III Semester B.Sc. Degree Examination, March - 2022
ENGLISH
(Regular CBCS - AECC)

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

Text: **The Blue Umbrella**

I. Answer the following questions in a word, a phrase or a sentence each.   **(10×1=10)**
1. What is the name of Bijju's sister?
2. Who is Ram Bharosa?
3. Who turned out as a 'Trusty Umbrella Thief'?
4. Who gave silver pendant with the claw to Binya?
5. How much money was offered by Ram Bharosa to steal the blue umbrella?
6. Where did Bijju and Binya live?
7. Mention names of the cows?
8. Who tried to steal the blue umbrealla?
9. Who did save blue umbrella from the thief?
10. What did Binya search in the forest glade?

II. **A)** 1. Sketch the character of Bijju.   **(1×10=10)**

                             (OR)

         2. Depiction of Nature in the Novel 'The Blue - Umbrella' - Explain.

     B) 1. Sketch the character of Binya Devi.   **(1×10=10)**

                             (OR)

         2. 'Sacrifice is key to happiness'. Discuss this statement with reference to Ruskin Bond's 'The Blue Umbrella'.

III. Write short notes on the following (any **four**)   **(4×5=20)**
1. Ram Bharosa.
2. Rajaram.
3. Concluding part of the story.
4. Picnickers.
5. Leopard claw episode.
6. Human tendency of owning things.

IV. A) Substitute the following expressions with one word. (1×5=5)
1. Able to move quickely and easily.
2. Sudden full down.
3. One who possesses many talents.
4. One who loves climbing.
5. Regard with respect.

B) Convert the following sentences as directed. (5×1=5)
1. They called off the meeting (passive).
2. The teacher always answers the questions of students (passive).
3. Bharati painted the entire house in two days. (passive).
4. The Indian Army has been created a history in this war. (Active).
5. Vikram Batra captured the point 5140 during kargil war. (passive).

C) Draft a notice informing your college students about 'Farewell Party' to be held on 2ⁿᵈ April 2022. (1×5=5)

D) Write a paragraph on the following. (1×5=5)
1. Pollution due to urbanization.

(OR)

2. Action speak louder than words.

E) Make the proofreading of the following passage. (1×5=5)

Knowledge is power. People may think that it is power that rules the world. There are, no doubt, worshippers of brute power. But if you think a little, you will find that it is kowledge that rules the world. A scientist studies the natural phenomena and uses its mighty force for human service. The forces of nature give us light, energy, comfort and power. A knowledgeable man is able to lead other people. He inspires confidence in others. The people aroud him also respect him. Knowledge gives a person immense power.

The ability to acquire knowledge, preserve and pass it on to the future generation makes man powerful. It enables him to control the forces of nature and use them for his benefit. This power of knowledge, if used wisely can bring Happiness to mankind. Knowledge leads to wisdom, respect and consequently power.

Knowledge is state of Awareness or understanding and learning of specific information about something and it is gained from experience or study. This means a person has the resources to express his views dynamically and make intelligent decisions based on his everyday situations, awareness and understanding.

F) Write a review of any film you watched recently (Provide details about, title of the film, star cast and production house, the plot, etc). (1×5=5)

III Semester B.Sc. Degree Examination, March - 2022
BASIC ENGLISH
Eco - English
(Repeaters)

Time : 3 Hours   Maximum Marks : 80

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

1.   How many years old is mayan civilization?

2.   What did the Lord order Noah to do?

3.   Who is moses?

4.   What is the name of king's son?

5.   Name the author of "Animal Farm".

6.   Who predicted that at the age of sixteen the hair of youth will turn white?

7.   How much radiation of the sun reaches the earth?

8.   What leads to the wild growth of vegetation in the rivers?

9.   What prevents the river water from reaching the sea?

10. What makes our air, water and food poisonous?

II. Answer the following in one or two sentences.   (5×2=10)

1.   What was amazing about the Hindus and Mayans?

2.   Who issued notice to Noah for his selection of people to be saved?

3.   Mention any two reasons for water pollution.

4.   What suggestion was given by the astrologers to the king to save his son?

5.   What is the major ill effect of river valley projects?

III. A) Describe the difficulties faced by Noah in getting the permission to build the ship.(10)

(OR)

B) List out the predictions of Mayans and hindus on the world ending.

