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36531

V Semester B.Sc. Degree Examination, April/May - 2021

MATHEMATICS-IX

(5.1) : Integral Transforms

11306

(CBCS - NEW)

Time : 3 Hours

Maximum Marks : 70

Instruction : *Answer all Sections.*

SECTION - A

5x2=10

Answer **any five** of the following.

1. Find L [cos mt] and L [sin mt].

2. Find L [$\sin^2 t$].

3. Find $L\left[\frac{S}{(S+4)^2}\right]$.

4. Using Convolution theorem find $L^{-1}\left[\frac{1}{S(S^2+1)}\right]$.

5. If $f(x)=x^2$ in $(-\pi, \pi)$, find Fourier co-efficient a_n.

6. If $f(S)$ is the Fourier transform of $F(x)$, then prove that $\frac{1}{a}f\left(\frac{S}{a}\right)$ is the Fourier transform of $F(ax)$.

   i.e. $F(ax) = \frac{1}{a}f\left(\frac{S}{a}\right)$

7. Find the z-transform of $(\cos\theta + i\sin\theta)^n$.

P.T.O.

SECTION - B

Answer any five questions. 5x6=30

8. Verify Convolution theorem for $f(t)=1$, $g(t)=\sin t$.

9. Find the Laplace transform of $\frac{e^{-at}-e^{-bt}}{t}$.

10. Find the Inverse Laplace transform of $\frac{1}{S(S+1)(S+2)}$.

11. Solve the differential equation $\frac{d^2y}{dx^2}-5\frac{dy}{dx}+6y=0$ given that $y(0)=1$ and $y'(0)=0$.

12. Find the Fourier series of the function $f(x)=x-x^2$. Hence deduce that

$$\frac{\pi^2}{12}=\frac{1}{1^2}-\frac{1}{2^2}+\frac{1}{3^2}-\frac{1}{4^2}+\ldots\ldots \text{ in the interval } (-\pi, \pi).$$

13. Find the Fourier expansion for the function

$$f(x)=\begin{cases}-1, & -3<x<0\\ 0, & x=0\\ 1, & 0<x<3\end{cases}$$

14. Obtain the Fourier series of $f(x)=e^{-ax}$, $-\pi < x < \pi$, hence deduce that

$$\frac{\pi}{\sinh x}=2\left[\frac{1}{2^2+1}-\frac{1}{3^2+1}+\frac{1}{4^2+1}\ldots\right].$$

SECTION - C

Answer **any five** of the following. 5x6=30

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

16. Find the sine and cosine transform of $2e^{-5x}+5e^{-2x}$.

17. Using Parseval's Identity show that $\int_0^\infty \frac{dx}{(1+x^2)^2} = \frac{\pi}{4}$.

18. Find the z-transform of $\cos(n\theta)$ and $\sin(n\theta)$.

19. Compute the inverse z-transform of $\frac{3z^2+2z}{(5z-1)(5z+2)}$.

20. Obtain the inverse z-transform of $\frac{z}{(z+1)^2}$ by power expansion.

21. Solve the difference equation $U_{n+2}+U_n=0$ by using z-transforms.

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36532

V Semester B.Sc. Degree Examination, April/May - 2021

MATHEMATICS - X

11257

(New) 5.2 Applied Mathematics

(CBCS)

Time : 3 Hours

Maximum Marks : 70

Instruction : *Answer all the sections.*

SECTION - A

5x2=10

Answer **any five** of the following :

1. Find Curl of $\vec{f} = \text{grad}\left(x^3 + y^3 + z^3 - 3xyz\right)$.

2. Prove that $\text{div}\left(\text{Curl } \vec{f}\right) = 0$.

3. Find $\nabla^2\phi$ for the function $\phi = 2x^2yz^3$

4. State Stoke's theorem.

5. Write one-dimensional heat equation and write its appropriate solution.

6. Find C.F. of $[2D - 3D^1 - 4]^2 z = 0$.

7. Define Functional and Geodesic.

SECTION - B

Answer **any five** of the following : 5x6=30

8. Prove that
$\text{Curl}(f \times g) = f\text{div}g - g\text{div}f + (g\cdot\nabla)f - (f\cdot\nabla)g$

9. Find the directional derivative of $\phi(x, y, z) = xy^2 + yz^3$ at $(2, -1, 1)$ in the direction of $2i + j + 2k$.

P.T.O.

