21ZOOC602   Reg No   :   ....

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc. SIXTH SEMESTER DEGREE EXAMINATION MAY 2024
ZOOLOGY

Environmental Biology, Wildlife Management and Conservation

Duration:2 Hours   **Max Marks:60**

SECTION - A

Answer the following strictly observing the internal choice provided: **4×5=20**

UNIT 1

1) Define Ecology. Add a note on scope of Ecology.

OR

2) Write a short note on cropland ecosystem.

UNIT 2

3) Write a short notes on effect of pollution on Animals.

OR

4) Write a short note on Biomagnification.

UNIT 3

5) Write any five applications of GIS and remote sensing in biodiversity conservation.

OR

6) Enumerate five critically endangered reptiles and critically endangered birds.

UNIT 4

7) Describe the salient features of Biological Diversity Act.

OR

8) Define In-Situ conservation. Explain with two examples.

SECTION - B

Answer the following strictly observing the internal choice provided: **4×10=40**

UNIT 1

9) Give an account of abiotic and biotic components of Grassland ecosystem.

OR

10) Define community stratification. Explain the types of stratification.

UNIT 2

11) Describe the prevention and control measures of air and water pollution.

OR

12) Describe the mechanism of formation of soil. Add a note on soil texture.

UNIT 3

13) With suitable examples explain home range and territory.

OR

14) Give an account of rare species of India.

UNIT 4

15) Give an account of Project Lion.

OR

16) Give an account of role of Governmental organizations in conservation of Wild Life.

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21ZOOC601   Reg No   :   ....

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc. SIXTH SEMESTER DEGREE EXAMINATION MAY 2024
ZOOLOGY
Evolutionary and Developmental Biology

Duration:2 Hours   **Max Marks:60**

SECTION - A

Answer the following strictly observing the internal choice provided: 4×5=20

UNIT 1

1) How adaptive radiation lead to the formation of sub species?

OR

2) Explain migration as an evolutionary force.

UNIT 2

3) Explain wildlife distruction as a major cause for species exinction.

OR

4) Write a note on incompleteness of fossil records.

UNIT 3

5) Define gametogenesis. Explain the types.

OR

6) Draw a neat labelled diagram of chick gastrula.

UNIT 4

7) Explain organogenesis in frog.

OR

8) Write a note on development of kidney in amphibians.

SECTION - B

Answer the following strictly observing the internal choice provided: 4×10=40

UNIT 1

9) Explain the various factors which supported theory of chemical evolution.

OR

10) Explain Macroevolution with suitable illustrations.

UNIT 2

11) Differnitiate between Eohippus and merychippus.

OR

12) Define Speciation. Explain the types with suitable illustrations.

UNIT 3

13) Explain genetic basis of embryonic development.

OR

14) Define Hardy Weinberg equilibrium. Explain the conditions for the maintenance and derive the binomial expression.

UNIT 4

15) Classify placenta based on foetal membranes involved and distribution of villi.

OR

16) Explain Modern synthetic theory of Evolution with suitable illustrations.

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CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc. SIXTH SEMESTER DEGREE EXAMINATION MAY 2024
STATISTICS
Statistical inference II

Duration:2 Hours   **Max Marks:60**

Answer any THREE of the following :   **(3×2= 06)**

1. Define statistical decision problem.

2. Write any two limitations of Bayes minimax decision rule.

3. There is a need for sequential testing. Justify.

4. State any two applications of Nonparametric tests.

5. Write the control limits of R chart when the standards are known.

Answer any FOUR of the following in not more than a page each :   **(4×6= 24)**

6. Explain the advantages and limitations of the squared error loss function in decision-making.

7. Obtain SPRTP to test $H_0:p=p_0$ against $H_1:p=p_1$ for a Binomial Population with parameter n and p.

8. Under Non Parametric Tests ,Derive a test statistic for Median Test.

9. Under Non Parametric Test ,Describe the test procedure for the application of Kruskal Walis H Test .

10. Distinguish between control charts for variables and attributes.

11. Briefly explain ATI and ASN. in single sampling plan.

Answer any THREE of the following in not more than two page each :   **(3×10= 30)**

12. Explain how the Bayesian decision principle incorporates prior beliefs or information into the decision-making process through Bayesian analysis and also write the advantages and limitations of Bayesian decision making.

