No. of Printed Pages : 2

21BSC4L1LK4

B.Sc./B.C.A./G.M.T. IV Semester Degree Examination, September/October - 2023

102443

ಕನ್ನಡ (ಬೇಸಿಕ್)

ವಿಜ್ಞಾನ ವಿಜಯ – 4 ಭಾಷಾಪಠ್ಯ

(NEP)

Time : 2 Hours | Maximum Marks : 60

ಸೂಚನೆ : ಭಾಷೆ ಹಾಗೂ ಬರಹದ ಶುದ್ಧಿಗೆ ಗಮನ ಕೊಡಲಾಗುವುದು.

ವಿಭಾಗ – ಎ

1. ಕೆಳಗಿನ **ಎಲ್ಲಾ** ಪ್ರಶ್ನೆಗಳಿಗೆ ಉತ್ತರಿಸಿರಿ. **10x1=10**

(a) ನಿಮ್ಮ ಪಠ್ಯಕ್ಕಿರುವ ಜಂಬಣ್ಣ ಅಮರಚಿಂತ ಅವರ ಪದ್ಯದ ಹೆಸರೇನು ?
(b) 'ಮಾರಿಕೊಂಡವರು' ಕತೆಯಲ್ಲಿ ಬರುವ ಲಕ್ಷ್ಮಿಯ ಗಂಡನ ಹೆಸರೇನು ?
(c) ಲಕ್ಷ್ಮೀಧರ ಅಮಾತ್ಯನ ಶಾಸನವನ್ನು ಹಾಕಿಸಿದವರು ಯಾರು ?
(d) ನೀತಿವಂತ ಕತೆಯಲ್ಲಿ ಬರುವ ಸುರೇಂದ್ರ ಯಾರಿಗೆ ಮನೆಪಾಠ ಹೇಳಿಕೊಡುತ್ತಿದ್ದ ?
(e) ಪು.ತಿ.ನ. ಅವರ ಸಂಪೂರ್ಣ ಹೆಸರೇನು ?
(f) 'ಮೃಗ ಮತ್ತು ಸುಂದರಿ' ಕತೆಯಲ್ಲಿ ಬರುವ ವರ್ತಕನಿಗೆ ಎಷ್ಟು ಮಂದಿ ಹೆಣ್ಣು ಮಕ್ಕಳಿದ್ದರು ?
(g) 'ಕಿಂಗ್‌ಲೀಯರ್' ನಾಟಕ ಕತೆಯಲ್ಲಿ ಬರುವ ಲೀಯರ್‌ನ ಕಿರಿಯ ಮಗಳ ಹೆಸರೇನು ?
(h) ಸುಭದ್ರಮ್ಮ ಮನ್ಸೂರ್ ಅವರು ಯಾವ ಜಿಲ್ಲೆಯಲ್ಲಿ ಜನಿಸಿದರು ?
(i) ಅಂಬೇಡ್ಕರ್ ಅವರು ಅರ್ಥಶಾಸ್ತ್ರದಲ್ಲಿ ಪಿ.ಹೆಚ್.ಡಿ. ಪದವಿ ಪಡೆದ ವಿಶ್ವವಿದ್ಯಾಲಯದ ಹೆಸರೇನು ?
(j) ಧಾರ್ಮಿಕ ಮತ್ತು ಸಾಮಾಜಿಕ ಕ್ರಾಂತಿಯನ್ನು ಮಾಡಿದ 12ನೇ ಶತಮಾನದ ವಚನಕಾರ ಯಾರು ?

ವಿಭಾಗ – ಬಿ

ಕೆಳಗಿನ **ಯಾವುದಾದರೂ ನಾಲ್ಕು** ಪ್ರಶ್ನೆಗಳಿಗೆ ಉತ್ತರಿಸಿರಿ. **4x5=20**

2. 'ಇಲ್ಲಿ ಮಕ್ಕಳು ಅಳುವುದಿಲ್ಲ' ಕವಿತೆಯಲ್ಲಿ ವ್ಯಕ್ತವಾದ ಉದ್ಯೋಗಸ್ಥ ಮಹಿಳೆಯರ ಮಕ್ಕಳ ಕುರಿತು ವಿವರಿಸಿರಿ.

3. ಡಾ. ಚಂದ್ರಶೇಖರ ಕಂಬಾರ ಅವರ 'ಕಾಯುತ್ತೇವೆ' ಕವನದ ಆಶಯವನ್ನು ವಿವರಿಸಿರಿ.

4. 'ಕಣಿವೆಯ ಮುದುಕ' ಪದ್ಯದಲ್ಲಿ ಕವಿ ಮತ್ತು ಮುದುಕನ ನಡುವಿನ ಸಂವಾದ ಕುರಿತು ಬರೆಯಿರಿ.

