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Reg. No. | | | | | | | | |

II Semester B.Sc. (NEP) Degree Examination, October - 2023

CHEMISTRY (DSC)

(Regular/Repeater)

Time : 2 Hours **Maximum Marks : 60**

Instructions to Candidates: **1) All questions are compulsory**

2) Draw neat diagrams and give equations wherever necessary.

1. Answer any SIX of the following questions. **(6×2=12)**

a) What is lattice energy ? Give its significance.

b) Write two characteristics of bonding molecular orbitals

c) Compare the acidic strength of acetic acid and benzoic acid and give the reason.

d) What is racemic mixture?

e) Write two applications of liquid crystals.

f) Define space lattice.

g) How half life period is related to initial concentration of reactant for zero order and second order reactions.

h) Define coefficient of viscosity.

2. Answer any THREE of the following questions. **(3×4=12)**

a) Calculate the lattice energy of Nacl using the born-Haber cycle from following data

Hent of sublimation of sodium = 108 kJ/mol

Ionisation energy of sodium gas = 495 kJ/mol

Dissociation energy of chlorine = 240 kJ/mol

Electron affinity of chlorine =- 347 kJ/mol

Heat of formation of Nacl = -381 kJ/mol

b) What is Ionic bond? Write the general characteristics of ionic compounds.

c) Explain the hybridization and geometry of pcls molecule.

d) Give the molecular orbital energy level diagram for O^{+1}_2 ion and write its molecular orbital configuration and magnetic property.

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3. Answer any THREE of the following questions. **(3×4=12)**

a) What is geometrical isomerism? Write the conditions of geometrical isomerism.

b) Explain

i) Chirality

ii) Mesocompounds

c) Discuss the rules of assigning E and Z notaions for compounds with examples.

d) Give the rules of assigning R and S notations for compounds with examples.

4. Answer any THREE of the following questions. **(3×4=12)**

a) What are liquid crystals? Give the classification of liquid crystals.

b) Derive the Bragg's equation.

c) Write about laws of crystallography

d) Calculate the separation between two successive planes in a crystal in which a series of planes produce a first order reflection from x-rays of $1.539A^0$ wavelength at an angle of 22.5^0

5. Answer any THREE of the following questions. **(3×4=12)**

a) Derive an expression for rate constant of second order reaction when concentration of reactants are equal.

b) Explain the structural illucidation of Benzoguinone by paractor values.

c) Write about following.

i) Molar refraction

ii) Structure of DMG and its use in inorganic analysis.

d) A second order reaction with reactants of equal concentrations is 20% completed in 500 seconds calculate

i) Rate constant of reaction

ii) Time for 60% completion of reaction.

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II Semester B.Sc. (NEP) Degree Examination, October - 2023

CHEMISTRY (DSC)

(Regular/Repeater)

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Instructions to Candidates:
1) **All questions are compulsory**
2) **Draw neat diagrams and give equations wherever necessary.**

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f) Define space lattice.

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[P.T.O.

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Reg. No. | | | | | | | | |

II Semester B.Sc. 6 (NEP) Degree Examination, October - 2023

MATHEMATICS

Algebra - II and Calculus - II

Paper : DSC

(Regular)

Time : 2 Hours **Maximum Marks : 60**

Instructions to Candidates: **Answer all questions.**

Answer any Six questions. **(6 ×2=12)**

1. a) Define bounded set and give an example.

   b) Define limit point of a set.

   c) Prove that every cyclic group is abelian.

   d) Define left and right cosets.

   e) If $u = \tan^{-1}\left(\frac{y}{x}\right)$ *then find* $\frac{\partial u}{\partial x}$ *and* $\frac{\partial u}{\partial y}$

   f) If $x = u(1-v),\ y = uv$ *then find* $\frac{\partial(x,y)}{\partial(u,v)}$

   g) Evaluate $\int_0^1 \int_0^2 xy\,(x+y)\,dx\,dy.$

   h) Evaluate $\int_0^1 \int_0^2 \int_0^3 (x+y+z)\,dx\,dy\,dz.$

Answer any THREE of the following. **(3×4=12)**

2. a) Prove that the unit interval [0,1] is uncountable.

   b) State and prove Archimedian Property of real numbers

P.T.O.

c) i) Define open set and give an example.

ii) Prove that the union of a finite number of closed sets is a closed set.

d) Prove that every infinite subset of a denumerable set is denumerable.

Answer any THREE of the following. **(3 ×4=12)**

3. a) If G = {1, 5, 7, 11} then prove that G is abelian group w.r.t multiplication module 12.

b) A non empty subset H of a group (G *) is a sub group of G iff

i) $\forall, a, b \in H \Rightarrow a * b \in H$

ii) $\forall\ a, \in H \Rightarrow a^{-1} \in H$.

c) Prove that every subgroup of a cyclic group is cyclic.

d) State and prove lagrange's theorem for groups.