13. Explain the relationship between ASN and OC functions in the SPRT and how can decision-makers utilize this relationship to optimize the design of SPRT?

14. Under Non Parametric Tests, derive two sample test statistic for Sign test. How do you apply it?

15. Stating the assumptions, derive the control limits of chart for defects when the standard value is known and unknown.

16. Distinguish between charts for average and variations. Make a comparative study of R and σ chart.

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CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc SIXTH SEMESTER DEGREE EXAMINATION MAY 2024
STATISTICS
Sampling Techniques and Statistics for National Development

Duration:2 Hours   **Max Marks:60**

Answer any THREE of the following :   **(3×2= 06)**

1. Explain Finite Population correction factor and Sampling fraction.

2. Define a measurement scale.

3. Obtain an unbiased estimator of Population mean under SRSWR.

4. State the necesssity of going for Circular Systematic Sampling.

5. Define Cluster Sampling.

Answer any FOUR of the following in not more than a page each :   **(4×6= 24)**

6. Briefly explain " A Good survey depends on well defined objectives and a well desighned questionnaire ".

7. Under SRSWR for attributes obtain an expression for Population mean , Sample mean, S^2 and s^2 in terms of population proportion.

8. Explain with an example Stratified Random sampling with and without Replacements.

9. Distinguish between Systematic and Stratified sampling Techniques with examples.

10. Obtain an expression for $V(\bar{y}_{sys})$ for a population with linear trend.

11. Describe the role of NSSO in the collecton of reliable information.

Answer any THREE of the following in not more than two page each :   **(3×10= 30)**

12. Discuss about various types of Reliability and the importance of testing the reliabiliy of the questionnaire.

13. Derive the formula for a small and large sample size in the estimation of population mean under SRSWR.

14. Under certain assumptions show that Stratified Sampling with Neymans Allocation is more efficient than Proportional Allocation which is more efficient than SRSWOR.

15. Under Systematic Sampling prove that $V(\bar{y}_r) = \frac{\sigma^2}{n}(1 + (n-1)\rho)$.

16. Compare Systematic and Stratified random sampling interms of intraclass correlation coefficient.

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21CSCC601   Reg No   :   ....

Duration:2 Hours   **Max Marks:60**

PART A

Answer any FIVE questions: (5×2= 10)

1) What is the purpose of i) nav ii) blockquote tags?

2) What is the usage of colgroup tag? Give an example.

3) How do you give radial gradient color in CSS? Give an example.

4) What is LDAP injection attack?

5) What is the purpose of slice() method in strings? Give an example.

6) What is the purpose of alert() method in JavaScript? Give an example.

PART B

Answer any FIVE questions :   (5×6= 30)

7) Write a note on a) FTP   b) SMTP   c) TCP/IP

8) Explain ordered list and unordered list with an example each.

9) Explain HTML form elements with an example.

10) Explain with an example   a) CSS Text Spacing   b) CSS Text Alignment
    c) CSS Text Transformation properties

11) What is XML? Explain with an example.

12) Explain function in JavaScript with an example.

PART C

Answer any TWO questions :   (2×10= 20)

13) Explain CSS 3D transform methods with an example.

14) Explain Logical and Bitwise operators in JavaScript with an example each.

15) Explain the life cycle of a Java Servlet with an example.

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CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc SIXTH SEMESTER DEGREE EXAMINATION MAY 2024
COMPUTER SCIENCE
Statistical Computing & R Programming

Duration:2 Hours   **Max Marks:60**

Answer any THREE of the following :   **(3×2= 06)**

1. Explain the function cumsum() in R with example.

2. List any two important features of a dataframe.

3. What are conditional and looping statements?

4. Define a) Null hypothesis and b) Alternative hypothesis.

5. State any two assumptions of Binomial distribution.

Answer any FOUR of the following in not more than a page each :   **(4×6= 24)**

6. How to create, name, access, merging array elements? Explain with examples.

7. Explain Quick sort implementation using Recursion.

8. Explain one way ANOVA and Chi-square test with an example.

9. Explain Nominal scale, Ordinal scale and Ratio scale with an example.

10. Briefly explain the scatter plot and histograms with examples? What are its importance?

11. Write a short note on a) Simple regression   b) Correlation matrix and c) Scatter diagram.

Answer any THREE of the following in not more than two page each :   **(3×10= 30)**

12. Which are the functions used to add points, lines, text, arrows and legend to the plot? Explain each function with an example.

