & Sports teacher in Model Public School, Jorhat. Write an application for the post in response to the advertisement. Give your bio-data also.

Section: C

(Grammar: 20 Marks)

5. Change the form of narration in the following sentences: $2 \times 2 = 4$
 - (a) Sita asked her father, "When shall I come back"? Father replied, "Come as early as possible".
 - (b) One day Rahul told me that he would become an Engineer and leave Assam. I asked him if he knew anything about Machine.
6. Change the voice of the following sentences: $1 \times 3 = 3$
 - (a) She bought the baby a doll.
 - (b) The student was told to leave the room.
 - (c) You will be asked to deliver the letters.

7. Rewrite any five of the following sentences using the verbs given in brackets in their correct tense forms:

1x5=5

- (a) The boy went out after he (lock) the gate.
- (b) I (think) of going abroad for quite some time.
- (c) All the students (leave) when I reached the school.
- (d) The First World War (last) for four Tears and ended in 1918.
- (e) I (wait) for you since morning.
- (f) I (go) to Shillong tomorrow.
- (g) While I (run) after the bus I dropped my wallet.

8. Rewrite any four of the following sentences filling the blanks with suitable prepositions:

1x4=4

- (a) John is addicted _____ gambling.
- (b) I have to finish the report _____ tonight.
- (c) He is an authority _____ science.
- (d) The children were looking forward _____ their visit to Shillong.
- (e) The teacher is in full control _____ the class.
- (f) John was annoyed _____ his mother.
- (g) The little girl was pleased _____ her new dress.

9. Transform the sentences as given:

1x4=4

- (a) Ravi is the tallest boy in the class. (Positive)
- (b) Industrious boys succeed in their lives. (Complex)
- (c) I like to read books (Negative-without changing the meaning)
- (d) Mr. Sharma is the owner of this factory. (Interrogative)

Section: D

(Text Books: 45 Marks)

10. Read any one of the following extracts and answer the questions that follow:

- (a) "Those who prepare green wars,
Wars with gas, wars with fire,
Victory with no survivors,
and walk about with their brothers
in the shade, doing nothing."

Questions:

- i. What are the different kinds of wars mentioned by the poet in the passage? 1
- ii. What kind of victory do they achieve? 1
- iii. What should the warmongers do? 1
- iv. Find the words in the passage that mean "those left alive" and "Win". 1

- (b) "A flowery band to bind us to the earth,
Spite of despondence, of the inhuman dearth
Of noble natures, of the gloomy days,
Of all the unhealthy and o'er-darkened ways
Made for our searching: yes, in spite of all,
Some shape of beauty moves away the pall
From our dark spirits."

Questions:

- i. What is the flowery ban mentioned? 1
- ii. What is meant by inhuman dearth? 1
- iii. What are the unhealthy and over darkened ways? 1
- iv. Mentioned the shape of beauty referred by the poet? 1

11. Answer any three of the following questions in 30-40 words: 2x3=6
- (a) What did the roadside stand try to sell?
 - (b) According to Pablo Neruda what important lesson can the Earth teach us?
 - (c) Why is grandeur associated with the "mighty dead"?
 - (d) What are the promises made to the country dwellers?
12. Answer Any Five of the following questions: 1x5=5
- (a) What did Franz think "for a moment"?
 - (b) What was Saheb wearing when he was at the gate of the club?
 - (c) Why is a "cheetal"?
 - (d) What did Shukla want Gandhi to do?
 - (e) What according to Jansie were they earmarked for?
 - (f) Which was the favourite site for Christmas camp?
13. Answer the following questions in 30-40 words: 2x5=10
- (a) What would Franz love to do on that sunny morning instead of going to school?
 - (b) What are the two different worlds in Firozabad?
 - (c) Why did Gandhi chide the lawyers?
 - (d) Why the tree plantation was fenced with electricity?
 - (e) Why Sophie felt uneasy to see the environment inside her house?
14. Answer Any one of the following questions in : 5x1=5
- (a) Describe Sophie's state of change from fancy to reality in the park towards the end of the story.
 - (b) "The battle of Champaran is won," Gandhi exclaimed. Explain the context in which this was said.
15. Answer Any one of the following questions in 120-150 words: 7x1=7
- (a) "Though both Mr. Lamb Derry suffer from a physical disability, their attitude to life is different". Justify the relevance of this statement with reference to the story. On the Face of It.
 - (b) Do you think the doctor's final solution to the problem was the best possible one in the circumstances?
 - (c) Describe how the story "The tiger king" could be considered a political satire.
 - (d) Write briefly about the activities related with the day of uruka.
16. Answer Any Four of the following questions in 30-40 words: 2x4=8
- (a) What is the importance of MaghBihu in lower Assam?
 - (b) What was meant by the phrase "Rather than facts from the war office"?
 - (c) How did Hana help Dr. Sadao?
 - (d) What was odd about cutting of the hair for the little girl?
 - (e) Why was the man holding the eatable in a peculiar way?

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RADIANT COLLEGE
PRE-TEST EXAM-2023
H.S. 2nd YEAR
SUB: Physics

Time: 3Hrs.