Answer any THREE of the following. **(3 ×4=12)**

4. a) If $u = \frac{1}{\sqrt{x^2+y^2+z^2}}$ then show that $\frac{\partial^2 u}{\partial x^2}+\frac{\partial^2 u}{\partial y^2}+\frac{\partial^2 u}{\partial z^2}=0$

b) State and prove Euler's theorem for homogeneous function.

c) if $J = \frac{\partial(u,v)}{\partial(x,y)}$, $J^1 = \frac{\partial(x,y)}{\partial(u,v)}$ then prove that $JJ^1 = 1$

d) Expand sin $(x+y)$ by maclaurian's series.

Answer any THREE of the following. **(3×4=12)**

5. a) Evaluate $\iint_D (x+2y+1)\,dx\,dy$, where D is domain bounded by $x=0, y=0, 3x+y-3=0$.

b) Find the area of the circle $x^2+y^2=a^2$ by double integration.

c) Find the volume of the tetrahedron bounded by the coordinate planes and the plane $x+y+z=1$

d) State and prove Leibnitz's theorem for differentiation under integral sing.

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II Semester B.Sc.4. Degree Examination, October - 2023

MATHEMATICS

Differential And Integral Calculus

Paper - I

(Repeater)

(W.e.f. 2017-2018 onwards)

Time : 3 Hours **Maximum Marks : 80**

Instructions to Candidates : *Question paper contains 3 parts namely A,B,C Answer all parts.*

Part - A

1. Answer any **Ten** of the following. **(10×2=20)**

   a. Find the angle between the radius vector and tang cut to the curve $r = a\cos\theta$.

   b. Find the length of the polar subtangent for the curve $r = a\theta$.

   c. Find the pedal equation of $r^2 = a^2\cos 2\theta$.

   d. Write the formula for co-ordinate of the centre of curvature.

   e. Find the radius of curvature of the curve $2ap^2 = r^3$.

   f. Prove that $\lim_{(x,y)\to(0,0)} \frac{x^2 - y^2}{x^2 + y^2}$ does not exist.

   g. If $z = x^2\sin(3x + y^2)$ find $\frac{\partial z}{\partial x}, \frac{\partial z}{\partial y}$.

   h. If $x = r\cos\theta$, $y = r\sin\theta$ show that $\frac{\partial r}{\partial x} = \frac{x}{\sqrt{x^2 + y^2}}$.

   i. Prove that the curve y = logx convex upwards everywhere.

   j. Find the envelope of the family of straight lines y=m(m+x), where 'm' is a parameter.

   k. Evaluate $\int \sin^5 x\, dx$ by using reduction formula.

   l. Obtain the reduction formula for $\int x^n e^{an} dx$.

Part - B

Answer any **Four** of the following. **(4×5=20)**

2. Derive $\frac{1}{p^2} = \frac{1}{r^2} + \frac{1}{r^4}\left(\frac{dr}{d\theta}\right)^2$ with usual notation.

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II Semester B.Sc.4. Degree Examination, October - 2023

MATHEMATICS

Differential And Integral Calculus

Paper - I

(Repeater)

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Time : 3 Hours **Maximum Marks : 80**

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Part - B

Answer any **Four** of the following. **(4×5=20)**

2. Derive $\frac{1}{p^2} = \frac{1}{r^2} + \frac{1}{r^4}\left(\frac{dr}{d\theta}\right)^2$ with usual notation.

P.T.O.

3. Find the angle of intersection of the curves $r = a\cos\theta$ and 2r=a.

4. Find the radius of curvature at any point on the curve $y = a\log\sec\left(\frac{x}{a}\right)$.

5. If $z = x^2\tan^{-1}\frac{y}{x} - y^2\tan^{-1}\frac{x}{y}$ show that $\frac{\partial^2 z}{\partial x\partial y} = \frac{x^2 - y^2}{x^2 + y^2}$.

6. Find the envelope of the family of curves $Y = mx + a\sqrt{1+m^2}$.

7. Find the reduction formula for $\int \cos ec^n x dx$.

PART - C

Answer any Four of the following. **(4×10=40)**

8. a. With usual notation prove that $\tan\phi = r.\frac{d\theta}{dr}$.

   b. Obtain pedal equation of the circle $x^2 + y^2 = 2aX$.

9. a. Prove that the radius of curvature in pedal form in $\delta = r.\frac{dr}{dp}$.

   b. Find the evolute of the parabola $y^2 = 4ax$.

10. a. State and prove Euler's theorem for homogeneous function in x and y of degree n.

    b. If $u = Sin^{-1}\left\{\frac{x^2 + y^2}{x + y}\right\}$ then show that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = \tan u$.