13. Explain functions for accessing the keyboard and monitor, reading and writing files.

14. Calculate the product moment coefficient of correlation for the following data:

x	12	14	16	18	20	22	24	26	28	30
y	36	33	30	27	24	21	18	15	12	9

15. Calculate the mean deviation from mode for the following data.

Class Interval	0-2	2-4	4-6	6-8	8-10	10-12
Frequency	220	345	452	280	63	10

16. What is prbobability distribution? Explain.

a) Marginal probability   b) Joint probability and   c) Conditional probability

distributions with an example.

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CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc. SIXTH SEMESTER DEGREE EXAMINATION MAY 2024
MICROBIOLOGY
INDUSTRIAL MICROBIOLOGY

Duration:2 Hours   **Max Marks:60**

SECTION - A

Answer the following strictly observing the internal choice provided: **4×5=20**

UNIT 1

1) Define stock culture. Write briefly on dried cultures and Silica Gel storage.

OR

2) Define scale up of fermentation process and list the merits of scale up process.

UNIT 2

3) Write a short note on C.S.L.

OR

4) Write briefly on packed bed bioreactor and airlift bioreactor. List out their applications.

UNIT 3

5) Define Down Stream Processing. Write a short note on filteration methods used in down stream processing.

OR

6) Write a short note on screening of microbes in industries.

UNIT 4

7) Write a short note on Citric acid production in industries.

OR

8) Write a note on Cess Pool.

SECTION - B

Answer the following strictly observing the internal choice provided: **4×10=40**

UNIT 1

9) Write in detail about selection pressure and selection criteria in selection of microbes.

OR

10) Explain in detail about Fed Batch fermentation.

UNIT 2

11) Draw a neat labelled diagram of a fermentor and explain about the product recovery using vacuum drum dryer in a fermentor.

OR

12) Define a Bioreactor and explain in detail the function of all the parts.

UNIT 3

13) Explain in detail concentration of macromolecules by precipitation.

OR

14) Define formulation. Write in detail about protein formulation using freeze drying method.

UNIT 4

15) List the criteria for Penicillin production and write in detail about culture maintainance and product media.

OR

16) Explain in detail about amylase production in industries.

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21MICC601   Reg No   :   ....

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc SIXTH SEMESTER DEGREE EXAMINATION MAY 2024
MICROBIOLOGY
IMMUNOLOGY AND MEDICAL MICROBIOLOGY

Duration:2 Hours   **Max Marks:60**

SECTION - A

Answer the following strictly observing the internal choice provided: **4×5=20**

UNIT 1

1) Write a short note on morphology and cultural characters of *Vibrio cholerae.*

OR

2) Write a short note on normal flora of intestinal tract.

UNIT 2

3) Write a short note on Zidovudine.

OR

4) List the factors affecting antimicrobial control.

UNIT 3

5) Write a note on factors affecting innate immunity.

OR

6) Write a short note on Spleen.

UNIT 4

7) Write a brief note on classification of Hypersensitivity.

OR

8) Write a short note on IgM.

SECTION - B

Answer the following strictly observing the internal choice provided: **4×10=40**

UNIT 1

9) Describe the morphology, cultural characters and pathogenesis of *Streptococcus pyogenes.*

OR

10) Describe the toxins and pathogenesis of *Escherichia coli.*

UNIT 2

11) List the antibacterial antibiotics and describe any four in general.

OR

12) Describe in detail on the development of drug resistance in microbes.

UNIT 3

13) Explain the mechanism of cell mediated and humoral immune response.

OR

14) Explain the types of immune response.

UNIT 4

15) Describe the lattice hypothesis for precipitation.

OR

16) Describe slide and tube agglutination reactions with examples.

