47001/A0010

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

I Semester B.Sc. (NEP) Degree Examination, March/April - 2023

KANNADA (Basic)

ಕನ್ನಡ ಸಂವರ್ಧನೆ

Ability Enhancement Compulsory Course-I

(Regular)

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

Instructions to Candidates:

ಭಾಷೆ ಮತ್ತು ಬರಹದ ಶುದ್ಧಿಗೆ ಗಮನಿಸಲಾಗುವುದು.

1. 'ಕನ್ನಡಾಂಬೆಯ ಹಿರಿಮೆ' ಪದ್ಯದ ಆಶಯವನ್ನು ಕುರಿತು ಬರೆಯಿರಿ. **(10)**

(ಅಥವಾ)

ಡಿ.ಆರ್.ನಾಗರಾಜ ಅವರ ದೃಷ್ಟಿಯಲ್ಲಿ 'ಕನ್ನಡ ಸಂವರ್ಧನೆ' ಹಾಗೂ ಸಾಧ್ಯತೆಗಳನ್ನು ಕುರಿತು ವಿವರಿಸಿರಿ.

2. ಭೂಮಿ ಮತ್ತು ಹೆಣ್ಣು ನಡುವಿನ ಸಂಬಂಧವನ್ನು ಕುರಿತು ಚರ್ಚಿಸಿರಿ. **(10)**

(ಅಥವಾ)

'ಇಡೀ ಊರಿನ ಉಸಿರ್ದಾಣ ನಮ್ಮೂರ ಕೆರೆ' ಎಂಬುದರ ಸ್ವಾರಸ್ಯವನ್ನು ಕುರಿತು ವಿವರಿಸಿರಿ.

3. ಜ್ಯೋತಿಷ್ಯ ಅರ್ಥಪೂರ್ಣವೋ ಅರ್ಥರಹಿತವೋ? ಚರ್ಚಿಸಿರಿ. **(10)**

(ಅಥವಾ)

'ವಿಜ್ಞಾನ ಪ್ರಶ್ನೆ' ಇದನ್ನು ಸಹಸ್ರಬುದ್ಧೆಯವರ ಅನಿಸಿಕೆಗಳ ಹಿನ್ನೆಲೆಯಲ್ಲಿ ವಿಶ್ಲೇಷಿಸಿರಿ.

4. ಭರತ ಮತ್ತು ಬಾಹುಬಲಿಯ 'ಯುದ್ಧ ನೀತಿ'ಯ ಸ್ವಾರಸ್ಯವನ್ನು ನಿರೂಪಿಸಿರಿ. **(10)**

(ಅಥವಾ)

'ರೈತನ ಬದುಕಿನಲ್ಲಿ ಬಿತ್ತನೆ' ಸಂಭ್ರಮದ ಕ್ಷಣಗಳನ್ನು ಕುರಿತು ವಿವರಿಸಿರಿ.

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

a) ಶಿವರಾಮ ಕಾರಂತ

b) ದೇವರು ಪೂಜಾರಿ

c) ಮಣ್ಣಿನ ಮೆರವಣಿಗೆ

d) ಡಾ.ಸವಿತಾ ಅಂಬೇಡಕರ

[P.T.O.

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

a) 'ಹೊತ್ತಿತೋ ಹೊತ್ತಿತೋ ಕನ್ನಡದ ದೀಪ' ಎಂದು ಹಾಡಿದವರಾರು?

b) 'ಕನ್ನಡ ಸಂವರ್ಧನೆ' ಪಠ್ಯದ ಲೇಖಕರು ಯಾರು?

c) ಚೆಂಬೆಳಕಿನ ಕವಿ ಯಾರು?

d) ಚಿದಾನಂದಮೂರ್ತಿ ಅವರ ಹುಟ್ಟೂರು ಯಾವುದು?

e) ಶಿವರಾಮ ಕಾರಂತರ ಆತ್ಮಕಥನ ಯಾವುದು?

f) ಎಚ್.ನರಸಿಂಹಯ್ಯನವರು ಯಾವ ವಿಶ್ವವಿದ್ಯಾಲಯದ ಕುಲಪತಿಗಳಾಗಿದ್ದರು?

g) ಸಹಸ್ರಬುದ್ದೆ ಅವರ ಲೇಖನದ ಹೆಸರೇನು?

h) ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾಲಯದ ಮೊದಲ ಕುಲಪತಿ ಯಾರು?

i) ಕೀರ್ತಿನಾಥ ಕುರ್ತಕೋಟಿ ಅವರು ವಿಶ್ರಾಂತ ಜೀವನವನ್ನು ಎಲ್ಲಿ ಕಳೆದರು?

j) 'ಭರತೇಶ ವೈಭವ'ದ ಕವಿ ಯಾರು?

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I Semester B.Sc. (NEP) Degree Examination, March/April - 2023

ENGLISH (AECC)

Generic English - I

(Regular)

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

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

1. What according to C.V. Raman is the elixir of life?
2. Who do not speak english exactly alike?
3. How old is Tembu?
4. What weapon did Baldeo carry?
5. What is the main cause of soil erosion?
6. Who translated Vachana 820?
7. Which God is addressed in the poem 'Vachana 820'?
8. Who wrote the poem. 'To India my Native Land'?
9. What do the roads signify in the poem, The Road Not Taken?
10. How was India worshipped in the past?

II. a) How is the water the 'true Elixir of Life'? **(1×10=10)**

(OR)

b) Describe the courage, honour and duty consciousness of Baldeo.