5. 'ಕಿಂಗ್‌ಲೀಯರ್' ನಾಟಕ ಕತೆಯಲ್ಲಿ ನಿಮಗಿಷ್ಟವಾದ ಪಾತ್ರದ ಕುರಿತು ವಿವರಿಸಿರಿ.

6. ರಾಷ್ಟ್ರೀಯ ಮಹಿಳಾ ಆಯೋಗದ ಕುರಿತು ಬರೆಯಿರಿ.

7. ಲಕ್ಷ್ಮೀದರ ಅಮಾತ್ಯನ ಶಾಸನದ ಆಶಯದ ಕುರಿತು ಬರೆಯಿರಿ.

P.T.O.

ವಿಭಾಗ – ಸಿ

ಕೆಳಗಿನ **ಯಾವುದಾದರೂ ಮೂರು** ಪ್ರಶ್ನೆಗಳಿಗೆ ಉತ್ತರಿಸಿರಿ. **3x10=30**

8. 'ಮಾರಿಕೊಂಡವರು' ಕತೆಯಲ್ಲಿ ಬರುವ ಕಿಟ್ಟಪ್ಪ ಪಾತ್ರದ ಬಗ್ಗೆ ಬರೆಯಿರಿ.

9. 'ನೀತಿವಂತ' ಕತೆಯಲ್ಲಿ ಬರುವ ಸುರೇಂದ್ರನ ನಯವಂಚನೆಯ ಕುರಿತು ಬರೆಯಿರಿ.

10. ಶ್ರೀಸಾಮಾನ್ಯನ ಪರಿಸ್ಥಿತಿಯನ್ನು ಕೆ.ಎಸ್. ನಿಸಾರ್ ಅಹಮದ್ ಅವರು ಹೇಗೆ ವರ್ಣಿಸಿದ್ದಾರೆ ಎಂಬುದನ್ನು ನಿಮಗಿಟ್ಟಿರುವ ಪಠ್ಯದ ಹಿನ್ನೆಲೆಯಲ್ಲಿ ಚರ್ಚಿಸಿರಿ.

11. ಕಿಂಗ್‌ಲೀಯರ್ ನಾಟಕ ಕತೆಯಲ್ಲಿ ಬರುವ ದೊರೆ ಲೀಯರ್‌ನ ಕಿರಿ ಮಗಳು ಕಾರ್ಡಿಲೀಯಳ ಬಗ್ಗೆ ಬರೆಯಿರಿ.

12. ಬಸವ–ಮಾರ್ಕ್ಸ್–ಅಂಬೇಡ್ಕರ್ ಅವರನ್ನು ಈ ಹೊತ್ತು ಓದಲೇಬೇಕಾದ ಅನಿವಾರ್ಯತೆ ಕುರಿತು ಬರೆಯಿರಿ.

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No. of Printed Pages : 2

21BSC4L2LE4

B.Sc./B.C.A./GMT IV Semester Degree Examination, September/October - 2023

BASIC ENGLISH

102851

(NEP)

Time : 2 Hours | Maximum Marks : 60

SECTION - A

I. Answer the following questions in a word, phrase or a sentence each. **10x1=10**

1. Name two Bee Keepers at the Bee Cooperative Society in Carvalho.
2. Which creature was thought to be extinct in the Novel ?
3. Mention the gender identity of Laxmi Narayan Tripathi.
4. With whom does Sugatha Kumari compare the night rain, in the first stanza ?
5. Mention the names of Japanese architects who introduced Pechakucha Presentation ?
6. Define Group Discussion.
7. When do you send an apology mail ?
8. What is an appreciation mail ?
9. Who is the present CEO of Twitter ?
10. Define Blog.

SECTION - B

II. Answer **any four** of the following. **4x5=20**

11. Describe the bee attack at the Independence day celebration in Carvalho.

12. Why does the man want to abandon the cat in the poem "Cat" ?

13. Describe the evaluation procedure in a project based school as mentioned in the Ted Talk by Trish Mallines Dzico.

14. Explain the process of Group Discussion.

15. Miss Anita, a Staff Nurse at St. Mary's Hospital has misplaced a patient's file. She composes an apology mail to her head. Compose the apology mail in this context.

16. Explain the uses of a "Blog".

SECTION - C

III. Answer **any three** of the following : **3x10=30**

17. Discuss Mandanna's involvement in the illicit brewing, the arrest and the release.

18. Discuss the poem "Night Rain" from feminist perspective.

19. How do you prepare for an effective Public Speech ? Explain.

20. Imagine you are a teacher. How do you appreciate the successful completion of a project work by a student ? Compose an E-mail.