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CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc. SIXTH SEMESTER DEGREE EXAMINATION MAY 2024
MATHEMATICS
Numerical Analysis

Duration:2 Hours   **Max Marks:60**

PART - A

I. Answer any 6 questions. Each question carries 2 marks: **(2×6= 12 Marks)**

a. Round off the following number to 3 decimal places and 3 significant figures :

   (i)38.46235 (ii)0.70029

b. Find an interval of unit length in which the equation $x^3 - 18 = 0$ has a real root.

c. (i) What is the degree of interpolating polynomial which interpolates 6 distinct points?

   (ii) When is Lagrange's interpolation formula specially used?

d. If $y_1 = 4, y_3 = 12, y_4 = 19, y_x = 7$, then find x.

e. Write the formula for $\frac{dy}{dx}$ at $x = x_0$ when Newton's forward difference formula is used.

f. Find the approximate value of $\int_0^1 \frac{dx}{x+1}$ correct to 3 decimal places, using trapezoidal rule with $h = 0.5$

g. If $y' = x + y, y(0) = 0$, find $y(0.2)$ using Euler's method with $h = 0.2$.

h. (i) What is the order of error in Runge-Kutta method of order 2?

   (ii) In Runge-Kutta fourth order formula $y_1 = y_0 + \frac{1}{6}[k_1 + 2k_2 + 2k_3 + k_4]$, write the expression for k_2.

PART - B

2. Answer any 2 questions. Each question carries 6 marks: **(6×2= 12 Marks)**

a. Find a real root of the equation $x^3 - x - 4 = 0$ by bisection method, correct to 3 decimal places.

b. Find a real root of the equation $2x = \cos x + 3$ correct to 3 decimal places by iteration method, choose $x_0 = \frac{\pi}{2}$

c. Solve the following system of equations by Gauss Jordan method :

$$5x - 2y + z = 4$$
$$7x + y - 5z = 8$$
$$3x + 7y + 4z = 16$$

d. Solve the following system of the equation by Gauss-Jacobi method , carry out 3 iterations.

$$10x + 2y + z = 9$$
$$2x + 20y - 2z = -44$$
$$- 2x + 3y + 10z = 22$$

PART - C

3. Answer any 2 questions. Each question carries 6 marks: (6×2= 12 Marks)

a. Derive the Newton's backward differeence formula to interpolate the set of points $(x_0, y_0), (x_1, y_1), \ldots, (x_n, y_n)$

b. The following values are taken from the table of cubes. Find $(6.36)^3$.

x	6.1	6.2	6.3	6.4	6.5	6.6	6.7
y	226.981	238.328	250.047	262.144	274.625	287.496	300.763

c. Using Lagrange's interpolation formula, express the function $\frac{x^2+x-3}{x^3-2x^2-x+2}$ as the sum of partial fractions .

d. Certain corresponding values of x and $\log_{10} x$ are $(300, 2.4771), (304, 2.4829), (305, 2.4843), (307, 2.4871)$. Find $\log_{10} 301$ using divided difference.

PART - D

4. Answer any 2 questions. Each question carries 6 marks: (6×2= 12 Marks)

a. From the following table of values of x and y , find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ when $x = 1$.

x	0	1	2	3	4	5	6
y	6.9897	7.4036	7.7815	8.1291	8.4510	8.7506	9.0309

b. Derive Simpson's $\frac{1}{3}$rd rule to evaluate $\int_{x_0}^{x_n} f(x)dx$

c. Compute the value of $\int_0^1 \frac{dx}{1+x}$ by Simpson's rule with 8 strips. Also compare the result with the true value.

d. (i) Find, from the following table, the area bounded by the curve and the x−axis from $x = 7.47$ to $x = 7.52$

x	7.47	7.48	7.49	7.50	7.51	7.52
y	1.93	1.95	1.98	2.01	2.03	2.06

(ii) The velocity of the car(running on straight road) at intervals of 2 minutes are given below:

Time(min)	0	2	4	6	8	10	12
Velocity(km/hr)	0	22	30	27	18	7	0

Apply Simpson's rule to find the distance covered by the car.

PART - E

5. Answer any 2 questions. Each question carries 6 marks: (6×2= 12 Marks)

a. Solve $y' - 1 = xy, y(0) = 1$ and also find $y(0.1)$ correct to 4 decimal places by Taylor series method (upto 4th degree term).

b. Determine the value of y when $x = 0.1$, given $y' = x^2 + y, y(0) = 1$, using Euler's modified method. Take $h = 0.05$

c. Given $y' = y - x, y(0) = 2$, find $y(0.1)$ using Runge-Kutta fourth order formula taking $h = 0.1$

d. With usual notation, derive Adam-Bashforth formula.