III. a) What role does the poet see for himself with regard to his country in - "To India my Native land"? **(1×10=10)**

(OR)

b) Discuss the title of the poem 'The Road Not Taken'.

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

1. Introduce yourself before a panel of interview members as an eligible candidate for the post of a lecturer.
2. Draft a congratulatory note on the success of your friend in getting selected in the state cricket team.
3. Write instructions on the task of "Preparing coffee" in a paragraph by using the words such as - firstly, after this, next, then, the next step is, subsequently, in the following stage, etc.
4. Draft an enquiry dialogue between you and the college clerk as you visit the office for seeking the admission to B.Sc first semester.

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V. Answer any Four of the following sets.

A) Use the following words as directed. (5×1=5)

1. 'Qualification' as a verb in a sentence.
2. 'Gentle' as an adverb in a sentence.
3. 'Assess' as a noun in a sentence.
4. 'Beauty' as an adjective in a sentence.
5. 'Yesterday' as an adverb in a sentence.

B) Fill in the blanks with suitable articles. (5×1=5)

1. Madhu has ..... teddy bear.
2. She is planning to buy ..... umbrella.
3. This is ..... book, which I lost yesterday.
4. It took ..... hour to reach the Bus stop.
5. I have never used ..... computer.

C) Fill in the blanks with suitable prepositions. (5×1=5)

1. My sister is senior ..... me.
2. I like travelling ..... sea.
3. Meera is always ..... the phone talking about everything in the world.
4. Netaji lived and died ..... his beliefs.
5. I thanked him ..... being so kind to me.

D) Convert the following direct questions into indirect questions. (5×1=5)

1. Is she captain of the team?
2. Are they happy with their results?
3. Will you be driving to the wedding this weekend?
4. Was he late for the class?
5. Where does he play tennis?

E) Frame the negative questions. (5×1=5)

1. He is sure of his success.
2. The girl got what she desired.
3. Jyoti has arrived yesterday.
4. It is easy to work hard and get success.
5. George broke the glass.

F) Frame the questions as directed. (5×1=5)

1. He succeeded <u>because of his dedication</u>. (Frame WH question to get underlined word as answer).
2. <u>Excercise</u> is good for health. (Frame WH question to get underlined word as answer).
3. He never attends classes, ... ? (Add tag).
4. Yes, it was a useful course. (Frame Yes/No questions to get this answer).
5. No, he did not help the poor. (Frame Yes/No question to get this answer).

47005/A0050

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I Semester (NEP) B.Sc. Degree Examination, March/April - 2023

HINDI

1) कहानी कुंज

2) हिन्दी भाषा के विविध रूप

Paper - AECC

(Regular 2021-22 Onwards Syllabus)

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

I. किन्हीं दस प्रश्नों के उत्तर लिखिए। **(10×1=10)**

1) कहानी कुंज के संपादक कौन है?

a) डॉ. पूर्णिमा आर b) डॉ. राजेंद्र पवार c) डॉ. मंजरी त्रिपाठी

2) प्रेमचंद का जन्म कब हुआ?

a) 1880 b) 1980 c) 1936

3) 'आकाशदीप' कहानी में चित्रित नायिका का नाम ----

a) चम्पा b) राधिका c) अलका

4) बालमनोविज्ञान से संबंधित कहानी

a) साइकिल b) आदमी का बच्चा c) अपरिचित

5) जाति–व्यवस्था पर करारा व्यंग्य किस कहानी में चित्रित है?

a) सलाम b) आकाशदीप c) ब्लैक होल

6) बग्गा साहब मिल में किस पद पर काम करते थे?

a) चीफ इंजीनियर b) मॅनेजर c) कॉशियर

7) 'खोयी हुई दिशाएँ' कहानी का प्रमुख पात्र -----

a) चन्दर b) परमेश्वर प्रसाद c) घीसू

8) हिन्दी दिवस कब मनाया जाता है?

a) 14 सितंबर b) 24 दिसबंर c) 28 अक्तूबर

[P.T.O.

9) 'भालू' को किस चीज का पागलपन था?

a) साइकिल b) मोटारसाइकिल c) जहाज

10) अष्टम अनुसूची किसने तैयार की?

a) श्री एन. गोपाल स्वामी अय्यंगार b) डॉ. राजेन्द्र प्रसाद c) महात्मा गांधी

11) 'दीशी' यह पात्र किस कहानी में चित्रित है?

a) अपरिचित b) डिप्टी कलक्टरी c) खोयी हुई दिशाएँ

12) जयशंकर प्रसाद का जन्म कब हुआ?

a) 1890 b) 1840 c) 1960

II. किन्हीं तीन की ससंदर्भ व्याख्या कीजिए। (3×5=15)

1) "आया, पिल्लों को गरम पानी में डुबोकर क्यों मार दिया?"

2) 'बगैर चिन्ता के जी ही नहीं सकते।'

3) "अब यह तुम पर डिपेंड करता है अंक कि तुम अपने दिमाग को 'बिग बैंग' बनने देना पसन्द करोगे या 'ब्लैक होल।"

4) "तुम कभी उनके घर गयी हो? उनसे मिली हो? फिर कैसे जानती हो वे बुरे लोग हैं?"

5) "मैं अनुचर हूँ, वरूणदेव की शपथ। मैं विश्वासघात नहीं करूँगा।"

III. किन्हीं दो प्रश्नों के उत्तर लिखिए। (2×10=20)

1) 'सलाम' कहानी का आशय स्पष्ट कीजिए?