21. How do you differentiate between Twitter and Facebook ? Explain the advantages and disadvantages of both.

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No. of Printed Pages : 2

21BSC4L2LH4

B.Sc./B.C.A./GMT IV Semester Degree Examination, September/October - 2023
HINDI BASIC AECC
IV : Study of Indian Language
(NEP)

100277

Time : 2 Hours | Maximum Marks : 60

नोट : *लिखावट शुद्ध और देवनागरी लिपि में हो।*

पठित पुस्तकें : (1) रानी नागफनी की कहानी (2) मानक हिन्दी

I. **किन्हीं दस** प्रश्नों को चुनकर उत्तर लिखिए। **10x1=10**

1. अस्तभानु के पिताजी का नाम क्या है?
2. नागफनी की सहेली का नाम क्या है?
3. नागफनी किसके लिए आत्महत्या करना चाहती है?
4. किसके होंठ कानों तक फटे हुये थे?
5. नागफनी के पिताजी का नाम क्या है?
6. मुफतलाल ने प्रेमपत्र किसके सहायता से भेजने का उपाय ढूँढा था?
7. नागफनी उपन्यास के लेखक का नाम क्या है?
8. हिन्दी दिवस कब मनाते हैं?
9. हिन्दी किस लिपि में लिखी जाती है?
10. संविधान के परिच्छेद 343 के अंदर क्या लिखा गया है?
11. हिन्दी कार्यान्वयन के लिए देश को भाषा के आधार पर कितने वर्गों में विभाजित किया गया है?

II. **किन्हीं दो** की संदर्भ सहित व्याख्या कीजिए। **2x5=10**

1. ''डॉक्टर साहब रोग के अनुसार दवाएँ बनती हैं या दवाओं के अनुसार रोग होते हैं।''
2. ''कुमार कितना खतरा झेलकर कला की साधना की जाती है। इस संगीत सम्राट को अगर प्यास लगी हो, तो शाम को 'पा' कहेंगे और सवेरे 'नी'-'पानी' कहने में पूरे बारह घंटे लग जाते हैं।''
3. ''मुख्य अमात्यजी, यह मेरा मित्र है। मैं सारा काम इसकी सलाह से करता हूँ। जब मैं राजा बनूँगा तब यह आपके ही जैसा मुख्य अमात्य होगा। आप इससे क्षमा माँगिए।

P.T.O.

III. **किन्हीं दो** प्रश्नों के उत्तर लिखिए। **2x5=10**

1. राष्ट्रभाषा पर विस्तार से एक लेख लिखिए।
2. मुफतलाल का चरित्र-चित्रण कीजिए।
3. लेखक हरिशंकर परसाई का व्यक्तित्व और कृतित्व पर प्रकाश डालिए।
4. करेलमुखी पात्र का वर्णन कीजिए।

IV. **किन्हीं तीन** प्रश्नों के उत्तर लिखिए। **3x10=30**

1. राजभाषा किसे कहते हैं? उसके अधिनियमों के बारे में विस्तार से लिखिए।
2. रानी नागफनी की कहानी उपन्यास की कथावस्तु अपने वाक्यों में लिखिए।
3. रानी नागफनी की कहानी उपन्यास में चित्रित व्यंग्य के बारे में विस्तार से लिखिए।
4. बोली, विभाषा, तथा बोलचाल की भाषा पर प्रकाश डालिए।

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No. of Printed Pages : 2

21BSC4C4PHL

B.Sc. IV Semester Degree Examination, September/October - 2023

PHYSICS

IV : Thermal Physics and Electronics

(NEP)

101192

Time : 2 Hours | Maximum Marks : 60

Note : *(i) Answer **all** sections.*

(ii) Non-programmed scientific calculators are allowed.

SECTION - A

1. Answer the following Sub-questions, each Sub-question carries **one** mark. **10x1=10**

(a) State Zeroth Law of Thermodynamics.

(b) What is irreversible process ?

(c) Why is it impossible to reach absolute zero ?

(d) What is Joule-Thomson effect ?

(e) Define Degrees of freedom.

(f) State Wein's displacement Law.

(g) What is extrinsic semiconductor ?

(h) Write the relation between α and β of a transistor.

(i) What are Integrated Circuits ?

(j) Convert $(EC)_{16}$ into binary number.

SECTION - B

Answer **any four** of the following. Each carries **five** marks. **4x5=20**

2. Derive an expression for work done during Isothermal process.

3. Explain how low temperature is obtained by adiabatic demagnetisation.

4. State and prove Steafan's Boltzmann Law.

5. Explain the working of a full-wave rectifier.

6. Explain the working of a transistor as an amplifier.

7. Derive an expression for voltage gain of an Op-Amp in inverting mode.

P.T.O.

SECTION - C

Answer **any three** of the following. Each carries **ten** marks. **3x10=30**

8. (a) What is heat engine ? Explain the construction and working of a carnot engine. **7+3**

(b) Calculate the efficiency of a carnot engine working between the Steam Point and Ice Point.