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CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc. SIXTH SEMESTER DEGREE EXAMINATION MAY 2024
MATHEMATICS
Linear Algebra

Time: 2 Hrs.   Max. Marks: 60

PART – A

Answer any SIX questions.   2×6=12

1) Prove that union of two subspaces of a vectorspace V need not be a subspace of V with an example.
2) Determine whether the set $\{(1,2,\ 1),(3,4,-7),(3,1,5)\}$ is a basis of $V_3(R)$.
3) Find a linear transformation $f: R^2 \to R^2$ if $f(1,0) = (1,1)$ and $f(0,\ 1) = (-1,2)$.
4) If $T: V \to W$ is a linear transformation then prove that $N(T)$ is a subspace of V.
5) Find the eigen values and corresponding eigenvectors of the identity linear transformation.
6) Show that 0 is an eigenvalue of T if and only if T is singular.
7) Let $V = R^3$ and let $v_1 = (1,0,2),\ \ v_2 = (0,3,1)$. Find a normal vector in V orthogonal to both v_1 and v_2
8) Define an orthonormal set.

PART – B
UNIT - I

Answer any TWO questions.   2× 6=12

1) Prove that in an n dimensional vectorspace $V(F)$ any $(n + 1)$ elements of V are linearly dependant and no set of $(n - 1)$ elements can span V.
2) Show that the set $B = \{(1,1,0),(1,0,1),(0,1,1)\}$ is a basis of vectorspace $V_3(R)$.
3) Express the vector $(2,-1,-8)$ as a linear combination of the vectors $\{(1,2,1)(1,1,-1)(4,5,-2)\}$.
4) Determine whether the polynomial $3x^2 + x + 5$ is the linear span of the set $S = \{x^3, x^2 + 2x, x^2 + 2, 1 - x\}$ of vectorspace of all polynomials over the field R.

UNIT - II

Answer any TWO questions.   2× 6=12

1) If $T: V_2(R) \to V_2(R)$ is defined by $T(x,y) = (x\cos\theta - y\sin\theta, x\sin\theta + y\cos\theta)$ then prove that T is a linear transformation.
2) Find the matrix of the linear transformation $T: V_3(R) \to V_2(R)$ defined by $T(x,y,z) = (x + y, y + z)$ relative to the basis $B_1 = \{(1,1,1),(1,0,0),(1,1,0)\}$ of $V_3(R)$ and $B_2 = \{(1,0),(0,1)\}$ of $V_2(R)$.
3) If $T: V \to W$ is a linear transformation and V is a finite dimensional vectorspace then prove that $r(T) + n(T) = dimV$.
4) If $T: U \to V$ is a linear transformation then prove that $T(c_1\alpha_1 + c_2\alpha_2 + \dots c_n\alpha_n) = c_1T(\alpha_1) + c_2T(\alpha_2) + \dots + c_nT(\alpha_n)$

UNIT - III

Answer any TWO questions.   2× 6=12

1) If λ is an eigen value of an invertible transformation T then show that λ^{-1} is the eigenvalue of T^{-1}.

2) If V is a vectorspace of dim n then prove that the linear transformation $T: V \rightarrow V$ can have atmost n distinct eigen values.

3) Prove that the set of all eigenvectors associated with the eigen value λ of a linear transformation T together with zero vector is a subspace of the vectorspace.

4) Let $T: V \rightarrow V$ be a linear transformation on a vector space V over F. Then prove that $\lambda \in F$ is an eigenvalue of T if and only if the transformation T-λI is singular.

UNIT - IV

Answer any TWO questions.   2× 6=12

1) If u, v $\in$V then prove that $|(u,v)| \leq \|u\| \|v\|$.

2) If $T: V \rightarrow W$ is a linear map and $dim(v) = dim(w) = n$ then prove that T is nonsingular if and only T transforms linearly independent vectors of V into linearly independent vectors of W.

3) Prove that $w^{\perp}$ is a subspace of V.