2) 'आदमी का बच्चा' कहानी में चित्रित बालिका 'डौली' का चरित्र–चित्रण कीजिए?

3) 'ब्लैक होल' कहानी का उद्देश्य स्पष्ट कीजिए?

4) 'कफन' कहानी का सारांश लिखिए?

IV. किन्हीं पाँच प्रश्नों के उत्तर लिखिए। (5×2=10)

1) मानक भाषा किसे कहते हैं?

2) राष्ट्रभाषा किसे कहते हैं?

3) राजभाषा हिन्दी के स्वरूप का फॉर्मूला किसने पेश किया और उसे कब स्वीकारा?

4) बोलचाल की भाषा का अर्थ लिखिए?

5) राज्यभाषा किसे कहते हैं?

6) संपर्क भाषा किसे कहते हैं?

7) राजभाषा आयोग का गठन कब हुआ और किसने किया?

V. किसी एक प्रश्न का उत्तर लिखिए। (1×5=5)

1) हिन्दी भाषा के विविध रूपों पर प्रकाश डालिए?

2) मानक भाषा की परिभाषा देते हुए उसका महत्व स्पष्ट कीजिए?

47032/A0320

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I Semester B.Sc. 6 (NEP) Degree Examination, April/May - 2023

PHYSICS

Mechanics and Properties of Matter

(Regular)

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

Instructions to Candidates :

1) Calculators are allowed.

2) Show intermediate steps.

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

1. a) Write two **differences between fundamental and derived units.**

b) What are **scalar and vector fields?**

c) Write two **differences between elastic and inelastic collisions.**

d) State **parallel axes theorem.**

e) Define **stress and strain.**

f) What is **meant by binding energy of satellite.**

g) Define **angle of contract in case of a liquid drop placed on a plane horizontal surface.**

h) Mention **two differences between streamline and turbulent flow.**

Answer 'a and b' or 'c and d'.

2. a) Define **gradient, divergence and curl of a vector.** Mention their physical significances. **(8)**

b) A sand bag **of mass 10kg is suspended with 3m long weightless string. A bullet of mass** 0.2kg is **fired with a speed of 20m/s into the bag and stays in the bag.** Calculate speed acquired by **the bag.** **(4)**

(OR)

c) What is **principle of rocket motion.** Derive an equation of motion for a single stage rocket. **(8)**

d) A steel **ball of mass 1kg is moving with velocity of 12m/s.** It strikes 4 kg is block at rest. The **collision is elastic. Find the speed of the ball and speed of the block after** collision. **(4)**

[P.T.O.

Answer 'a and b' or 'c and d'.

3. a) Derive an expression for moment of inertia of rectangular lamina about an axis through its centre and parallel to one side. **(8)**

b) A circular disc of mass 5kg and radius 0.38m rotates about its axis passing through centre and perpendicular to its plane. Calculate its moment of inertia. **(4)**

(OR)

c) Derive Kepler's second and third laws of planetary motion. **(8)**

d) Determine escape velocity on the moon. Mass of moon is 7.35×10^{22}kg and radius is 1.5×10^{6}m. **(4)**

Answer 'a and b' or 'c and d'.

4. a) Derive an expression for work done per unit volume in deforming the body. **(8)**

b) A wire 10m long has a cross sectional area of $1.25\times10^{-4}m^2$. It is subjected to a load of 5 kg if Young's modulus of the material is $4\times10^{10}N/M^2$. Calculate the elongation of the wire. **(4)**

(OR)

c) Derive an expression for time period of torsional pendulum. **(8)**

d) The ratio of radii of two long wires of same material is 2:1. If these wires are stretched by equal force. Find the ratio of stresses produced in them. **(4)**

Answer 'a and b' or 'c and d'.

5. a) Derive an expression for capillary rise in case of liquid in capillary tube. **(8)**

b) Find the excess pressure inside a liquid drop of radius 2×10^{-2}m given that surface tension of water is 0.073 N/m. **(4)**

(OR)

c) State, explain and derive Stoke's law of viscosity. **(8)**

d) Find terminal velocity of metal ball of radius 1×10^{-3}m. Falling through liquid. **(4)**

Given: Density of liquid =1200 kg/m^3.

Density of material of ball = 7800kg/m^3.

Coefficient of viscosity of liquid = 1.5NS/m^2 g=9.8m/s^2.

47032/A0320

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I Semester B.Sc. 5 (NEP) Degree Examination, April/May - 2023

PHYSICS

Mechanics and Properties of Matter

(Repeaters)

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

Instructions to Candidates :

1) Calculators can be used to calculate problems.

2) Write intermediate steps during problems.

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

1. a) What is inelastic collision?

   b) What is tongue?

   c) What are geostationary Satellites?

   d) State parallel axis theorem.

   e) Define poisson's ratio.

   f) Define Stress.

   g) Define surface tension.

   h) How viscosity of liquid varies with temperature?

Answer any one full question 'a and b' OR 'c and d'.

2. a) State the principle of rocket. Hence derive the expression for velocity of single stage rocket. **(10)**

   b) An electron of mass 9×10^{-31}kg revolves in a circle of radius 0.53A° around the nucleus of hydrogen with a velocity of 2.2×10^{6}m/s. Find the angular momentum of electron.**(2)**

(OR)

   c) Derive expression for final velocity in case of elastic collision in one dimension.**(10)**

   d) A torque of 20Nm is applied on a wheel initially at rest, Calculate the angular momentum of the wheel after 3 seconds. **(2)**

[P.T.O.