9. (a) Deduce $Cp - Cv = R$ using Maxwell's relations for a perfect gas. **7+3**

(b) Find the value of Joule-Thomson Co-efficient for a perfect gas.

10. Explain Maxwell-Boltzmann Law of distribution of velocities in an ideal gas and hence obtain expression for mean velocity. **10**

11. (a) Explain how zener diode act as a voltage regulator. **5+5**

(b) Explain the characteristics of field effect transistor.

12. (a) State and prove De Morgan's Theorem. **5+5**

(b) With truth table explain AND and OR gates.

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No. of Printed Pages : 2

21BSC4C4CHL

B.Sc. IV Semester Degree Examination, September/October - 2023

CHEMISTRY - IV

DSC IV : Inorganic and Physical Chemistry-II

(NEP)

101159

Time : 2 Hours | Maximum Marks : 60

Note : *Answer* ***all*** *questions.*

SECTION - A

1. Answer the following sub-questions. Each sub-question carries **one** mark. **10x1=10**

(a) Write the Born-Lande equation and explain the terms. **1**

(b) What is Ionic Bond ? **1**

(c) What is meant by Hybridization ? **1**

(d) Define Resonance Energy. **1**

(e) Write any two rules for linear combination of atomic orbitals. **1**

(f) What is a Metallic Bond ? **1**

(g) What is Residual Entropy ? **1**

(h) State the third law of Thermodynamics. **1**

(i) Write BET equation. **1**

(j) State Kohlrauch's Law. **1**

SECTION - B

Answer **any four** of the following questions. Each question carries **five** marks. **4x5=20**

2. Set up Born-Haber cycle for the formation of sodium chloride crystal and write the expression for the lattice energy. **5**

3. State and explain the Baffle rule with suitable example. **5**

4. Write the molecular orbital energy level diagram of oxygen molecule. Calculate its bond order and predict its magnetic nature. **5**

5. Derive an equilibrium for Langmuir adsorption isotherm. **5**

6. Derive an expression for the rate constant of a second order reaction where the initial concentration of both reactants are same. **5**

7. Define Enthalpy. Explain work done on isothermal and adiabatic expansion in ideal gas. **5**

P.T.O.

SECTION - C

Answer **any three** of the following questions. Each question carries **ten** marks. **3x10=30**

8. (a) What is radius ratio ? Calculate the limiting radius ratio of an ionic solid when co-ordination number is 6. 6

   (b) What are ionic compounds of the type Ax ? Explain with an example. 4

9. (a) Explain Sp^3d hybridization by taking pcl_5 as an example. 6

   (b) Explain the structure of BF_3 and BF_4^- Ion according to VSEPR theory. 4

10. (a) Derive Gibbs-Helmholtz equation with respect to volume, temperature and pressure. 6

    (b) Derive Michaelis-Menten equation for enzyme catalysis. 4

11. (a) Discuss the 'Electron sea model' of metal. 6

    (b) Write a note on n-type semiconductors. 4

12. (a) Explain the Debye-Huckel on sagar equation for the strong electrolyte. 6

    (b) How do you determine solubility product of sparingly soluble salts by conductance method ? 4

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No. of Printed Pages : 2

21BSC4C4MTL

B.Sc. IV Semester Degree Examination, September/October - 2023

MATHEMATICS

Integral Transform and Partial Differential Equations

(NEP)

100922

Time : 2 Hours

Maximum Marks : 60

Note : *Answer* ***all*** *parts.*

PART-A

1. Answer **all** questions : **10x1=10**

(a) Find L{sinhmt}

(b) Find $L\left\{\frac{3}{2s+5}\right\}$

(c) If $f(x)=x^2$ find the Fourier Co-efficient of a_0 in $(-\pi, \pi)$.

(d) Define Half-Range Cosine series.

(e) Find Fourier sine transform of $f(x)=\frac{1}{x}$.

(f) Define inverse Fourier transform.

(g) If $z(Un)=\bar{u}(z)$ then, prove that $z(K^{-n}\,Un)=\bar{u}(K,z)$.

(h) Find z-Transform of K^n

(i) Solve : $px+qy=z$

(j) Solve : $p^2+q^2=1$

PART-B

Answer **any four** of the following questions. **4x5=20**

2. Evaluate $L\{4\sin^2 t \cos 2t\}$.

3. Find Fourier Series of function $f(x)=x-x^2$ in the interval $(-\pi, \pi)$.

4. Find the fourier transform of $f(x)=\begin{cases} x & |x|\le a \\ 0 & |x|>0 \end{cases}$.

5. Find z-Transform of $(n+1)^2$.

6. Solve : $x(y-z)p + y(z-x)q = (x-y)z$.

7. Find the complex Fourier series of $f(x)=e^{ax}$ in the period $(-\pi, \pi)$.

P.T.O.