4) If $T: V \rightarrow W$ is non singular linear map then prove that $T: V \rightarrow W$ is linear and bijective.

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CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc. SIXTH SEMESTER DEGREE EXAMINATION MAY 2024
CHEMISTRY
Inorganic & Physical chemistry IV

Duration:2 Hours   **Max Marks:60**

PART - A

I. Answer any Six from the following: **(2×6= 12 Marks)**

1. On the basis of VBT, write the hybridisation and magnetic properties of $[Fe(CN)_6]^{4-}$?

2. Draw the splitting of d orbitals in square planar complex according to crystal field splitting?

3. What is d-d transition?

4. State Laporte-selection rule.

5. What is Thermogravimetry?

6. Write the reduced phase rule equation and explain the terms.

7. Calculate the EMF of the concentration cell consisting of copper electrodes, one immersed in a solution of 0.05M concentration and the other 0.5M concentration of its ions at 25°C.

8. What are immiscible liquid mixtures? Give an example.

PART - B

II. Answer any SIX of the following choosing at least one question from each unit:

(6×8= 48 Marks)

UNIT I

9. a) Explain the determination of magnetic susceptibility by Gouy's method?
   b) Explain the application of complexes in semimicro analysis. (4+4)

10 a) Derive the relationship between stepwise formation constant and overall formation constant.
   b) What is meant by trans effect? Explain one application of trans effect. (5+3)

UNIT II

11. a) Write the conditions for orbital contribution or quenching of orbital angular moment?

b) Write the application of magnetic moments data of 3d metal complexes predicting geometry of the compex? (4+4)

12 a) Write the characteristics of charge transfer spectra.

b) Explain the two types of charge transfer spectra. (4+4).

UNIT III

13. a) With the help of a neat diagram explain the phase diagram of Water system.

b) Determine the numberof phases, number of components and Degree of freedom in the following system: $CaCO_3(s) \rightarrow CaO\ (s) + CO_2(g)$ (5+3)

14. a) Explain the TGA and DTA curves.

b) Explain the instrumentation of DTA. (4+4)

UNIT IV

15. a) Discuss the construction and working of a calomel elecrtrode

b) Explain briefly the different types of electrodes. (4+4)

16. a) Explain the determination of the strength of Mohrs salt solution using potassium dichromate by potentiometry.

b) Derive the relationship between EMF and equlibrium constant. (4+4)

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CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc. SIXTH SEMESTER DEGREE EXAMINATION MAY 2024
CHEMISTRY
Organic Chemistry & Spectroscopy II

Duration: 2 Hours   **Max Marks:60**

PART - A

I. Answer any Six from the following: **(2×6= 12 Marks)**

1. How is propanoic acid prepared from DEM?

2. Write the preparation of antipyrine from AAE.

3. What is isoelectric point?

4. What are the diseases caused by the deficiency of pantothenic acid and VitaminK.

5. Write the structure of Vitamin A and Vitamin C.

6. Calculate the value of einstein of energy for radiation of length 400 nm.

7. What is spin – spin coupling?

8. How many signals are obtained for ethyl alcohol in NMR spectrum?

PART - B

II.Answer any SIX of the following choosing at least one question from each unit:

(6×8= 48 Marks)

UNIT I

9. a) How is succinic acid prepared from DEM ?

   b) Explain the preparation of Grignard reagent.

10 a) What is Claisen condensation? Give the mechanism of the reaction?

   b) Give the synthesis of acetone from DEM. (5+3)

UNIT II

11. a) Explain the different types of protein structure.

    b) How is the C-terminal end of a protein analysed? (5+3)

12. a) Explain solution phase peptide synthesis with a suitable example.

    b) Explain the role of protecting groups in peptide sythesis. (5+3)

UNIT III

13. a) Explain the reactions of aldehydes and ketones with methyl lithium.

    b) Explain the reaction of aldehydes and ketones with Grignard reagent. (4+4)

14. a) Draw and explain Jablonski diagram.

    b) Compare fluoroscence and phosphorescence. (5+3)

UNIT IV

15. a) What is chemical shift and explain the factors affecting chemical shift?

    b) Explain the PMR spectrum of 1,1,2-tribromoethane. (4+4)

16. a) Explain the theory of Mass spectrometry.