IV. A) Describe the consequences of construction industry on the rivers.   (10)

(OR)

B) Sum up the arguments of major in proving men as an enemy of animals.

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V. Write short notes. (Any 2).   (2×5=10)
1. Jonash.
2. Global warming.
3. Types of pollution.
4. Water.

VI. Frame sentences from the following pairs of words.   (5×2=10)
1. Floor - flour.
2. Lose - Loose.
3. Sweet - Sweat.
4. Quiet - Quite.
5. Accept - Except.

VII. A) Give one word substitute for the following :   (5×1=5)
1. One who speaks many languages.
2. A person in charge of museum.
3. A person who does not believe in God.
4. One who has a long experience of any occupation.
5. One who lives in solitude.

   B) Write an interpretation of following notices (any **one**) :   (1×5=5)
1. Tresspassers will be punished.
2. Stick No bills.

VIII. 1. Translate the following paragraph into Kannada.   (10)
Punctuality is the essential part of our life and nature. The sun rises with the seasonal
Punctuality and so it sets. The seasons turn in their cycles and there again you have
nature observing punctuality. The huge stars move in their course so punctually that
they remin in the heavens and everything seems well in the world. The singing of a
Cuckoo, the migration of birds, the following of trees and bearing of fruits in their
time and seasons to us a lesson in punctuality. In fact, our life and growth, age and
death are so planned by the creator that they showed follow a pattern of punctuality.

(OR)

2. Paraphrase the following poem.
Nature's first green is gold,
Her hardest hue to hold,
Her early leaf's flower;
But only so an hour.
Then leaf subsides to leaf,
So eden sank to grief,
So dawn goes down to day,
Nothing gold can stay.

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III Semester B.Sc./B.C.A. Degree Examination, March - 2022
HINDI (MIL)
1) कथाभारती 2) संक्षेपण 3) सामानार्थी शब्द
4) विपरीतार्थक शब्द 5) अनेकार्थक शब्द
(Regular)

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

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

1.   प्रेमचंद जी का वास्तविक नाम ----- था।

   a) धनपतराय   b) चतुर्भुज   c) श्रीराम वर्मा

2.   सिध्देश्वरी ----- के भोजन के लिए अपने परिवार की प्रतीक्षा में है।

   a) सुबह   b) शाम   c) दोहपर

3.   ---- विश्वविद्यालय से अमरकांत ने बी.ए की शिक्षा प्राप्त की।

   a) पंजाब   b) इलाहाबाद   c) दिल्ली

4.   भीष्म साहमी का निधन ---------- में हुआ।

   a) 2003   b) 2002   c) 2001

5.   लाला शिवप्रसाद जी रात -------- खाकर जान दे दी

   a) जहर   b) गोलीयाँ   c) नशिली पदार्थ

6.   सेठ चंदुमल की दुकान चाँदनी चौक -------- में थी।

   a) पंजाब   b) दिल्ली   c) इलाहाबाद

7.   कहानियों में -------- तत्व महत्वपूर्ण माने गये है।

   a) 9   b) 8   c) 7

8.   ---------- में कहानियों के साथ संक्षेपण समानार्थी शब्द, विपरीतार्थक शब्द के अध्याय जोडे है।

   a) कथा – भारती   b) कहानी कुंज   c) गद्य विविधा

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9. उदय प्रकाश जी का जन्म ------- गाँव में हुआ

    a) उदयपुर   b) रामपुर   c) सीतापूर

10. संजीव का जन्म -------- में हुआ।

    a) 1948   b) 1947   c) 1949

11. मैं कल से खेती करूँगा/ मेरा यही ------- है।

    a) फैसला   b) निर्णय   c) विचार

12. संक्षेपण के ----- गुण है।

    a) 11   b) 10   c) 12

13. विश्व हिंदी दिवस कब मनाया जाता है।

    a) 10 मार्च   b) 10 जनवरी   c) 10 फरवरी

14. हिंदी साहित्य में कितने साहित्यकारों को ज्ञानपीठ पुरस्कार मिला?