10. If $u = x+y+z$, $v = x^2+y^2+z^2$, $w = xy+yz+zx$ show that $[\nabla u\ \nabla v\ \nabla w] = 0$

11. Verify Gauss divergence theorem for $\vec{f} = 2xyi + yz^2j + xzk$ and s is the total surface of the rectangular parallelepiped bounded by the planes $x=0$, $y=0$, $z=0$, $x=1$, $y=2$ and $z=3$.

12. Verify Green's theorem in the plane for $\oint_C \left[\left(xy + y^2\right)dx + x^2\,dy\right]$; where 'C' is the closed curve bounded by $y=x$ and $y=x^2$.

13. Find the curve on which the functional $I = \int_0^1 \left[\left(\frac{dy}{dx}\right)^2 + 12xy\right] dx$ with $y(0)=0$ and $y(1)=1$ can be extremised.

SECTION - C

Answer **any five** of the following : 5x6=30

14. Solve : $[D^2 + DD^1 - 6(D^1)^2]\ z = \cos(2x+y)$.

15. Solve : $[D^2 - 2DD^1 + (D^1)^2]\ z = 12xy$.

16. Solve : $(D - 3D^1 - 2)^2\ z = 2e^{2x}\tan(y+3x)$.

17. Solve : $[D^2 - DD^1 + D^1 - 1]\ z = \cos(x+2y) + e^y$.

18. Obtain the solution of one-dimensional wave equation $\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}$ by using the method of separation of variables.

19. Reduce the equation $\frac{\partial^2 u}{\partial x^2} + x^2 \frac{\partial^2 u}{\partial y^2} = 0$ into a Canonical form.

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36533

V Semester B.Sc. Degree Examination, April/May - 2021

MATHEMATICS - XI

11233

5.3 - Graph Theory - I (Optional)

(CBCS - New)

Time : 3 Hours

Maximum Marks : 70

Instruction : *Answer* ***all*** *Sections.*

SECTION - A

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

1. Define multiple graph and pseudo graph.

2. Define complete bipartite graph with an example.

3. Does there exist a graph with four vertices A, B, C, D such that deg A=2, deg B=3, deg C=2 and deg D=2.

4. Define cut-vertex of a graph. Give an example of connected graph G containing a cut vertex v such that G-v has 4 components.

5. Define Line graph.

6. Find the values of $K(K_{6,7})$ and $\lambda(P_6)$.

7. Define Eulerian cycle with an example.

P.T.O.

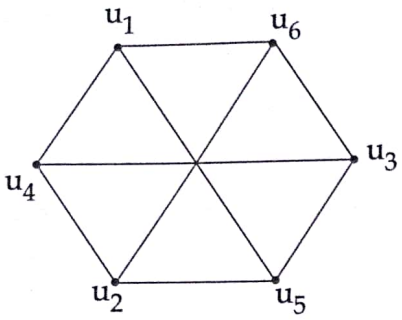
SECTION - B

Answer any five of the following : 5x6=30

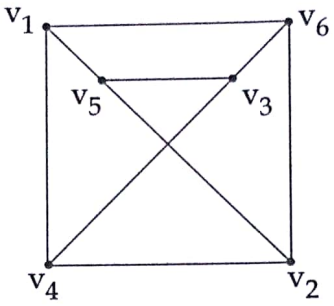
8. Prove that a graph G is bipartite if and only if all its cycles are even.