Answer any one full question 'a and b' OR 'c and d'.

3. a) State Kepler's laws of motion, and prove kepler's third law of planetary motion. (10)

b) Escape velocity of the earth 11.2km/s. Find the escape velocity of planet whose radius is twice and mass is thrice to that of the earth. (2)

(OR)

c) Give theory of Flywheel and hence obtain expression for moment of inertia of flywheel. (10)

d) An bar pendulum is having mass 1.2kg and moment of inertia about centre of gravity is 75×10^{-3}kgm^2. Find its radius of gyration. (2)

Answer any one full question 'a and b' OR 'c and d'.

4. a) Derive the relation connection between Young's modulus, Bulk modulus, and modulus of rigidity. (10)

b) When a pressure on a sphere is increased by 80 atmosphere. Then its volume decreases by 0.01%. Find the bulk modulus. (2)

(OR)

c) Give theory of cantilever and hence obtain expression for depression produced at free loaded end. (10)

d) The poisson's ratio and rigidity modulus of material of wire are 0.285 and 3.5×10^{10}N/m^2 respectively. Calculate the Young's modulus of the material of wire. (2)

Answer any one question 'a and b' or 'c and d'.

5. a) Describe Quinke's Method, with necessary theory for the determination of surface tension of mercury. (10)

b) Find the height to which water rises in capillary tube of diameter 1mm. If surface tension of water is 70×10^{-3}N/m and angle of contact is 60°. (2)

(OR)

c) Derive Poiseuille's equation for the flow of liquid in the tube. (10)

d) Find the viscous drag acting on steel ball of diameter 2mm and moving with terminal velocity 5×10^{-2}m/s in a liquid. (2)

Given -coefficient of viscosity is 0.6 Nms^{-2}.

44035/A0350

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

I Semester B.Sc.5 (CBCS) Degree Examination, April - 2023

PHYSICS (Optional)

(Repeaters)

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

Instructions to Candidates :

i) Calculators can be used to solve problems.

ii) Write intermediate steps.

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

i. Give any two distinction between elastic and inelastic collisions.

ii. What is torque?

iii. Write expression for angular momentum in terms of moment of inertia and angular velocity.

iv. Explain the terms GPS and NavIC.

v. State perpendicular axis theorem.

vi. A bar pendulum of mass 1.2 kg and moment of inertia about center of gravity is 75×10^{-3}kgm^2. Find radius of gravitation.

vii. Define Poisson's ratio.

viii. What is torsional pendulum?

ix. Write Expression for bending moment and explain the terms.

x. Write Relativistic formula for mass of the body.

xi. What is the objective of **Michelson** Morley experiment?

xii. What do you mean by rest mass of an electron?

2. Answer the questions 'a and b' OR 'c and d'. **(4×15=60)**

a. Two metal balls of different masses have same momentum. Which one has greater kinetic energy. **(5)**

b. Derive expression for final velocities in case of inelastic collision in

i. Laboratory frame of reference.

ii. Center of mass frame of reference. **(10)**

(OR)

c. The ball of mass 0.1 kg collides elastically with the ball of unknown mass at rest. If 0.1 kg ball rebounce with half its original speed, what is the mass of other ball. **(5)**

d. State the principle of rocket motion, derive expression for single stage rocket. **(10)**

3. Answer the questions 'a and b' OR 'c and d'.

a. Determine escape velocity on the moon. Mass of moon is 7.35×10^{22}kg and radius of moon is 1.5×10^{6}m. **(5)**

[P.T.O.

b. State, explain and prove Kepler's second law of planetary motion. **(10)**

(OR)

c. A rectangular plate of mass 0.7 kg has length of 0.25 m and breadth of 0.018 m find its moment of inertia about an axis passing through center of gravity, and perpendicular to its plane. **(5)**

d. Give the theory of compound pendulum. **(10)**

4 Answer the questions 'a and b' OR 'c and d'.

a. The ratio of radii of two wires of same materials is 2:1. If these wires stretched by equal force, Find the ratio of stresses produced in them. **(5)**

b. Derive relation between elastic constants. **(10)**

(OR)

c. A uniform metal ball of length 1.2 m rests on two knife edges at its ends. When it is loaded at the center with 3 kg, the depression produced is 0.015 m, calculate the critical load. **(5)**

d. Give the theory of cantilever and hence obtain expression for depression produced at the loaded end. **(10)**

5. Answer the questions 'a and b' OR 'c and d'.

a. What should be speed of rocket so that the observer majors its length as $3/4^{th}$ of its length at rest. **(5)**

b. State postulates of special theory of relativity. Derive Lorentz's transformation equation. **(10)**

(OR)

c. Two space ships 'A' and 'B' are moving in opposite direction each with a speed of 0.9 C. Find the relative velocity of B. With respective to A. **(5)**

d. Derive Einstein's mass - energy relation. **(10)**

47023/A0230

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I Semester B.Sc. (NEP) Degree Examination, March/April - 2023
CHEMISTRY (DSC)
(Regular)

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** questions. **(6×2=12)**

a. What is accuracy? Express it as percentage relative error.

b. What is precipitation titration? Give an example.

c. In which region of electromagnetic spectrum are the following series of lines in hydrogen spectrum observed?

i. Balmer series.

ii. Bracket series.

d. What is screening effect?

e. What is hybridisation?

f. Mention the types of organic reactions.

g. Write Vander Waal's equation for n moles of gas.

h. Define mean free path.