PART-C

Answer any **three** of the following questions. **3x10=30**

8. (a) Solve by using Laplace transforms $\frac{d^2y}{dt^2}+K^2y=0$ given that $y(0)=2$, $y'(0)=0$.

(b) If $L\{f(t)\}=F(s)$ then, prove that $L\left\{t^n f(t)\right\}=(-1)^n \frac{d^n}{ds^n}\left[F(s)\right]$.

9. (a) Find the Cosine half range series of $f(x)=x(l-x)$ in $0\le x\le l$.

(b) Obtain the fourier series of $f(x)=|x|$ in $(-l, l)$. Hence show that $\frac{1}{1^2}+\frac{1}{3^2}+\frac{1}{5^2}+\ldots\ldots=\pi^2/8$.

10. (a) If F(s) is the Fourier transform of $f(t)$, then prove that $\frac{1}{a}F\left(s/a\right)$ is the fourier transform of $f(at)$.

(b) Use Parseval's identity to prove that $\int_0^\infty \frac{dt}{\left(a^2+t^2\right)\left(b^2+t^2\right)}=\frac{\pi}{2ab(a+b)}$.

11. (a) Compute inverse z-transform $\frac{3z^2+2z}{(5z-1)(5z+2)}$.

(b) Solve by using z-transforms of $y_{n+2}-4y_n=0$ given that $y(0)=0$, and $y(1)=2$.

12. (a) Form the Partial Differential equation from $2z=\frac{x^2}{a^2}+\frac{y^2}{b^2}$ where 'a' & 'b' are arbitrary constants.

(b) Find the complete integral of $pxy+pq+qy=yz$ by Charpit's method.

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No. of Printed Pages : **2**

30424

B.Sc. IV Semester Degree Examination, September/October - 2023

MATHEMATICS - I

VII : Real Analysis and Complex Analysis

100151

(NEP)

Time : 2 Hours | Maximum Marks : 60

Note : *Answer* ***all*** *sections.*

SECTION - A

Answer **any ten** questions. **10x2=20**

1. Define upper and lower Riemann integral of a function.

2. Compute L(P, f) and U(P, f) if $f(x)=x^2$ for $x\in(0, 3)$ and let $P=\{0, 1, 2, 3\}$ be the partition of (0; 3).

3. Show that $\int_1^2 x^3\,dx=\frac{15}{4}$ by fundamental theorem of calculus.

4. Define oscillatory sum.

5. If P_1 and $P_2\in f$ (a, b), then prove that $L(P_1, f)\leq U(P_2, f)$.

6. Define conformal transformation.

7. Show that $f(z)=u+iv$ is not analytic if $u=\frac{1}{2}\log(x^2+y^2)$ and $v=2xy$.

8. Show that $|z-1|^2+|z+1|^2=4$ represents a unit circle.

9. Show that $u=x^3-3xy^2+3x^2-3y^2+1$ is harmonic.

10. Evaluate $\int_c(\bar{z})^2dz$ around the circle $|z|=1$.

11. If f(z) is differentiable at $Z=Z_0$ then show that f(z) is continuous at $Z=Z_0$.

P.T.O.

12. Evaluate $\int_C \frac{1}{z(z-1)}dz$ where 'C' is $|z|=2$.

SECTION - B

Answer **any two** questions. **2x5=10**

13. If f∈R(a, b) and m, M are respectively the infimum & supremum of f(x) on [a, b] then $m(b-a) \le \int_a^b f(x)dx \le M(b-a)$

14. State and prove fundamental theorem of integral calculus.

15. Prove that a constant function defined on a closed interval is Reimann integrable.

SECTION - C

Answer **any three** questions. **3x5=15**

16. State and prove the C-R equation in polar form.

17. Prove that $f(z)=\cosh z$ is analytic and $f''(z)=\sinh z$.

18. Show that $u=\cos x\cosh y$ is harmonic. Find the analytic function, whose real part is u(x, y) by Milne Thomson's Method.

19. If the real part of an analytic function is $(r^2\cos 2\theta - r\sin\theta)$ then find the corresponding imaginary part.

SECTION - D

Answer **any three** questions. **3x5=15**

20. State and prove Cauchys integral formula.

21. Evaluate $\int_C \frac{1}{z(z-1)}dz$, where C is the circle $|z|=3$.

22. If a is any positive real number and C is the circle $|z|=3$. Show that $\int_C \frac{e^{2z}}{(z^2+1)^2}dz=\pi i(\sin a - a\cos a)$.