9. Show that the graphs G & H are isomorphic.

G :



H :



10. Prove that any graph G or $\overline{G}$ is connected.

11. Show that every u-v walk contains a u-v path.

12. Prove that every self complementary graph has 4n or 4n+1 vertices.

13. If T is a binary tree with n terminal vertices then T has (2n−1) vertices.

14. Suppose a tree T has N_1 vertices of degree 1, N_2 vertices of degree 2, N_3 vertices of degree 3, ... N_k vertices of degree k, prove that

$$N_1 = 2 + N_3 + 2N_4 + 3N_5 + \ldots + (k-2)N_k.$$

SECTION - C

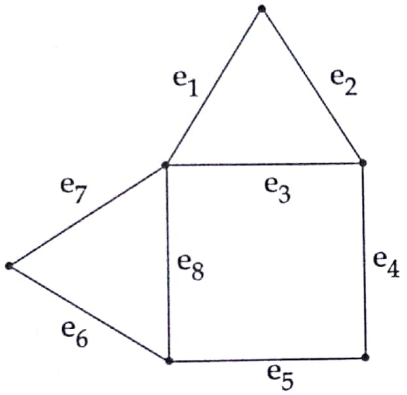
Answer **any five** of the following : 5x6=30

15. Define incidence matrix of a graph G and draw the graph G which has adjacency matrix.

$$\begin{bmatrix} 0 & 1 & 1 & 1 & 0 & 0 \\ 1 & 0 & 1 & 0 & 0 & 0 \\ 1 & 1 & 0 & 1 & 0 & 0 \\ 1 & 0 & 1 & 0 & 1 & 1 \\ 0 & 0 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 1 & 1 & 0 \end{bmatrix}$$

16. Find the cycle matrix of the graph G.

G :



17. State and prove Whitney's theorem.

18. Explain Konigberg's seven bridge problem.

19. If a connected graph G is Eulerian then prove that edges of G can partitioned into cycles.

20. If G is a graph with $p \geq 3$ vertices such that $\delta(G) \geq \frac{p}{2}$ then prove that G is Hamiltonian.

21. Draw the graphs :
    (a) Graph with both Eulerian and Hamiltonian.
    (b) Graph with Eulerian but not Hamiltonian.
    (c) Graph which is Hamiltonian but not Eulerian.

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36538

V Semester B.Sc. Degree Examination, April/May - 2021

ZOOLOGY-VI

Z-5.2 - Environmental Biology and Wildlife Zoology

10605

(CBCS)

Time : 3 Hours | Maximum Marks : 70

Instructions : (1) *Answer all questions.*

(2) *Draw neat labelled diagrams wherever necessary.*

SECTION - A

Answer **any five** of the following in **one** or **two** sentences each. **5x2=10**

1. What is nekton ? Give an example.
2. Define ecotone.
3. List the sources of Nitrogen and Phosphour.
4. What is precipitation ?
5. Expand IUCN and BNHS.
6. Define the status of extinction and give an example.

SECTION - B

Answer **any six** of the following in **one** or **two** paragraphs each. **6x5=30**

7. Write a short note on need for the conservation of Wildlife.
8. Explain briefly about food chains.
9. Explain zones of Sea.
10. Write a note on adaptations in terrestrial animals.
11. Discuss the methods of solid waste management.
12. Write a short note on neoarctic realm and its fauna.
13. Explain Carbon Cycle.

P.T.O.

SECTION - C

Answer the following in detail (**ANY THREE**). 3x10=30

14. Explain the causes, effects and solutions of Air Pollution.

15. Discuss in detail about the natural resources.

16. Describe the effects of anthropogenic activities on Wildlife.

17. Write a detailed note on Project Tiger.

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36537

V Semester B.Sc. Degree Examination, April / May - 2021

ZOOLOGY-V

Z-5.1 : Cell Biology & Developmental Biology (CBCS)

10605

Time : 3 Hours | Maximum Marks : 70

Instructions : (i) *Answer all the questions.*
(ii) *Draw labelled diagrams wherever necessary.*

SECTION - A

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

1. Write any four differences between Prokaryotes and Eukaryotes.
2. Mention the hydrolytic enzymes found in Acrosome of sperm.
3. In which phase of meiosis chromosome number reduces to half ? Define crossing over.
4. What is morphogenetic movement ?
5. Expand IVF and ICSI.
6. What is Oncology ? Name any two carcinogens.