2. Answer any **Three** questions. **(3×4=12)**

a. What are errors? Write about indeterminate errors.

b. Explain the titration curve of strong acid and strong base.

c. Explain the theory of metal ion indicators used in EDTA titration.

d. Explain the theory of redox indicators with reference to diphenylamine in the titration of FAS against $K_2Cr_2O_7$.

[P.T.O.

3. Answer any **Three** questions. (3×4=12)

   a. Derive an expression for radius of electron in hydrogen atom.

   b. What are orbit and orbital? Give the shapes of s and p orbitals.

   c. What are quantum numbers? Write their significance.

   d. State and explain

      i. Aufbau principle.

      ii. Hund's rule.

4. Answer any **Three** questions. (3×4=12)

   a. Explain the electromeric effect with examples.

   b. Write the following with examples.

      i. Electrophiles.

      ii. Heterolytic fission.

      iii. Huckel's rule.

   c. Explain the following with example.

      i. Wurtz reaction.

      ii. Wurtz - fittig reaction.

   d. Discuss the mechanism of halogenation of alkane.

5. Answer any **Three** questions. (3×4=12)

   a. Define the following and how they are related to vander waal's constants.

      i. Critical temperature.

      ii. Critical pressure.

      iii. Critical volume.

   b. Explain the following and how they are related to each other

      i. RMS velocity.

      ii. Average velocity.

   c. State and explain Nernst distribution law. Mention its limitations.

   d. Derive an expression for the amount of substance left unextracted after n^{th} extraction with a portion of solvent each time.

44024/A0240

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

I Semester B.Sc. Degree Examination, March/April - 2023

CHEMISTRY (Optional)

(CBCS Scheme)

(Repeater)

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

Instructions to Candidates :

1. *All questions are **compulsory.***
2. *Draw neat **diagrams** and give equations wherever necessary.*

I. Answer any **TEN** questions. **(10×2=20)**

1. State Heisenberg's uncertainty principle.
2. Write the series of lines appear in the hydrogen spectrum.
3. Write the electronic configuration of copper (Z = 29).
4. Calculate the bond order of N_2 molecule.
5. Name the type of hybridisation present in SF_6 molecule and also its geometry.
6. Mention the factors influencing the formation of ionic bond.
7. What is electromeric effect?
8. State Huckel's rule.
9. What are nucleophiles? Give two examples.
10. Give the methods of purification of solids.
11. Calculate the angle strain in cyclobutane.
12. What are epimers? Give example.

II. Answer any **THREE** questions. **(3×5=15)**

a) Explain Bohr's theory of atomic model.

b) What are quantum numbers? Give their significance.

c) What are orbit and orbital? Give the shapes of S and P orbitals.

d) State and explain :

i) Aufbau principle

ii) Hund's rule.

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III. Answer any **THREE** questions. (3×5=15)

a) Write the salient features of MOT.

b) Explain the Born - Haber's cycle for the formation of sodium chloride.

c) Explain the geometry of PCl_5 on the basis of hybridisation.

d) What are bonding and antibonding molecular orbitals? Write their characteristics.

IV. Answer any **THREE** questions. (3×5=15)

a) What are carbocations? Discuss their stability.

b) What are dienes? Write their classification with examples.

c) Explain the preparation of alkenes by

i) Dehydration of alcohols.

ii) Dehydrohalogination of alkyl halides.

d) What is Ozonolysis? Explain the Ozonolysis of 2-butene.

V. Answer any **THREE** questions. (3×5=15)

a) What is chromatography? Explain the column chromatography.

b) Explain the rules for assigning E and Z notations for compounds.

c) Explain the Baeyer's strain theory of cycloalkanes.

d) Explain the following with example.

i) Enantiomers

ii) Anomers.

iii) Meso compounds.

42124/A240

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

I Semester B.Sc. Degree Examination, March/April - 2023

CHEMISTRY (OPTIONAL)

(Old Syllabus Scheme -Repeater)

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

Instructions to Candidates :

i) All questions are compulsory.

ii) Answer all questions in the same answer book.

iii) Draw neat labelled diagrams and equations wherever necessary.

SECTION - A

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

1. a) State Hund's rule.

b) Define lattice energy.

c) Give the principle of steam distillation.

d) Define accuracy.

e) What are enantiomers?

f) Define the term normality.

g) What are chromophores?

h) Define geometrical isomerism.

i) State law of corresponding states.

j) Mention two limitations of Henry's law.

k) State Nernst distribution law.

l) Define salt hydrolysis.

[P.T.O.

SECTION - B

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

2. Derive an expression for the energy of an electron in the n^{th} orbit of an H-atom.
3. Define covalent bond. Explain the formation of HCl molecule on the basis of VBT.
4. Explain how liquids are separated by fractional distillation.
5. Discuss the stability of cycloalkanes by Bayer's strain theory.
6. Derive reduced equation of state from Vander waal's equation.
7. Calculate the pH of 0.01M solution of sodium acetate at 15°C ((*Ka for* $CH_3COOH = 1.75\times10^{-5}$ *and* $KW = 1.008\times10^{-14}$.