    a) 11   b) 10   c) 12

II. किन्हीं दो का संदर्भ सहित अर्थ स्पष्ट कीजिए: (2×7=14)

1. "पढ़ल-लिखल लडकी लोग सामने आर्वे और हाथ का गादेना पढ़कर बतार्वे।"

2. "उसमें अजब साहस और बल है। खेत पानी गोबर पाकर झुमने लगे भवानी की ऑखो में।"

3. "अगर इन पापियों को कोई गोली मार देता तो मैं बहुत खुश होता।"

4. "------- मेरे प्यारे रामदीन, तुमने बजार में मेरी प्रतिष्ठा बचा ली।"

III. किसी एक प्रश्न का उत्तर लिखिए।   (1×14=14)

1. "दोपहर का भोजन" इस कहानी का उद्देश्य बताईए।

2. "चीफ की दावत" इस कहानी का सारांश लिखिए।

IV. किन्हीं दो प्रश्नों के उत्तर संक्षेप में लिखिए　　　　(2×7=14)

　　1.　पहली चूक इस कहानी से क्या जानकारी मिलती है, समीक्षा कीजिए

　　2.　झूठी है तेरी दादी इस कहानी का उद्देश्य स्पष्ट किजीए।

　　3.　अपराध इस कहानी का सारांश बताईए।

　　4.　ककडी की कीमत इस कहानी की विशेषताएँ बताईए।

V. निम्नलिखित अनुच्छेद का संक्षिप्तीकरण कर उचित शीर्षक दीजिए।　　　　(1×10=10)

　　　　आज भी उन सफेद पत्थरों से आवाज आती है मै भूला नही हूँ। आज भी उन पत्थरों से न जाने किस मार्ग से होती हुई पानी की बुंद प्रतिवर्ष उस सुंदर सम्राज्ञी की मृत्यु की याद कर मनुष्य की उस करुण कथा के दुखांत को देखकर पिघल जाती है। और उन पत्थरों से अनजाने एक आँसू लुढक पड़ता है। आज भी यमुना नदी की धारा समाधी को चुमती हुई मग्न मानव जीवन की यह करुण कथा अपने प्रेमी सागर को सुनाने दौड़ पड़ती है।

VI. किन्ही 6 पर्यायवाची शब्दों का एक-एक पर्यायवाची शब्द लिखिए।　　　　(6×1=6)

1.	आँख	5.	दास
2.	अश्व	6.	गृह
3.	आकाश	7.	जंगल
4.	जल	8.	दिस

VII. किन्ही 6 विलोम शब्दों का एक-एक विलोम शब्द लिखिए।　　　　(6×1=6)

1.	आलोक	5.	मृदु
2.	खंडन	6.	बाढ
3.	गोचर	7.	उत्तीर्ण
4.	पंडित	8.	क्षर

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VIII.किन्ही 6 अनेकार्थ शब्दों का एक-एक अनेकार्थक शब्द लिखिए।	(6×1=6)

1. अंजाम	5. कुल

2. अधिकार	6. गौरव

3. काम	7. चरित्र

4. गुरू	8. अंत

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III Semester B.Sc.3/4 Degree Examination, March - 2022
MATHEMATICS (Optional)
Paper - I Mathematical Logic and Real Analysis
(Repeaters)
(Syllabus w.e.f. 2015-16)

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

Instruction of Candidates :

  1) *Question paper contains 3 parts namely A, B, C.*

  2) *Answer all questions.*

PART - A

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

1. a)   Define converse and contra positive of given implication.