SECTION - B

(A) Answer **any three** of the following. 3x5=15

7. Describe the steps involved in the process of oogenesis with the schematic representation.
8. Draw a neat labelled diagram of the whole mount of 24 hrs. chick embryo.
9. Write a brief account of the modern trends in Reproduction.
10. Enumerate the functions of Placenta.
11. Sketch and label the structure of Hen's egg.

P.T.O.

(B) Answer **any three** of the following. 3x5=15

12. Briefly explain the ultra structure of mitochondrion with a neat labelled diagram.

13. Enumerate the characteristics of cancer cells.

14. Explain the Leptotene and Zygotene stages of meiosis with the help of labelled diagrams.

15. Describe the fluid mosaic model of plasma membrane with labelled diagram.

16. Give an account of the functions of nucleus.

SECTION - C

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

17. Describe the mechanism of fertilization and its significance.

18. Give an account of the extra embryonic membranes of chick.

19. Explain the whole mount of 48 hrs. of chick embryo with a neat labelled diagram.

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

20. Describe the different stages of mitosis with suitable diagrams.

21. Explain in detail about the occurrence, types and functions of lysosome.

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36522

V Semester B.Sc. Degree Examination, April/May - 2021

BOTANY - VI

10548

5.2 : Cell Biology and Cytogenetics

(CBCS)

Time : 3 Hours | Maximum Marks : 70

Instructions : (1) *Answer all the questions.*
(2) *Draw diagrams wherever necessary.*

SECTION - A

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

1. Who assigned the term mitochondria ?
2. What are alleles ?
3. Define Operon.
4. What is homozygote ?
5. Name the triplet codon for the amino acid Methionine.
6. What is heterochromatin ?
7. Why Lysome is called suicide bag ?
8. Define genome.
9. What is euploidy ?
10. Who designed the structure of DNA ?
11. Who proposed the gene concept ?
12. What is test cross ?
13. Mention the second law of Mendel.
14. Who proposed the clover leaf model of t-RNA ?
15. What is epistasis ?

P.T.O.

SECTION - B

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

16. Explain the 'Fluid Mosaic Model' of plasma membrane and its functions.

17. Explain the semiconservative method of DNA Replication.

18. Describe the process of protein synthesis.

19. Explain the sex-determination in Melandrium.

20. What are complimentary factors ? Explain with suitable examples.

21. What is genetic code ? Explain its characters.

22. What is incomplete dominance ? Explain with suitable example.

SECTION - C

III. Answer **any three** of the following : 10x3=30

23. Explain the ultrastructure of nucleus with neat labelled diagram and mention its functions.

24. What is Linkage ? Describe the phenomenon of linkage and crossing over in Maize.

25. What is Nucleotide ? Explain the Watson and Crick model of DNA.

26. Why did Mendel selected the Pea plants for his experiment ? Explain the Mendel's Dihybrid experiment.

27. In Sweet Pea gene C or P alone produces White flowers, Purple coloured flowers are produced due to the presence of both the factors. What will be the flower colour of offspring of the following crosses ? In which the genotypes of parents are given ?
    (a) CcPp × CcPP
    (b) CcPP × CcPP

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36521

V Semester B.Sc. Degree Examination, April/May - 2021

BOTANY

10584

5.1 - Morphology, Taxonomy and Economic - Botany

(CBCS)

Time : 3 Hours

Maximum Marks : 70

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

(ii) *Draw the diagrams wherever necessary.*

I. Answer all the questions. 15x1=15

1. What is Corollary Corona ?
2. What is Phyllogenetic system of classification ?
3. Who proposed Binomial Nomenclature ?
4. Name the family having syngenesious stamen.
5. Write the Botanical name of clove.
6. What type of stem is found in ginger ?
7. What are Pnematophores ?
8. What is Offset ? Give an example.
9. What is Placentation ?
10. What is Systematic Botany ?
11. Define a Seed.
12. What is Simple leaf ?
13. What is Lomentum ?
14. What are Carpophore ?
15. What is false fruite ?