11. a. Find the range of values of x for which the curve $y = (x^2 + 4x + 5)e^{-x}$ is concave upwards and concave downwords.

    b. Find all the asymptotes of the curve

    $y^3 - x^2y + 2y^2 + 4y + 1 = 0$.

12. a. Find reduction formula for $\int \cos^n x dx$.

    b. Evaluate $\int_0^1 \frac{x^6}{\sqrt{1-x^2}}\,dx$.

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II Semester B.Sc.(NEP) Degree Examination, September/October - 2023

ENGLISH

Generic English - II

(Regular)

Time : 2 Hours **Maximum Marks : 60**

I. Answer the following in a word, a phrase or a sentence each. **(10×1=10)**

1) What were grown during 1000 to 500 BC?

2) What is alternative to the Green Revolution methods?

3) What are the two little courtesies expressed in on saying please.

4) Who threw the passenger out of the lift?

5) Who followed Milkha Singh wherever he went?

6) What was the focus of Milkha Singh?

7) How many hours did W.B. yeats pray for his daughter?

8) What does 'reverie' mean in the poem a prayer for my daughter?

9) How does the speaker laugh like?

10) How to come up in life?

II. 1) Describe practice sessions of Milkha singh? **(1×10=10)**

(OR)

2) Explain ZBNF as a chemical free farming.

III. 1) How does Maya Angelou assert her dignity and resilience in the poem 'Still I Rise'? **(1×10=10)**

(OR)

2) What virtues does the Poet want his daughter to be blessed with?

IV. A. Rewrite as directed **(5×2=10)**

1) Give the synonyms of the following

i) Cute

ii) Create

[P.T.O.

2) Use the following homophones in your own sentences (any one)

i) Brake-Break

(OR)

ii) Diary-Dairy

3) Fill in the blanks with appropriate form of words given in the bracket adding affixes.

i) Scientists try to ---------- their ideas (code)

ii) Bharat is a popular -------- in the North karnataka (sing).

4) Match the words in column 'A' with its collective words in column 'B'.

	A	B
i)	Brain	Storm/wind/sharp
ii).	Pony	tail/head/ fish

5) Bring out the difference in meaning of the following pair of words by using them in your own sentences Advice - Advise.

(OR)

B. 1) Read the following passage carefully and identify the technical terms related to the field of and write in the answer script. **(5)**

A press release is a short yet compelling news story It is written by a public relations professional and sent to targeted members of the media Its goal is to press release the interest of a community or business. The press release contains information for the journalists.

2) a) Write a note Types of Listening **(1×5=5)**

(OR)

b) Techniques to improve the listening skills.

V. **Answer any Two of the following.** **(2×5=10)**

1) Change into Indirect Speech

a) Ashita said 'when are you leaving'?
b) He said ' I am going out'.
c) Rama said ' I had already left'.
d) Sita said 'where do they stay'?
e) Kavita said 'shall we begin'?

2) Write an imaginary dialogue between you and your friend about the independence Day Preparations

3) Explain verbal and Non. Verbal communication.

4) Summarize the following passage in your own words and give a suitable title.

Student life involves walking up early in the morning, rushing to school or college, completing assignments, studying, learning, gaining an education etc. Apart from these we also learn many sports and skills that usually help us in the future, Generally student life is considered the best part of our life.

VI. Answer any two of the following **(2×5=10)**

1) Draft a copy of speech on Swachh Bharat Abhiyan

2) Write a brief essay on science for peace and development.

3) Write a short paragraph on 'Bhagat Singh'.

4) Translate the following paragraph into Kannada or Hindi or Marathi or Urdu .

Ashita was on a long road trip outside the city to reach her project site, Lates, on the way her car got a break down, she tried hard but couldn't restart the car. But soon a young man with a peaceful grin on his face knocked on her car window said 'Sister do you need a any help. Ashita was surprised to see the young man suddenly appearing from nowhere on the dark lonely road.

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II Semester B.Sc. (NEP) Degree Examination, September/October - 2023

KANNADA (Basic)

ತೆರೆದ ಮನ (ಎಇಸಿಸಿ)

(Regular)

Time : 2 Hours **Maximum Marks : 60**

Instructions to Candidates:

ಭಾಷೆ ಮತ್ತು ಬರಹದ ಶುದ್ಧಿಯನ್ನು ಗಮನಿಸಲಾಗುವುದು.

I. a) ಜ್ಯೋತಿರೆಡ್ಡಿ ತನ್ನ ಬದುಕನ್ನು ಕಟ್ಟಿಕೊಂಡ ಪ್ರಸಂಗವನ್ನು ಕುರಿತು ವಿವರಿಸಿರಿ. **(10)**

(ಅಥವಾ)

b) ಎಲ್ಲಾ ಕಲೆಗಳಲ್ಲಿ ಶ್ರೇಷ್ಟವಾದ ಕಲೆ 'ಜೀವನ ಕಲೆ' ಎಂಬುದನ್ನು ಡಿ.ವಿ.ಜಿ. ಯವರ ಮಂಕುತಿಮ್ಮನ ಕಗ್ಗದ ಹಿನ್ನಲೆಯಲ್ಲಿ ನಿರೂಪಿಸಿರಿ.