   b)   Construct the truth table for plup.

   c)   If $x = r\cos\theta$ and $y = r\sin\theta$ then find $\dfrac{\partial(x,y)}{\partial(r,\theta)}$

   d)   State Taylor's Theorem for function of two variables.

   e)   Expand e^{x+y} upto the second degree term by using Maclaurin's Theorem.

   f)   Define maximum and minimum value of the function $f(x, y)$.

   g)   Prove that $f(x, y) = x^3 + 3xy^2 - 3x^2 - 3y^2 + 7$ is maximum at $(0, 0)$.

   h)   Define convergent sequence and give an example.

   i)   Prove that the sequence $\{a_n\}$ defined by $a_n = 1 + \dfrac{1}{2} + \dfrac{1}{3} + \ldots + \dfrac{1}{n}$ is monotonic increasing.

   j)   Define cauchy's sequence and give an example.

   k)   State cauchy's second theorem on limits.

   l)   Prove that $\underset{n \to \infty}{\text{lt}} \; n^{\frac{1}{n}} = 1$.

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PART - B

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

2. Define tautology and prove that statement $\left[(p \to q) \wedge (p \to r) \right] \to (p \to r)$ is a tautology.

3. State and prove Lagrange's Mean value theorem for function of two variables.

4. Find extreme values of the function $f(x,y) = x^3 - y^3 + 3(x^2 + y^2) - 9x$.

5. If sequence $\{a_n\}$ converges to l and $\{b_n\}$ converges to m then prove that $\underset{n \to \infty}{it} (a_n + b_n) = l + m$.

6. Show that the sequence $\{a_n\}$ defined by $a_n = \dfrac{2n+5}{5n+2}$ is

   i) bounded

   ii) Monotonic and

   iii) Converges to $\dfrac{2}{5}$

7. State and prove cauchy's General principle of convergence of sequence.

PART - C

Answer any **FOUR** of the following : (4×10=40)

8. a) Define universal and existential quantifiers. Explain difference between then with suitable examples.

   b) Prove indirectly that "If n^2 is odd then n is odd".

9. a) If u and v are functions of x and y and x & y are functions of r and s then prove that $\dfrac{\partial(u,v)}{\partial(r,s)} = \dfrac{\partial(u,v)}{\partial(x,y)} \cdot \dfrac{\partial(x,y)}{\partial(r,s)}$.

   b) If $x + y + z = u$, $y + z = uv$ & $z = uvw$ then find $\dfrac{\partial(x,y,z)}{\partial(u,v,w)}$.
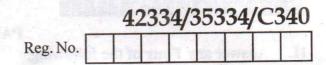
10. a) Explain the lagrange's method of undetermined multipliers to find extreme values of the function $u = f(x, y, z)$ where x, y, z are connected by the relations $\phi_1(x,y,z)=0$ and $\phi_2(x,y,z)=0$.

b) Find the maximum value of $x^2y^2z^2$ under the restriction $x^2+y^2+z^2=1$.

11. a) Prove that monotonic increasing bounded above sequence is convergent and converges to its least upper bound.

b) Prove that $\{x_n\}$ defined by $x_1=1$ and $x_n = \sqrt{2+x_{n-1}}$ is convergent and it converges to 2.

12. a) If $\{a_n\}$ converges to l then prove that sequence $\{x_n\}$ defined by

$$x_n = \frac{a_1 + a_2 ... + a_n}{n}$$ also converges to l.

b) Prove that for the sequence $\{a_n\}$ defined by

i) $a_n = \frac{1}{n}\left(1+\frac{1}{2}+\frac{1}{3}+...+\frac{1}{n}\right), \operatorname*{It}_{n\to\infty} a_n = 0$

ii) $a_n = \left(\frac{1}{2}, \frac{2}{3}, \frac{3}{4}...\frac{n}{n+1}\right)^{\frac{1}{n}}, \operatorname*{It}_{n\to\infty} a_n = 1$