P.T.O.

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

16. Write the salient features of the family Astraceae.

17. Distinguish between Apocyanaceae and Solonaceae.

18. Assign the following plants to their respective families, write a Botanical name and uses :
    (a) Castor
    (b) Sunflower
    (c) Vinca rosea

19. Describe the structure of Hypanthodium Infloresence with neat sketch.

20. What is Aestivation ? Explain different types of Aestivation.

21. Explain Epigynous and Hypogynous flowers.

22. Describe the structure of bladder in bladderwort.

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

23. Define a stem, explain different types of aerial modification of stem.

24. What is leaf ? Explain different types of compound leaves.

25. Write the distinguished characters of the family malvaceae. Give an Economic Importance of any three plants and mention their Botanical names.

26. Assign the following plants to their respective families, write their Botanical names and uses :
    (a) Mustard
    (b) Sugar cane
    (c) Lemon
    (d) Cotton
    (e) Ground nut

27. What is Herbarium ? Explain the process of Herbarium technique.

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36530

V Semester B.Sc. Degree Examination, April/May - 2021

PHYSICS VI

5.2 - Statistical Mechanics, Quantum Mechanics and Electronics - I

11254

(CBCS)

Time : 3 Hours

Maximum Marks : 70

Instruction : *Write answers to Section A questions in the first two pages only.*

SECTION - A

Answer the following questions, each of 1 mark. 15x1=15

1. Which particle obey paulis exclusion principle ?
2. State Heisenberg's uncertainty principle.
3. What are matter waves ?
4. What are extrinsic semiconductors ?
5. What is Stirling's approximation ?
6. Define Ensemble.
7. What is zener diode ?
8. Write one use of Light Emitting Diode.
9. What is Solar cell ?
10. Define Efficiency of Full Wave Rectifier.
11. What is Liquid Crystal Display ?
12. Name two particles involved in the Compton Scattering.
13. What is a Linear Harmonic Oscillator ?
14. What is Zero point energy ?
15. On what factor colour of LED depends ?

P.T.O.

SECTION - B

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

16. Compare Maxwell Boltzmann and Fermi Dirac distribution functions.

17. Illustrate the Heisenberg uncertainty principle by Gamma ray microscope.

18. Derive an expression for electrical conductivity of a semiconductor.

19. Obtain an expression for energy of a particle in one dimensional box.

20. Explain the Transistor as an amplifier in CE mode with a neat circuit diagram.

21. Explain the construction and working of a photo diode.

22. Derive an expression for energy gap of a semiconductor.

SECTION - C

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

23. (a) State and prove Boltzmann equipartition theorem. 5 + 5
    (b) Write a note on Seven Segment Display.

24. (a) What is Compton effect ? Derive an expression for Compton shift. 7 + 3
    (b) Calculate the wavelength associated with an electron of energy 150 eV. (Given $h = 6.625 \times 10^{-34}$ Js and Charge of an $e = 1.6 \times 10^{-19}$ c)

25. (a) Obtain Schrodinger's time independent wave equation. 7 + 3
    (b) Find the lowest energy of a neutron confined to a nucleus of size 10^{-14}m. (Given : Mass of the neutron $= 1.67 \times 10^{-27}$ kg, $\hbar = 1.054 \times 10^{-34}$ J.sec)

26. (a) What is Hall effect ? Derive an expression for Hall coefficient and mention the importance of Hall effect. 8 + 2
    (b) The intrinsic carrier density at room temperature in Germanium is 2.37×10^{19} m^3 if the electron and hole mobilities are 0.38 $m^2V^{-1}s^{-1}$ and 0.18 $m^2V^{-1}s^{-1}$ respectively. Calculate the Resistivity.

27. (a) Explain with neat circuit diagram the construction and working of Bridge rectifier. 5 + 5
    (b) Explain L and Pi section filters with neat diagrams.

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36529

V Semester B.Sc. Degree Examination, April/May - 2021

PHYSICS - V

Atomic and Molecular Physics

11238

(CBCS)

Time : 3 Hours

Maximum Marks : 70

Instruction : Answer to **Section - A** in first two pages only.