    b) What are chemically equivalent protons? Give examples. (4+4)

CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc SIXTH SEMESTER DEGREE EXAMINATION MAY 2024
BOTANY
Plant physiology and plant biochemistry

Duration:2 Hours　　　　　　　　　　　　　　　　**Max Marks:60**

I. Answer any Five of the following :　　　　　　　　**(5×2= 10 Marks)**

1. Mention two physiological roles of Phosphorous in plant metabolism.

2. What is Geotropism?

3. What are the significances of Cyclic Photophosphorylation?

4. What is Emerson effect?

5. Why Glucose and Fructose are considered reducing sugars?

6. What are Co- Enzymes? Give two exampes.

7. What is Scarification?

8. What are photo neutral plants? Give an example.

II. Answer any FOUR of the following :　　　　　　　**(4×5= 20 Marks)**

9. What is diffusion? Explain the factors affecting diffusion. Add a note on the uses of imbibition to plants.

10. Explain K+ ion exchange theory.

11. Write a note on i) Apical dominance   ii) *Gibberella fujikuroi*

12. Explain the role of Auxins in plant growth.

13. Write a short note on Phototropism and Thigmotropism.

14. Give the schematic representation of Krebs cycle.

15. What are Proteins? Mention its functions.

16. Explain the Lock and Key model of enzyme action.

III. Answer any THREE of the following :　　　　　　**(3×10= 30 Marks)**

17. Define   i) Photoperiodism   ii) Geotropism   iii) Bud dormancy
    iv) Ripening hormone   v) Anti- gibberellin

18. Explain the carbohydrate metabolism in terms of Sucrose and Starch.

19. Describe the Nitrogen cycle.

20. Describe the biosynthesis of Lipids.

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CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc SIXTH SEMESTER DEGREE EXAMINATION MAY 2024
BOTANY
Cell biology

Duration:2 Hours   **Max Marks:60**

I. Answer any Five of the following :   (5×2= 10 Marks)

1. Mention any two plastids with one function each.

2. Which model provides details on structure of plasma membrane ? Who proposed it?

3. Define Glycosylation. Mention its types

4. What are Ergastic substances? Give two examples.

5. Give the significance of mitosis

6. Differentiate between Euchromatin and Heterochromatin.

7. Define Translation. Mention the steps involved.

8. Mention any two function of tRNA.

II. Answer any FOUR of the following :   (4×5= 20 Marks)

9. Describe the ultrastructure of Mitochondrion.

10. Write a note on charecteristic of prokaryotic and Eukaryotic cells

11. Write a note on active and passive transport.

12. Write a note on symetrical model of ribosomes

13. Write a Note on Synaptonemal complex.

14. Explain different stages of prophase I of meosis

15. What are the properties of a genetic material?

16. Write a note on Prokaryotic promoters.

III. Answer any THREE of the following :   (3×10= 30 Marks)

17. Write a note on the Lac operon model.

18. Explain primary and secondary signal transduction Pathway

19. Explain transcriptional and post-transcriptional gene regulation in Prokaryotes.

20. With a neat labelled diagram explain different types of DNA

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CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc SIXTH SEMESTER DEGREE EXAMINATION MAY 2024
PHYSICS
Elements of condensed matter and nuclear physics

Duration:2 Hours   **Max Marks:60**

PART - A

Answer any five questions, selecting minimum of one question from every unit :   5×9=45

UNIT I

1   a) What are the limitations of Einstein's theory of specific heat of solids?

   b) Assuming the expression for density of energy states, arrive at an expression for Fermi energy at 0 K.   **(2+7)**

2   a) Give the essential features for the failure of Langevin's theory of paramagnetism.

   b) Describe how Hall coefficient can be determined experimentally.   **(2+7)**

UNIT II

3   a) What are the steps involved for finding the Miller indices of a given plane of a crystal?

   b) Draw the diagram of Bragg's spectrometer and explain how it is used to determine the wavelength of X-rays.   **(2+7)**

4   a) Explain the origin of characteristic X-rays.

   b) Explain the applications of superconductivity.   **(2+7)**

UNIT III

5   a) What is the principle of an atom bomb and a nuclear reactor?