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III Semester B.Sc. 3/4 Degree Examination, April - 2022
MATHMATICS (Optional)
Group Theory, Integral Calculus and Differential Equation
Paper : II
(Repeater w.e.f. 2015-16)

Time : 3 Hours   Maximum Marks : 80

Instructions to Candidates :

    1)   *Question paper contain three parts namely A,B,C.*

    2)   *Answer All parts.*

PART - A

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

  1.   a)   Define semigroup give an example.

        b)   Show that square root of unity is abelian group w.r.t. multiplication.

        c)   Write the permulation $f = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 \\ 5 & 4 & 6 & 3 & 1 & 2 & 7 \end{pmatrix}$

        d)   Find all left cosets of group H={1,-1} in a group G={1,-1,i,-i} under multiplication.

        e)   Prove that every cyclic group is abelian.

        f)   Write the formula for are length of

            i)   Cartesian curve

            ii)   Parametric curve

        g)   Find the surface area of the circle $x^2+y^2=a^2$

        h)   Solve the equation $e^y \cos x dx + e^y \sin x dy = 0$

        i)   Solve $\frac{dy}{dx} + y \tan x = \sec x.$

        j)   Solve $(x^2 - 4xy)dx + cy^2 - 2x^2)dy = 0$

        k)   Solve $p^2 - fp + 12 = 0$

        l)   Find the general solution of $(y - px)(p-1) = p$

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PART - B

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

2. Prove that a non empty sub set H of a group G is a sub group of G iff $\forall a, b \in H, ab^{-1} \in H$.

3. Prove that the set $G = \{a + b\sqrt{2} / a, b \in z\}$ is an abelian group under addition.

4. Find the volume of the solid generated by revolution of ellipse $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 1$ about the major axis (i.e a>b).

5. Solve the equation $(2x - 3y + 2)dx + (3x - 2y + 1)dy = 0$.

6. Prove that the sufficient condition for the equation Mdx+Ndy=0 to be exact.

7. Solve y-2xp+yp²=0.

PART - C

III. Answer any **Four** full questions.   (4×10=40)

8. a) Prove that arbitrary intersection of subgroups of a group G is also a subgroup of G.
   b). Prove that H={1,2,4} is a sub group of a group G, where G= {1,2,3,4,5,6} under multiplication module F.

9. a) State and prove lagrange's theorem for a finite group.
   b) Show that in any group G,
   $(ab)^{-1} = b^{-1}, a^{-1}, \forall a, b \in G$.

10. a) Derive the formula for volume of the solid generated by revolving the curve y=f(x)about the x-axis.
    b) Find the total length of the curve $r = a(1 + \cos\theta)$ using integration.

11. a) Explain the method of solving the differential equation $\dfrac{dy}{dx} + py = QY^n$.

    b) Solve the $\dfrac{xdy}{dx} = y + x^3 + 3x^2 - 2x$.

12. a) Solve the equation $x^2 p^2 + xyp - 6y^2 = 0$.

    b) Solve $x^2 y^2 = px^3 y + y^2 p^2$ by reducing to clairaut's form by using the substitution $x^2 = u$ and $y^2 = v$.

III Semester B.Sc. (CBCS) 5 Degree Examination, April - 2022
PHYSICS
Physics Optional
(Regular)

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

Instructions to Candidates:

1. *Calculators can be used to calculate problems.*

2. *Write intermediate steps during problem solving.*

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

1.   i)   Give any two postulates of Kinetic theory of gases.

ii)   Define coefficient of viscosity of liquid.

iii)   State and explain Stefan's law of radiation.

iv)   What is entropy?

v)   What are isochoric and isobaric processes?

vi)   Carnot's heat engine is working between temperatures of 227°C and 27°C receives heat of 2000 J per cycle. What is the heat rejected to sink

vii)   Define surface energy. How is it related to surface tension?

vlii)   State and explain Stoke's law of viscosity.

ix)   What is inversion temperature in Joule-Thomson effect?

x)   What are beats in sound waves?

xi)   Define one decibel.

xii)   What is absorption coefficient of an open window with regard to sound intensity, incident upon it?