SECTION - A

Answer the following : **15x1=15**

1. Give any two properties of an Atom.
2. Define atomic mass unit.
3. Give any two uses of mass spectrograph.
4. What is excitation potential ?
5. What is the energy of the atom in 3^{rd} orbit of hydrogen ?
6. What is a wave no. ?
7. What is continuum ?
8. Give the value of fine structure constant.
9. State Pauli's Exclusion principle.
10. What is LS coupling ?
11. What is anomalous Zeeman effect ?
12. Define depolarisation ratio.
13. Mention one important characteristic of Laser.
14. What is the acronym of Laser ?
15. What is a magnetic dipole ?

P.T.O.

SECTION - B

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

16. Describe Dempster's method to determine the atomic masses of isotopes.

17. Discuss Bohr's theory of hydrogen atom and its adequacies.

18. Discuss the salient features of Vector Atomic model.

19. Write a note on stark effect.

20. With a neat diagram explain the experiment to study Raman effect.

21. Write a note on fluorescence.

22. Write a note on holography.

SECTION - C

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

23. (a) Describe Millikan oil drop method to determine the charge of an electron. 7+3
    (b) Find the no. of electrons on a water drop of mass 9.8×10^{-12} gm, when it remains just suspended in an Electric field of 2940 V/cm. Given the charge of an electron is 1.6×10^{-19}C and $g = 9.8$ m/s^2.

24. (a) Describe Rutherfords α-scallering experiment and explain Nuclear Atom model. 6+4
    (b) Explain Sommerfiel atom model.

25. (a) Discuss the classical theory of Zeeman effect and obtain an expression for Zeeman shift. 7+3
    (b) In a normal Zeeman effect, the sodium 422.6 nm line splits into three components separated by 0.25 nm in a magnetic field of 3T. Calculate the value of specific charge of the electron.

26. (a) Derive an expression for pure rotational energy of a diatomic molecule. 6+4
    (b) Distinguish between pure rotational and vibrational spectra of a diatomic molecule.

27. (a) With necessary theory explain the principle and working of a Laser. 7+3
    (b) Discuss any three applications of Lasers.

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36523

V Semester B.Sc. Degree Examination, April/May - 2021

CHEMISTRY - V

5.1 (CBCS)

11567

Time : 3 Hours

Maximum Marks : 70

Instructions : (1) *Section - A contains questions from Inorganic, organic and physical Chemistry.*

(2) *Section - B contains questions from Inorganic Chemistry.*
Section - C contains questions from Organic Chemistry.
Section - D contains questions from Physical Chemistry.

(3) *Answer all Sections.*

SECTION - A

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

1. Write the formula for magnetic moment of an electron.
2. Which 'd' configuration of high spin octahedral complexes contributes orbital angular momentum ?
3. What is the spectroscopic ground state for d^7 configuration ?
4. Define intercalation.
5. How the following are distinguished by NMR spectroscopy ?
   (a) CH_3COCH_3 (b) CH_3CH_2CHO
6. What are the values of τ and δ for TMS in high and low field ?
7. What is the oxidation product of sulphides ?
8. Define isoelectric point.
9. Calculate the energy of a photon of wavelength of 6000 Å.
10. Define Bioluminescence.
11. Define bond moment.
12. Define Debye.

P.T.

SECTION - B

10x2=20

Answer any two of the following :

13. (a) Explain with diagram the measurement of magnetic susceptibility by Guoy's method. 6

(b) Explain ferromagnetism and its deviation to paramagnetism with temperatures. 4

14. (a) Explain the spectra of an octahedral complex of d^9 configuration with an example. Draw the combined orgel diagram for d^1 and d^9 configuration. 6

(b) Explain charge transfer spectra with an example. 4

15. (a) Draw the structures of cyclic and sheet silicates and explain both with an example each. 6

(b) Explain the hydrolysis reactions of $(NPCl_2)_3$ and $(NPCl_2)_4$. 4

SECTION - C

10x2=20

Answer any two of the following :