23. Find bilinear transformation which maps $z=\infty, i, O$ into $W=-I, -i, 1$.

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30453

B.Sc. IV Semester Degree Examination, September/October - 2023

MATHEMATICS - VIII

4.2 : Special Functions and PDE - I

100268

(NEP)

Time : 2 Hours | Maximum Marks : 60

Note : *Answer* ***all*** *Sections.*

SECTION - A

Answer **any ten** questions. **10x2=20**

1. Define Legendres equation and Legendres polynomial.

2. Show that $P_1(x) = x$ and $P_2(x) = \frac{1}{2}(3x^2 - 1)$.

3. Show that $J_{-1/2}(x) = \sqrt{\frac{2}{\pi x}} \cdot \cos x$

4. Show that $H_n^1(x) = 2xH_n(x) + H_{n+1}(x)$.

5. Show that $H_{2n}(0) = (-1)^n \frac{(2n)!}{n!}$

6. Prove that $L_2(x) = \frac{1}{2!}(2 - 4x + x^2)$.

7. Define Laguerre polynomial of order 'n'.

8. Form the partial differential equation from $x^2 + y^2 = (z - e^2)\tan^2\alpha$.

9. Solve $p\tan x + q\tan y = \tan z$.

10. Solve $p^2 + q^2 = 1$.

11. Solve $pe^y = qe^x$.

12. Solve $p^2 - q^2 = x - y$.

P.T.O.

SECTION - B

Answer **any five** questions. **5x5=25**

13. Prove that $np_n(x) = x \cdot p_n(x) - p_{n-1}(x)$.

14. Express $x^3 - 5x^2 + 6x + 1$ interms of Legendre polynomials.

15. Show that $J_0(x) = \frac{1}{\pi}\int_0^{\pi}\cos(x\sin\theta)d\theta = \frac{1}{\pi}\int_0^{\pi}\cos(x\cos\theta)d\theta$.

16. Prove that $2xH_n(x) = 2nH_{n-1}(x) + H_{n+1}(x)$.

17. Solve $Z^2(p^2x^2 + q^2) = 1$.

18. Solve $4(1 + z^3) = 9z^4pq$.

19. Solve $(x^2 - yz)p + (y^2 - zx)q = z^2 - xy$.

SECTION - C

Answer **any three** questions. **3x5=15**

20. Show that $(2n + 1)p_n(x) = P'_{n+1}(x) - P'_{n-1}(x)$.

21. Show that $\int J_3(x)dx = J_0(x) - \frac{4}{x}J_1(x)$.

22. Prove that $\frac{d}{dx}\left(J_n^2 + J_{n+1}^2\right) = 2\left(\frac{n}{x}J_n^2 - \frac{(n+1)}{n}J_{n+1}^2\right)$.

23. Prove that $H_n(x) = 2^n\left\{\exp\left(-\frac{1}{4}\frac{d^2}{dx^2}\right)x_n\right\}$.

24. Solve $(x^2 - yz)p + (y^2 - zx)q = z^2 - xy$.

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No. of Printed Pages : **2**

21BSC4C4BOL

B.Sc. IV Semester Degree Examination, September/October - 2023

BOTANY

Ecology and Conservation Biology

(NEP)

100518

Time : 2 Hours | Maximum Marks : 60

SECTION - A

1. Answer the following questions : **10x1=10**

(a) What is soil texture ?

(b) What are Epiphytes ? Give an example.

(c) What is food web ?

(d) Define xerosere.

(e) What is Intra Specific-Interaction ?

(f) What is Phytogeography ?

(g) Define mortality.

(h) What is acid rain ?

(i) Define Ex-situ conservation.

(j) Define species diversity.

P.T.O.

SECTION - B

Answer **any FOUR** of the following questions : **4x5=20**

2. Explain the Morphological and Anatomical adaptations of Hydrophytes.

3. Explain the structure of Pond Ecosystem with neat labelled diagram.

4. Explain the scope and Importance of community Ecology.

5. What are Phytogeographical region of India ? Explain any two types.

6. Explain about the threats to biodiversity.

7. Explain the types of biodiversity.

SECTION - C

Answer **any THREE** of the following questions : **10x3=30**

8. What are climatic factors ? Write the effect of light on growth of plants.

9. What are Biogeochemical cycles ? Explain the carbon cycle with suitable diagram.

10. Explain the Intra-Specific and Inter-Specific interactions with examples.

11. What is water pollution ? Write the causes, effects and controlling methods.

12. Write a notes on :
    (a) Botanical garden.
    (b) Endemic species.

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36412

Sl. No. 100103

B.Sc. IV Semester Degree Examination, September/October - 2023

BASIC ENGLISH

(CBCS)

Time : 3 Hours | Maximum Marks : 70

SECTION - I

I. Annotate **any two** of the following. **2x6=12**

(a) "He didn't beat you, Not the fish."
(b) "If Sharks come, God pity him and me."
(c) "I didn't know Shark had such handsome beautifully formed tails."