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II   **Answer any ONE (Question 2 or Question 3) of the following:**

2.   a)   Derive expression for coefficient of thermal conductivity of gas.   **(10)**

     b)   Calculate the mean free path of gas molecule if number of molecules per cubic meter is 30×10^{24} and diameter of molecules is 60.6×10^{-9} m.   **(5)**

3.   a)   Derive Stefan's law of radiation.
    (10)

     b)   A black body radiates 1000 J of heat energy per second at 500 K. What is he amount of energy radiated by it if its temperature is raised to 800 K? If area of the body is 2 m^2, how much is energy radiated per second per unit area at temperature of 800 K? **(5)**

III   **Answer any ONE (Question 4 or Question 5) of the following**

4.   a)   Derive Maxwell's thermodynamic relations.   **(10)**

     b)   The system contains 2000 J of heat. A work of 2500 J is done on the system. What is the total internal energy of system? What is the change in internal energy of the system?

    (5)

5.   a)   Derive clausius - Clapeyron's equation.   **(10)**

     b)   A carnots engine has an efficiency of 30%. Its efficiency is to be increased to 50%. By What amount the temperature of the source must be increased? Given that temperature of sink is at 300 K.   **(5)**

IV   **Answer any ONE (Question 6 or Question 7) of the following**

6.   a)   Derive Poiseuille's formula for coefficient of viscosity of liquid.   **(10)**

     b)   What is the excess pressure inside a spherical water drop of a radius of 6×10^{-2} m. Given that the surface tension of water is 72×10^{-3} Nm^{-1}.   **(5)**

7. a) Describe construction and working of diffusion pump. (10)

   b) Explain Porous plug experiment in Joule-Thomson effect. (5)

V Answer any ONE (Question 8 or Question 9) of the following

8. a) Discuss composition of two SHM's of equal frequencies and equal amplitudes at right angles to each other.
   (10)

   b) A particle is executing SHM of amplitude 8 m. Its period is 2π. Find its velocity when its displacement is 5 m from mean position. (5)

9. a) Derive Sabine's formula for reverberation time. (10)

   b) In Helmholtz's resonator the resonating volume for frequency of 512 Hz is $90 \times 10^{-6} m^3$. Calculate resonating volume for frequency of 480 Hz. (5)

III Semester B.Sc. Degree Examination, March - 2022
SKILL ENHANCEMENT COURSE
Weather Fore Casting
Paper : PHYSEC T- 32

Time : 2 Hours   **Maximum Marks : 40**

PART - A

I.   Answer any **Five** sub qustions.   (5×2=10)

1.   a)   Define atmosphere.

     b)   What is cyclone?

     c)   What is airmass?

     d)   What are isobars & isothermals?

     e)   What is climate?

     f)   What is acid-rain?

     g)   Define weather.

     h)   What is weather forecasting?

PART - B

II. Answer question no. 2 or question no 3.

2.   a)   Explain the variation of atmospheric pressure with height.   (5)

     b)   Describe the compositional layers of atmosphere.   (10)

(OR)

[P.T.O.

3. a) Explain the methods of measuring weather. (5)

   b) Explain the forces acting to produce wind and outline the methods of measuring wind speed. (10)

PART - C

III. Answer question no. 4 or question no 5.

4. a) What is global warming? Explain its effects. (5)

   b) Describe the classification of climate. (10)

(OR)

5. a) Write a note on weather maps. (5)

   b) Explain the types of weather forecasting and its measurement. (10)

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III Semester B.Sc.4. Degree Examination, April - 2022
PHYSICS (Optional)
(Repeater)

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

Instructions to Candidates :   *Calculators are allowed to solve problems. Write intermediate steps.*