SECTION - B

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

8. a) Explain Born-Haber's cycle for the formation of Nacl Molecule.
   b) Write a note on determinate errors.
9. a) Explain with suitable examples.
      i) Bathochromic shift
      ii) Hyperchromic shift.
   b) Explain the resolution of mixture by walden inversion.
10. a) Define critical temperature, critical pressure and critical volume.
    b) With neat labelled diagram , explain phenol-water system.
11. a) Give the assumptions of Bohr's model of an atom.
    b) Explain the determination of configuration of butenedioic acid by anhydride formation.
12. a) Discuss redox titration with suitable example.
    b) i) What are azotropic mixtures. Give example.
       ii) Give any two applications of nernst distribution law.

47030/A0300

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

I Semester B.Sc. 6. Degree Examination, March/April - 2023

MATHEMATICS (DSC)

Algebra - I and Calculus - I

Paper : 21BSCICIMATIL

(Repeater/Regular)

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

Instructions to Candidates : *Answer all questions.*

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

   a. Define the equivalent matrices.

   b. Find the rank of the matrix $\begin{bmatrix} 1 & 1 & -1 \\ 2 & -3 & 4 \\ 3 & -2 & 3 \end{bmatrix}$.

   c. For the curve $r = ae^{\theta \cot \alpha}$ then show that $\phi = \alpha$.

   d. Find $\frac{ds}{dx}$ for the curve $y^2 = 4ax$.

   e. State Rolles theorem.

   f. Evaluate $\lim_{x \to 0}\left[\frac{x - \sin x}{x^3}\right]$.

   g. Find the n^{th} derivative of $\log(x^2 + 3x + 2)$.

   h. If $y = \sin^2 x$ then find y_n.

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

   a. Verify Cayley - Hamilton theorem for the matrix $\begin{bmatrix} 5 & 3 \\ 4 & 2 \end{bmatrix}$ and find its inverse.

   b. Prove that rank of a matrix is unaltered by multiplying the elements of a row by non-zero scalar.

[P.T.O.

c. Find the rank of the matrix $\begin{bmatrix} 1 & 2 & 1 & 2 \\ 1 & 3 & 2 & 2 \\ 2 & 4 & 3 & 4 \\ 3 & 7 & 4 & 6 \end{bmatrix}$ by reducing it to echelon form.

d. Test the consistency of the system of equations, $x+y+z=9$; $2x+5y+7z=52$, $2x+y-z=0$ and solve.

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

a. Find angle of intersection of the curves $r=a\cos\theta$ and $r=a(1-\cos\theta)$.

b. For the plane curve, prove that $\frac{1}{p^2}=\frac{1}{r^2}+\frac{1}{r^4}\left(\frac{dr}{d\theta}\right)^2$.

c. Derive the radius of curvature in cartesian form.

d. Find the equation of circle of curvature for the curve $xy(x+y)=2$ at $(1,1)$.

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

a. If f(x) is continuous in [a,b] then show that it attains its bounds at least in that interval.

b. If $\lim_{x\to a} f(x)=L$ and $\lim_{x\to a} g(x)=M$ then prove that $\lim_{x\to a}[f(x)-g(x)]=L-M$.

c. State and prove Cauchy's mean value theorem.

d. Find the Maclaurins series expansion for the function $\log(\sec x)$ up to 5^{th} degree terms.

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

a. If $y=\cos 2x.\cos 4x.\cos 6x$ find y_n.

b. Find the n^{th} derivative of $e^{ax}.\cos(bx+c)$.

c. State and prove Leibnitz's theorem for the n^{th} derivative of product of two functions.

d. If $y=(x^2-1)^n$ then prove that $(x^2-1)y_{n+2}+2xy_{n+1}-n(n+1)y_n=0$.

44033/A0330

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

I Semester B.Sc.5 Degree Examination, March/April - 2023

MATHEMATICS

Algebra - I and Calculus - I

(Repeater)

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

Instructions to Candidates : *1. Question paper contains 3 parts namely A,B and C.*
2. Answer all questions.

Part - A

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

1. a. Define Reciprocal determinant.
   b. Define elementary row transformations of matrix.
   c. Define skew - symmetric matrix with example.
   d. If $a,b \in R$, then a>b iff $-a < -b$.
   e. Find the value of k, if

$$f(x) = \begin{cases} 4x-1 \ for \ x \le 1 \\ x+k \ for \ x > 1 \end{cases}$$ is continuous at x = 1.

   f. State borel covering theorem.
   g. Evaluate : $\lim_{x \to 4}\left[\frac{x^2-16}{x^2+7x+12}\right]$.
   h. If $y = \log(2x+3)$ find y_n.
   i. Find the n^{th} derivative of $sin2x.sin3x$.
   j. State Rolle's mean value theorem.
   k. Expand $cosx$ by maclaurin's theorem.
   l. Find the value of 'C' for $f(x) = x^3 + x^2$ in [1,2] by using Lagrange's mean value theorem.

P.T.O.

Part - B

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

2. Show that $\begin{vmatrix} 1 & 1 & 1 & 1 \\ 1 & 1+x & 1 & 1 \\ 1 & 1 & 1+y & 1 \\ 1 & 1 & 1 & 1+z \end{vmatrix} = xyz$.

3. If $a,b,c \in R$ then prove that $a^2+b^2+c^2 \geq ab+bc+ca$.

4. State and prove intermediate value theorem.

5. If $\lim_{x\to a} f(x) = l$ and $\lim_{x\to a} g(x)$ then prove that $\lim_{x\to a}[f(x)+g(x)] = l+m$.

6. Find the nth derivative of $e^{ax}.\sin(bx+c)$.

7. Verify Cauchy's mean value theorem for the function $f(x)=e^x$ and $g(x)=e^{-x}$ in [a,b].

Part - C

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

8. a. Prove that the rank of matrix does not alter under the elementary row or column transformations.

   b. Find the rank of matrix $A = \begin{bmatrix} 1 & -1 & 1 \\ 2 & -3 & 4 \\ 3 & -2 & 3 \end{bmatrix}$ by reducing it to normal form.