II. a) 'ನನ್ನ ಇಷ್ಟದ ಪುಸ್ತಕಗಳು' ವ್ಯಕ್ತಿಯ ವ್ಯಕ್ತಿತ್ವವನ್ನು ರೂಪಿಸುತ್ತವೆ? ಎನ್ನುವ ಲೇಖಕರ ವಿಚಾರಗಳನ್ನು ಸಂಗ್ರಹಿಸಿ ಬರೆಯಿರಿ. **(10)**

(ಅಥವಾ)

b) ಅಕ್ಕಮಹಾದೇವಿ ಚೆನ್ನಮಲ್ಲಿಕಾರ್ಜುನನ್ನು ಕುರಿತು ಕನಸಿನ ವೃತ್ತಾಂತವೇನು? ವಿವರಿಸಿರಿ.

III. a) 'ಮಳೆ ನಿಂತ ಮೇಲೆ' ಈ ಕಥೆಯ ಬಡತನದ ದಾರುಣತೆಯನ್ನು ಎತ್ತಿ ತೋರಿಸುತ್ತದೆ? ವಿವರಿಸಿರಿ **(10)**

(ಅಥವಾ)

b) 'ನಾನು ಪುಟ್ಟಿ ಮಳೆ ನೋಡಿದ್ದು' ಕವಿತೆಯ ವೈಶಿಷ್ಟ್ಯತೆಗಳನ್ನು ವಿವರಿಸಿರಿ.

IV. a) ಕಾಫಿ ಚಟ ಅನುವಂಶಿಕವೆ? ಪರಿಸರ ಪ್ರೇರಿತವೆ? ಎಂಬುದನ್ನು ವಿವರಿಸಿರಿ. **(10)**

(ಅಥವಾ)

b) 'ವಿಗ್ರಹಗಳೋಗ್ರಹಗಳೋ' ಸಂಬಂಧವನ್ನು ಕುರಿತು ಲೇಖಕರ ಅಭಿಪ್ರಾಯಗಳನ್ನು ಸಂಗ್ರಹಿಸಿ ವಿವರಿಸಿರಿ.

[P.T.O.

V. ಟಿಪ್ಪಣಿ ಬರೆಯಿರಿ ಬೇಕಾದ ಎರಡಕ್ಕೆ (2×5=10)

a) ಆದರ್ಶ ಜೀವನ.

b) ಚೈತನ್ಯದ ಪೂಜೆ.

c) ಧನಿಯರ ಸತ್ಯ ನಾರಾಯಣ.

d) ನ್ಯಾನೋ ತಂತ್ರಜ್ಞಾನ.

VI. ಒಂದೇ ವಾಕ್ಯದಲ್ಲಿ ಉತ್ತರಿಸಿರಿ. (10×1=10)

a) ಡಿ.ವಿ.ಜಿ. ಅವರ ಪೂರ್ಣ ಹೆಸರೇನು?

b) ಪಾಟೀಲ ಪುಟ್ಟಪ್ಪ ಅವರ ಜನ್ಮಸ್ಥಳ ಯಾವುದು?

c) ಡಾ.ಎಚ್. ನರಸಿಂಹಯ್ಯನವರಿಗೆ 1985 ರಲ್ಲಿ ಯಾವ ಪ್ರಶಸ್ತಿ ದೊರಕಿದೆ?

d) ಅಂಬಿಕಾತನಯದತ್ತ ಇದು ಯಾರ ಕಾವ್ಯನಾಮ?

e) ಕುವೆಂಪು ಅವರ ತಂದೆ–ತಾಯಿಯ ಹೆಸರೇನು?

f) ತೌಡನ ಹೆಂಡತಿಯ ಹೆಸರೇನು?

g) ಆಕಾಶಬುಟ್ಟಿ ಇದು ಯಾರ ಕೃತಿ?

h) 'ಬರ' ಈ ಕಥೆಯನ್ನು ಯಾವ ಪುಸ್ತಕದಿಂದ ಆಯ್ದುಕೊಳ್ಳಲಾಗಿದೆ?

i) ಜೆ.ಆರ್. ಲಕ್ಷ್ಮಣರಾವ್ ಅವರು ಯಾವ ವರ್ಷ ಜನಿಸಿದರು?

j) 'ಅಮ್ಮ ಹೇಳಿದ ಎಂಟು ಸುಳ್ಳುಗಳು' ಈ ಕೃತಿಗೆ ಯಾವ ಪ್ರಶಸ್ತಿ ದೊರಕಿದೆ?