Total Marks: 70

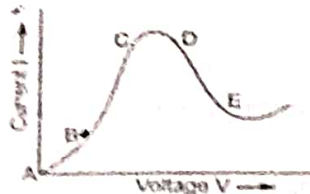
1. Answer the following questions.

1x8=8

- (a) What is the ratio of the number of holes and number of conduction electrons in an intrinsic semiconductor?
- (b) What is the energy possessed by an electron for $n = \infty$?
- (c) How is the volume of a nucleus related to mass number A?
- (d) What is the breakdown voltage of a junction diode?
- (e) What is the least possible value of charge on electron?
- (f) The wavefront due to a source situated at infinity is _____.
- (g) The power factor of an a.c. circuit is 0.5. What is the phase difference between the voltage and current in the circuit?
- (h) Write the dimension formula of mobility μ .

2.

- (a) The total energy of an electron in the first excited state of hydrogen atom is about -3.4eV. What is the (i) kinetic energy, (ii) potential energy of the electron in this state? 2
- (b) Define nuclear energy? What is the binding energy per nucleon for most of the nuclei? 2
- (c) Establish the relation $n_{21} = \frac{\sin\left(\frac{A+Dm}{2}\right)}{\sin A/2}$ 2
- (d) A semiconductor has equal electron and hole concentration of $6 \times 10^8 \text{ m}^{-3}$. On doping with certain impurity, electron concentration increases to $9 \times 10^{12} \text{ m}^{-3}$. Calculate the new hole concentration. 2
- (e) Write Einstein's photoelectric equation. Two metals A and B have work functions 2eV and 4eV respectively. Which metal has higher threshold wavelength? 1+1=2
- (f) The total capacitance of two capacitors is $4 \mu\text{F}$ when connected in series and $18 \mu\text{F}$ when connected in parallel. Find the capacitance of each capacitor. 2
- (g) A circular coil of wire consisting of 100 turns, each of radius 8.0 cm carries a current of 0.40 A. What is the magnitude of the magnetic field B at the centre of the coil? 2
- (h) Distinguish between dia, para and ferromagnetic materials. 2
- (i) Graph showing the variation of current versus voltage for a material GaAs as shown in figure. Identify the region of (i) negative resistance (ii) where Ohm's law is obeyed 2



- (j) A silver wire has a resistance of 2.1Ω at 27.5°C , and a resistance of 2.7Ω at 100°C . Determine the temperature coefficient of resistivity of silver. 2

3.

- (a) What is Wheatstone bridge? When is the bridge said to be balanced? Use Kirchhoff's rules to obtain conditions for the balanced condition in a Wheatstone bridge. 3
- (b) Obtain an expression for the energy stored in an inductor of self-inductance when the current through it grows from zero to I . 3
- (c) Derive an expression for path difference in Young's double slit experiment and obtain the conditions for constructive and destructive interference at a point on the screen. Hence find the expression for fringe width. 3
- (d) An electron of mass m and charge e is accelerated from rest through a potential V . Show that De Broglie wavelength of the electron is $=\frac{h}{\sqrt{2mV}}$. 3
- (e) Explain the working of a PN junction as a half-wave rectifier. 3
- (f) What is displacement current? Derive the expression for displacement current. 1+2=3
- (g) An electric dipole consists of two opposite charges each of $1\mu\text{C}$ separated by 2cm . The dipole is placed in an external uniform field of 10^5NC^{-1} . Find (i) the maximum torque exerted by the field on the dipole and (ii) the work done in rotating the dipole through 180° from the position $=0^\circ$. 3
- (h) State Gauss's law in electrostatics. Derive an expression for electric field at any point P due to a charged thin spherical shell. 3
- (i) State Huygen's principle. Deduce Snell's law using Huygen's principle. 3

Or

Describe the diffraction phenomenon by drawing a neat diagram.

4.

- (a) 1+1+1+2
- i. What do you mean by total internal reflection?
- ii. State Snell's law of refraction of light.
- iii. An object is held between two plane mirrors inclined at 45° to each other. What is the number of images formed?
- iv. Write the conditions for total internal reflection.

Or

Derive the lens formula $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$. Two lenses of power 6D and -2D are placed in contact. Find the power and focal length of the combination. 3+2=5

5. Describe the working of an A.C generator. Also draw the output waveform graph of the alternating emf produced.

Or

5

Define root mean square value of alternating current. Derive an expression for root mean square value of alternating current over a complete cycle. A $100\ \Omega$ resistor is connected to a 220V , 50Hz ac supply. What is the rms value of current in the circuit?

6. What is the basic principle of a moving coil galvanometer? How is a galvanometer converted into a voltmeter and an ammeter? Draw the relevant diagrams and find the resistance of the arrangement in each case. Take resistance of galvanometer as G .

Or

5

Derive the expression for force between two parallel currents. Two long and parallel straight wires A and B carrying currents of 8.0A and 5.0A in the same direction are separated by a distance of 4.0cm . Estimate the force on a 10cm section of wire A.

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