9. a. Prove that $|x+y| \leq |x|+|y| \ \forall x, y \in R$.

   b. Prove that $f(x) = \begin{cases} \frac{\sin x}{x} + \cos x ; x \neq 0 \\ 2 \quad ; x = 0 \end{cases}$ is continuous at x = 0.

10. a. If f(x) is continuous in [a,b] then it is bounded in that interval.

    b. Evaluate : $\lim_{x\to 0}\left[\frac{x-\sin x}{\tan^3 x}\right]$.

11. a. State and prove Leibnitz theorem for nth derivative of the product of two functions.

    b. If $y = a\cos(\log x) + b\sin(\log x)$ then show that

    $x^2 y_{n+2} + (2n+1)x y_{n+1} + (n^2+1)y_n = 0$.

12. a. State and prove Taylor's theorem with schlomilch and Ranches form of remainder.

    b. Expand $\log(1+e^x)$ using Maclaurin's series.

35133/42133/A330

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

I Semester B.Sc. 3/4 Degree Examination, March/April - 2023

MATHEMATICS

Differential Calculus

Paper : I

(Repeater)

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

Instructions to Candidates :

1) Question paper has three parts namely **A,B and C**
2) Answer **all** parts.

PART - A

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

1. a) If $a,b,c \in R, a \neq 0$ and $ab = ac$ then prove that b = c.

b) For all $x \in R$ prove that $|x| = \sqrt{x^2}$.

c) Show that $f(x) = \begin{cases} 4x+3; & x < 4 \\ 3x+7; & x \geq 4 \end{cases}$ is continuous at $x = 4$

d) Define uniform continuity.

e) Find the 4th derivative of $(3x+5)^6$.

f) Find the nth derivative of $\sin^3 x$.

g) If $y = \log(x^2 - 4)$ then find y_n.

h) State Cauchy's mean value theorem.

i) Verify Lagranges mean value theorem for $f(x) = \log x$ in $[1,e]$.

j) Expand $\log(1+x)$ using Maclaurin's theorem.

k) Evaluate $\lim_{x \to 1} \frac{1 + \log x - x}{1 - 2x + x^2}$.

l) State L-Hospital rule.

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PART - B

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

2. Prove that $|x-y| \le |x|+|y|, \forall x, y \in R$.

3. If $\lim_{x \to a} f(x) = l$ and $\lim_{x \to a} g(x) = m$ then prove that $\lim_{x \to a}[f(x).g(x)] = lm$

4. Find the nth derivative of $e^{ax} \sin(bx+c)$.

5. Verify Rolle's theorem for the function $f(x) = x^2 - 6x + 8$ in the interval $[2,4]$.

6. Verify Cauchy's mean value theorem for the function x^2 and x^3 in $[1,2]$.

7. Evaluate $\lim_{x \to 0}\left(\frac{1}{x^2} - \cot^2 x\right)$

PART - C

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

8. a) State and Prove Archimedian property for real numbers.

   b) Find the solution set of $3x^2 - 10x + 3 < 0$.

9. a) State and Prove Intermediate value theorem.

   b) Discuss the continuity of $f(x) = \begin{cases} \frac{e^{\frac{1}{x}} - 1}{e^{\frac{1}{x}} + 1}, & x \neq 0 \\ 0 & x = 0 \end{cases}$ at $x = 0$

10. a) State and prove Leibnitz theorem for nth derivative of a product of two functions.

    b) If $y = e^{m \sin^{-1} x}$ then show that $(1-x^2)y_{n+2} - (2n+1)xy_{n+1} - (m^2+n^2)y_n = 0$.

11. a) State and prove Taylor's theorem with Schlomich and Rouche's form of remainder.

    b) Use Maclaurins theorem to find the expanding of the function $\log(1+e^x)$ to the term containing x^4

12. a) Find the value of 'a' in order that $\lim_{x\to 0}\left[\frac{\sin 2x + a\sin x}{x^3}\right]$ is finite and evaluate the limit.

b) Evaluate

i) $\lim_{\theta\to\frac{\pi}{2}} \frac{\log\left(\theta-\frac{\pi}{2}\right)}{\tan\theta}$

ii) $\lim_{x\to\infty}\left(1+\frac{a}{x}\right)^x$

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No. of Printed Pages : 7

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

I Semester B.Sc./B.Com/BCA Degree Examination, March/April - 2023

COMPUTER SCIENCE

Digital Fluency (SEC)

(Regular)

Time : 1 Hour **Max. Marks : 25**

Instructions to Candidates:

1) **Answer all questions**
2) **All questions are MCQ.**
3) **Each question carries one mark.**

1. Which of the following is the smallest unit of data in a computer?

   A) Byte B) Bit

   C) Nibble D) Kilobyte

2. The basic architecture of computer was developed by

   A) Charles Babbage B) Blaise Pascal

   C) John Von Neumann D) Garden Moore

3. Following is the computer program that would convert an assembly language to the machine language.

   A) Interpreter B) Compiler

   C) Disassembler D) Assembler

4. Which generation is based on VLSI technology?

   A) First Generation B) Second Generation

   C) Third Generation D) Fourth Generation

[P.T.O.