PART - A

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

1. a)   State Fermat's principle.
    b)   What are cardinal points?
    c)   Define Gauss law.
    d)   What is achromatism.
    e)   Define electric polarisation.
    f)   State Biot - Savart's law.
    g)   Define time - constant of R-L Circuit.
    h)   Define figure of merits of Ballistic Galvanometer
    i)   If peak to peak voltage of a waveform is 6 volt Find r.m.s. Value.
    j)   Two thin convex lenses have focal lengths 1.03m and 0.96 m for red & violet colours respectively. Find longitudinal chromatic aberration.
    k)   The dielectric constant of medium is 3.5. Electric field is 2×10^6 vm^{-1}. Find the electric displacement.
    l)   What is Earth Inductor?

PART - B

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

2. Derive Abbe's sine Rule.

3. What is spherical aberration. Describe any two methods of minimising the spherical aberration.

P.T.O.

4. Derive the boundary conditions at a surface separating two dielectric media.

5. An electron of energy 20 eV moving in a direction perpendicular to a magnetic field $B = 10^2$ Weber/m^2 describes a circle of radius R. Find the value of R.

6. Two thin convex lenses of focal lengths 0.12m and 0.16m are 0.08 m apart in air co-axially. Find the equivalent focal length.

7. The current sensitivity of B.G. is 2×10^{-9} and deflection is 1 mm on a scale placed at a distance of 1m away from the mirror of B.G. Calculate the charge density if BG made 150 oscillations in 10 sec.

PART - C

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

8. Derive Newton's formula for construction of image using cardinal points.

9. Derive expression for the kinetic energy acquired by the charged particle in uniform electric field applied along the direction of the particle motion.

10. Describe Clausius - Mosotti equation for polarisation of a dielectric.

11. Describe the construction, principle and theory of Helmholtz galvanometer

12. Describe the method of determination of self inductance of a coil using Ballistic Galvanometer.

III Semester B.Sc. 3/4 Degree Examination, March - 2022
CHEMISTRY (Optional)
(Old Scheme)
(Repeaters)

Time : 3 Hours   Maximum Marks : 80

Instructions to Candidates :

1) *All questions are Compulsory.*

2) *Answer all question in the same answer book.*

3) *Draw neat diagrams and give equations wherever necessary.*

SECTION - A

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

   a) What are Ellingham diagrams?

   b) Give two advantages of powder metallurgy.

   c) What are aprotic solvents? Give an example.

   d) Write Lewis concept of acid and base.

   e) What are activating groups? Give one example.

   f) Give the composition and uses of cordite.

   g) What is fingerprint region in spectroscopy?

   h) What are organolithium compounds? Give an example.

   i) What are colligative properties? Give one example.

   j) State Raoult's law.

   k) State second law of Thermodynamics.

   l) Define chemical potential.

SECTION - B

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

2. Give the salient features of Ellingham diagram.

3. Explain the Bronsted-Lowery concept of acids and bases with examples.

4. Explain the orientation effect of –OH group in phenol.

5. Explain the mechanism of piancol-pinacolone rearrangement.

6. Derive clausius-clapeyron equation.

7. 0.28 gm of a substance dissolved in 25 gm of benzene lowered the freezing point of benzene by 0.42°C. Calculate the molecular mass of the substance ($K_f = 5.12°Cmol^{-1}$)

SECTION - C

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

8. a) Explain the extraction of Nickel by mond's process.

   b) Mention the types of solvents and write the properties of good solvents.

9. a) Explain the mechanism of claisen rearrangement.

   b) Give the synthesis and uses of

   i) N-hexyl resorcinol

   ii) Picric acid

10. a) Describe Berkely and Hartley method of determination of osmotic pressure.

    b) Derive Gibb's Helmholtz equation.

11. a) Explain pearson's concept of hard and soft acids and bases.

    b) Derive an equation for K_b thermodynamically.

12. a) How are the following prepared from methyl magnesium iodide

    i) Ethanol

    ii) Ethanoic acid

    b) Discuss the entropy change in an irreversible process.