16. (a) Discuss the principle of vibrational spectroscopy. How the following pairs are distinguished by vibrational spectra ? 6

(i) Ethyl alcohol and diethyl ether

(ii) Acetic acid and ethyl acetate

(b) Write a note on NMR spectroscopy. 4

17. (a) Draw the structures of the following compounds that will show only one peak in its NMR spectra. 6

(i) $C_3H_6Cl_2$ (ii) C_5H_{12}

(iii) C_2H_6O (iv) C_4H_6

(b) How diethyl sulphide prepared from potassium sulphide and phosphorus pentasulphide ? 4

18. (a) Give any two preparations of α-amino acids and two each chemical reactions for carboxylic and amin group. 6

(b) Give the reactions of ethyl mercaptain with : 4

(i) Acid chloride (ii) Aldehyde

(iii) Ketone

SECTION - D

Answer **any two** of the following : 10x2=20

19. (a) State and derive Lamberts-Beer's law for light absorption by solutions. 6

(b) Explain one each photosensitised reaction by an atom and a molecule. 4

20. (a) State and explain phosphorescence and fluorescence with a diagram. 6

(b) How dipole moment determined by temperature method ? 4

21. (a) The bond lengths of HF, HCl, HBr and HI respectively are 0.92 Å, 1.27 Å, 1.41 Å and 1.61 Å. Calculate the percentage of covalent character when the experimental dipole moments are 1.90 D, 1.03 D, 0.788 D and 0.3805 D respectively. 6

(b) Explain the reasons for low and high quantum yields. 4

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36524

V Semester B.Sc. Degree Examination, April/May - 2021

11653

CHEMISTRY

VI - CBCS - 5.2

Maximum Marks : 70

Time : 3 Hours

Instructions : (1) *Section - A contains questions from Inorganic, organic and physical Chemistry.*

(2) *Section - B contains questions from Inorganic Chemistry.*
Section - C contains questions from Organic Chemistry.
Section - D contains questions from Physical Chemistry.

(3) *Answer **all** the **four** Sections **A, B, C** and **D**.*

SECTION - A

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

1. What are Computations ?
2. Define the term relative error.
3. What are non-aqueous solvents ?
4. Write radioactive displacement law.
5. What is Iodine Number ?
6. Write the structure of Malachite green.
7. What are detergents ?
8. What are dyes ?
9. How does specific conductance varies with dilution ?
10. Define Transport Number.
11. State Kohlrausch's Law.
12. Define ionic mobility.

P.T.O.

SECTION - B

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

13. (a) Explain the sources of error and their effects upon analytical results. 6
    (b) Write a note on reporting of analytical data. 4

14. (a) Discuss the general properties of solvents with respect to : 6
        (i) Electrical Conductance
        (ii) Viscosity and
        (iii) Dielectric Constant
    (b) Write any two chemical reactions of liquid sulphur dioxide. 4

15. (a) Describe the structure of nucleus and nuclear model. 6
    (b) Explain mass defect and binding energy. 4

SECTION - C

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

16. (a) Give any three synthetic applications of Ethyl acetoacetate. 6
    (b) Write the synthesis and uses of Bismark Brown. 4

17. (a) Explain Keto-enol tautomerism in ethyl acetate. 6
    (b) Give the synthesis and uses of terylene. 4

18. (a) Explain the method of determination of iodine number of oils and fats. 6
    (b) Write a note on cleaning action of soap. 4

SECTION - D

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

19. (a) Define specific, molar and equivalent conductivity with their units. 6
    (b) State Kohlrausch's Law and write its applications. 4

20. (a) Describe the experimental method of determination of transport number by Hittort's method. 6
    (b) Explain conductometric acid-base titrations of weak acid with strong base. 4

21. (a) Explain the determination of molecular weight of polymers by viscosity method. 6
    (b) The resistance of N/10 solution of a salt is found to be 2.5×10^3 Ohms. Calculate equivalence conductance of the solution. Cell Constant = 1.15 cm^{-1}. 4

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