SECTION - II

II. Write short notes on **any two**. **2x6=12**

(a) Sketch the character Manolin
(b) Santiago
(c) Martin

SECTION - III

III. Answer **any one** of the following. **1x10=10**

(a) Justify the title of the novella The Old Man and the Sea.
(b) What is the significance of the title in Hemingway's The Old Man and the Sea ?

SECTION - IV

IV. Answer **any six** of the following. **6x6=36**

(a) Describe the meaning and types of etiquettes.
(b) Write a note on Importance of Dress Code.
(c) Write a note on Job Interviews.
(d) Mention types of Presentations.
(e) Describe the unconscious gender bias in the workplace.
(f) What are the qualities of Effective Presentation ?
(g) What is Presentations ?
(h) Write a note on Gender Equality.

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36421

No. of Printed Pages : **2**

Sl. No. 100121

B.Sc. IV Semester Degree Examination, September/October - 2023

PHYSICS

IV : Physical Optics, Fibre Optics and Special Theory of Relativity

(CBCS)

Time : 3 Hours Maximum Marks : 70

SECTION - A

15x1=15

Answer the following :

1. Give an example for diffraction of light.
2. What is transmission grating ?
3. What happens to the fringe width if the width of the Young's double slit is increased ?
4. Why does a thin film of oil looks coloured ?
5. What are two methods of producing coherent sources ?
6. Define polarisation.
7. Define optical activity of a substance.
8. On what principle optical fibre works ?
9. Define numerical aperture of an optical fibre.
10. Define acceptance angle.
11. What is spherical aberration in lenses ?
12. What is double refraction ?
13. What is achromatism ?
14. What is length contraction ?
15. State any one postulate of special theory of relativity.

P.T.O.

SECTION - B

Answer **any five** of the following. **5x5=25**

16. Compare zone plate and convergent lens.

17. Write a note on half wave plate.

18. Describe Young's double slit experiment.

19. Derive an expression for equivalent focal length of two thin convex lenses separated by distance.

20. Mention any five applications of optical fibre.

21. Derive an expression for time dilation using Lorentz transformation equations.

22. Derive Einstein's mass-energy relation.

SECTION - C

Answer **any three** of the following. **3x10=30**

23. (a) Discuss the theory of interference in a thin film of uniform thickness. **7+3**

(b) In Young's experiment, it is found that the width of 4 fringes is 4.8mm. If the fringes are seen at a screen kept at 1.2m from the slit. The distance between the slits is 0.75mm. Calculate the wavelength of light used.

24. Derive an expression for intensity of single slit Fraunhofer diffraction. **10**

25. (a) Write a note on Laurent's half shade polarimeter. **5+5**

(b) Explain Huygen's theory of positive and negative crystals.

26. (a) Distinguish between Huygen's and Ramsdevis eye pieces. **5+5**

(b) Explain the cardinal points of coaxial optical system.

27. With a neat diagram explain Michelson-Morley experiment and discuss its negative results. **10**

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No. of Printed Pages : **2**

36422

B.Sc. IV Semester Degree Examination, September/October - 2023

CHEMISTRY

IV (New)

100384

(CBCS)

Time : 3 Hours | Maximum Marks : 70

Note : *(i) Section-A : contains questions from Inorganic, organic and physical chemistry.*

(ii) Section-B : contains questions from Inorganic chemistry.

(iii) Section-C : contains questions from organic chemistry.

(iv) Section-D : contains questions from physical chemistry.

*(v) Answer **all** the sections.*

SECTION-A

Answer **any ten** of the following. **10x1=10**

1. State EAN rule.
2. Give an example for hexadentate ligand.
3. Give an example for low spin complexes.
4. What is disproportionation ?
5. Give the alternative name of epoxide.
6. How does acetone reacts with hydroxyl amine ?
7. What are amines ?
8. Which is more basic among P-nitroaniline and P-toulidine ?
9. State Rault's law for dilute solutions.
10. Give an example for a non ideal solution deviates negatively.
11. Define phases.
12. What is Vant-Hoff's factor ?

P.T.O.