5. What is true about operating system?

A) An operating system is a collection of software.

B) An operating system is a vital component of the system software.

C) An operating system is an interface between a user and computer hardware.

D) All of the above.

6. Which of the following is not a kind of system software?

A) Operating system B) Device Drivers

C) Microsoft Word D) BIOS software.

7. Which of the following is an example of open source operating system?

A) Linux B) Windows

C) Ubuntu D) Both (a) and (c)

8. Which of the following computer memory is fastest?

A) Register B) ROM

C) RAM D) Hard Disk

9. Data in _____ bytes size is called Big data.

A) Tera B) Giga

C) Peta D) Meta

10. PaaS stands for

A) Parallel as a service B) Platform as a Service

C) Platforms as a service D) Platform as a software.

11. In MS word 2007, how many ways a text can be aligned?

A) 2 ways B) 5 ways

C) 3 ways D) 4 ways

12. Shortcut key to open a 'New Blank Document' in Ms- Word.

A) CTRL+N B) CTRL+O

C) CTRL+B D) CTRL+M.

13. Word wrap means

A) Aligning text with the right margin

B) Inserting spaces in between words

C) Automatically moves text to the next line when necessary

D) Allows user to type over text.

14. Which bar in Excel show the used formula of selected active cell?

A) Menu bar B) Scroll bar

C) Task bar D) Formula bar

15. Following is a powerful tool used to create and format spreadsheets.

A) Adobe Photoshop B) Microsoft powerpoint

C) Microsoft Excel D) Microsoft word

16. Which Excel function displays row data in column or column data in row?

A) Row to column B) Column to Row

C) Transpose D) Switch

17. Which of the following option is used to see all slides at once?

A) Slide view B) Slide sorter view

C) All slide view D) None of the above

18. Google Docs is similar to which of the following application?

A) Microsoft outlook B) Microsoft word

C) Text Document D) Microsoft Excel

19. _____ is a cloud based storage service which is developed by Google.

A) Google Docs B) Google Drive

C) Goolge Chrome D) Google Slides

20. Which of the following is not a virtual meeting application?

A) Zoom B) Google meet

C) Webex D) Kahoot

21. Which is the e-Learning application launched by Government of India?

A) Byju's
B) Swayam
C) Udemy
D) None of the above

22. MOOC Stands for

A) Master Open Online Courses
B) Massive Open Offline Class
C) Massive Open Online Courses
D) Master Open Online Class

23. Which E-commerce model focuses on Consumers dealing with one another?

A) Business to Business
B) Business to consumer
C) Consumer to Consumer
D) Consumer to Business.

24. Which of the following is not a E-Commerce website?

A) Amazon
B) Google
C) Flipkart
D) Myntra

25. Expand HTTP.

A) Hyper Text Test Protocol
B) Hyper Text Transfer Protocol
C) Hyper Text Transmit Protocol
D) Hyper Text Test Provision.

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I Semester (All Degree Courses) Degree Examination, March/April - 2023

COMPUTER SCIENCE

Digital Fluency (SEC-Theory)

(Repeater)

Time : 1 Hour **Max. Marks : 25**

Instructions to Candidates: Answer all Sections.

SECTION - A

I. Answer all five questions. Select the most appropriate answer from the following. **(5×1=5)**

1. Expansion of IIOT.
   A) Industrial Internet of Things.
   B) Information Internet of Things.
   C) Interpreter Internet of Things.
   D) None of the above.
2. Neural Networks is the old name for.
   A) Data Learning B) Machine Learning
   C) Deep Learning D) Network Learning.
3. Big Data Tools and Technologies.
   A) NOSQL B) Apache Hadoop
   C) Apache Hive D) All of the above
4. Which is not a google cloud platform Service?
   A) Big Data B) Networking
   C) IOT D) None
5. DLP full form.
   A) Data Leakage Prevention. B) Data Loss Prevention
   C) Data Load Prevention D) None.

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SECTION - B

II. Answer any Five questions. Each carries 2 marks. **(5×2=10)**

6. Define AI. Give its applications.
7. Who are the users of Machine Learning?
8. Explain the Advantages of Database.
9. Differentiate between IOT and IIOT.
10. List the advantages of cloud computing.
11. Mention the types of Cyber Security.
12. Give the importance of Communication skills.
13. Mention the steps in creative problem solving.

SECTION - C

III. Answer any Two questions. Each carries 5 marks. **(2×5=10)**

14. Fill in the blanks.
    a) Deep Learning is the subset of _____.
    b) Technology used in the process of automatically translate content from one language to another language without human input _____.
    c) Full form of SaaS in cloud is _____
    d) Process of working well with one or more people to accomplish a common goal is called _____
    e) Process of turning ideas into things _____
15. Give True or False.
    a) AI intelligence is demonstrated by machines _____ (True/Flase)
    b) Data are individual facts, statistics, or items of information, often numeric _____ (True/Flase)
    c) Cloud Computing networks are designed to support only public cloud _____ (True/False).

d) Communication is defined as transferring information to produce greater understanding _____ (Ture/False)

e) Teamwork will not increase the quality and quantity of output _____ (True/False)

16. Match the following.

a)	AI	i)	Antivirus
b)	IoT	ii)	Healthcare
c)	Cyber Security	iii)	Self-Driving cars
d)	Big Data	iv)	AWS
e)	Cloud	v)	Robots