   b) Explain the terms mass defect, binding energy and binding energy per nucleon. Also discuss graphically the variation of average binding energy per nucleon with mass number.   **(2+7)**

6   a) Explain why chain reaction cannot be maintained in natural uranium?

   b) Explain Yukawa's meson field theory and explain how the rest mass of a meson can be estimated using uncertainty principle.   **(2+7)**

UNIT IV

7. a) What are linear and orbital accelerators? Explain.

    b) Describe the construction and working of a betatron and hence arrive at the expression for the energy gained by the electron. (2+7)

8. a) State and explain the range and energy of an α particle.

    b) Draw a labelled diagram of a semiconductor detector and explain its working. What are its advantages? (2+7)

PART - B

Answer any three questions 3×5= 15

9. The Debye temperature of Carbon is 1850 K. Calculate its specific heat per K mole for diamond at 20 K. Also compute the highest lattice vibration frequency $(R = 8.31 \times 10^3 \text{ J/Kmole/K})$

10. Calculate the smallest grazing angle at which the monochromatic X - ray of wavelength $1.549A^0$ will be reflected from a quartz crystal which has as atomic spacing $d= 4.255A^0$. What is the highest reflecting order that could be observed with this radiation?

11. Alpha disintegration energy of $^{88}Ra_{226}$ is 1.01 MeV. Calculate kinetic energy of alpha particles and the created daughter nucleus.

12. In a linear accelerator protons are accelerated. The velocity of the proton in the first drift tube is 4.7×10^6 m/s and the length of the orbit tube is 1 m. What would be the energy of the protons emerging out of the fourth drift tube? Also find the length of the fourth drift tube. Mass of the proton = 1.67×10^{-27} kg.

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CHOICE BASED CREDIT SYSTEM SEMESTER SCHEME
B.Sc. SIXTH SEMESTER DEGREE EXAMINATION MAY 2024
PHYSICS
Electronic instrumentation and sensors

Duration:2 Hours   **Max Marks:60**

PART - A

Answer any five questions, selecting minimum of one question from every unit :   5×9=45

UNIT I

1   a) Mention the disadvantage of DC voltmeter.

   b) Define efficiency and ripple factor of a bridge rectifier and derive the expressions for the same.   **(2+7)**

2   a) Mention the applications of rectifier.

   b) Draw the block diagram of a CRO. Mention its applications.   **(2+7)**

UNIT II

3   a) Draw the diagram for delta configuration and give the expression for line current.

   b) Define power transmission in three phase system and find the relationship between line voltage and phase voltage in star connection.   **(2+7)**

4   a) Draw the diagram for delta configuration and give the expression for power consumed.

   b) Define line and phase voltages. Show that line voltage is $\sqrt{3}$ times the phase voltage in star configuration.   **(2+7)**

UNIT III

5   a) Draw wave forms to show the formation of FM wave by the carrier wave and modulating signal.

   b) Describe AM radio receiver with a block diagram.   **(2+7)**

6   a) Give any two advantages of FM.

   b) Explain the working of a colour TV transmitter with a block diagram.   **(2+7)**

UNIT IV

7   a) Give any two examples for Mechanical transducers.

    b) Define resistive thermometer. Mention its advantages and disadvantages. (2+7)

8   a) What are active transducers? Give an example.

    b) Explain Piezo-electric transducers and their advantages.   (2+7)

PART - B

Answer any three questions: 3×5= 15

9   A bridge rectifier has a transformer secondary voltage 30Vrms. If supplied power to load resistance 1500Ω and diode forward resistance 15Ω
    Calculate (i) output voltage (ii) rectifier efficiency.

10 3 impedance coils of (20+15j)Ω are connected in star connection. 3 phase line voltage of 400V, 50 Hz supply. Calculate the line current, total power and power factor.

11 Calculate the modulation factor of a AM wave if the maximum peak to peak voltage is 8 mV and the minimum peak to peak voltage is 2 mV. Using this value, determine the total power of the Am wave is power of the carrier wave is 3 KW.

12 A 20 V, 500 mW zener diode is used for providing a 20 V suitable supply to a variable load. If the input voltage is 32 V calculate the following
    (i) value of swerries resistance required (ii) the diode current when R_L is 2.4kΩ.
    (iii) the minimum value of R_L that can be connected across the regulator.

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