SECTION-B

Answer **any two** of the following. **2x10=20**

13. (a) Draw all geometrical isomers of type M(AA) a_2b_2, $M(AB)_3$ and Ma_3b_3 with an example each. **6**

(b) Applying Werner's theory draw the structures of following complexes. **4**

(i) $COCl_3.6NH_3$

(ii) $COCl_3.5NH_3$

14. (a) Explain the crystal field splitting of d-orbitals in tetrahedral complexes. **6**

(b) Explain the formation of a complex $[Ni(NH_3)_6]^{+2}$ ion by VBT. **4**

15. (a) Construct the frost diagram for nitrogen under basic condition. **6**

(b) What are disproportion and comproportionation. **4**

SECTION-C

Answer **any two** of the following. **2x10=20**

16. (a) Define diazo-coupling of aniline with various organic compounds. **6**

(b) Write any two methods of preparation of ethers. **4**

17. (a) Give the mechanism of aldol condensation. **6**

(b) Write the mechanism of Canizzaro's reaction. **4**

18. (a) Describe the methods of preparation of amines by alkyl halides, alcohols and Gabriel's method. **6**

(b) Give the distinguishing tests between 1°, 2° and 3° amines. **4**

SECTION-D

Answer **any two** of the following. **2x10=20**

19. (a) Using Boiling point composition and vapour pressure composition diagrams, explain the principle of fractional distillation of high boiling azeotropic liquid mixtures with an example. **6**

(b) Explain the pheno-water system with a labelled diagram. **4**

20. (a) Draw and explain phase diagram for one component system comprising of only one solid phase. **6**

(b) Write a note on freezing mixtures. **4**

21. (a) How the colligative properties are used in the determination of degree of dissociation and degree of association ? **6**

(b) A 0.5% of aqueous solution of KCl was freezed at $-0.24°C$. Calculate the Vant-Hoff factor and degree of dissolution of solute at this concentration. [K_f for water is 1.86°C]. **4**

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36424

Sl. No. 100111

B.Sc. IV Semester Degree Examination, September/October - 2023

BOTANY - IV

Ecology and Environmental Biology

(CBCS)

Time : 3 Hours | Maximum Marks : 70

Note : *(i) Answer* ***all*** *the questions.*

(ii) Draw diagram wherever necessary.

SECTION-A

I. Answer the following questions. **15x1=15**

1. Define the term 'Ecology'.
2. Expand IUCN.
3. What are Epiphytes ?
4. What is Reforestation ?
5. What is Velamen tissue ?
6. Define food chain.
7. What are Decomposers ?
8. What is Hygrometer ?
9. What is Estuary ?
10. Define the term Phytogeography.
11. What are non-renewable resources ? Give examples.
12. What is Acid Rain ?
13. What are Mangroves ?
14. What are Endemic Species ?
15. What is Vivipary ?

P.T.O.

SECTION-B

II. Answer **any five** of the following. **5x5=25**

16. Explain the Morphological adaptation of Xerophytes.

17. Write a note on Soil profile.

18. Explain the structure and function of Pond Ecosystem.

19. Write the difference between renewable and Non renewable resources.

20. Give brief account on Importance of Forestry.

21. What are Ecological pyramids ? Describe any one pyramid with neat diagram.

22. Explain the causes and control measures of Deforestation.

SECTION-C

III. Answer **any three** of the following. **3x10=30**

23. What is Ecosystem ? Explain Biotic and Abiotic components of ecosystem.

24. What are Biogeochemical cycles ? Explain the Nitrogen cycle with labelled diagram.

25. What are Plant Successions ? Describe the various stages of hydrosere.

26. Explain the different phytogeographical regions of India.

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No. of Printed Pages : **2**

36425

Sl. No. 100087

B.Sc. IV Semester Degree Examination, September/October - 2023

ZOOLOGY

Z-4 : Animal Physiology and Biochemistry

(CBCS)

Time : 3 Hours | Maximum Marks : 70

Note : *(i) Answer* ***all*** *sections.*

(ii) Draw the labelled diagrams wherever necessary.

SECTION-A

Answer **any five** of the following. **5x2=10**

1. Mention the Carbohydrates found in Pancreatic juice.
2. What is co-enzyme and Apo-enzyme ?
3. Define Hypertension.
4. Define inspiration and Expiration.
5. What is glomerular filtration ?
6. Expand ACTH and MSH.

SECTION-B

A. Answer **any four** of the following. **4x5=20**

7. Explain the mechanism of Synaptic transmission.
8. Write a note on the hormones of Neurohypophysis.
9. Explain briefly about the process of Carbohydrate digestion in man.
10. Write a short note on the hormones of reproduction.
11. Sketch and label the V.S of human heart.
12. Describe the Sliding filament theory of muscle contraction.

P.T.O.

B. Answer **any two** of the following. **2x5=10**

13. Describe the Induced fit theory of Enzyme action.

14. Explain briefly about the classification of Proteins.

15. Briefly explain the Kreb's cycle.

SECTION-C

A. Answer **any two** of the following. **2x10=20**

16. Explain the process of Protein digestion in man.

17. Explain the structure of Nephron with a neat labelled diagram.

18. Explain in detail about the hormones of the adenohypophysis of pituitary gland.

B. Answer **any one** of the following. **1x10=10**

19. Write a detailed note on Fat Soluble Vitamins.

20. Explain about the clinical significance of enzymes.

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