VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST

Residential & Autonomous – A Gurukula Institute of Life-Training
Re-accredited (3rd Cycle) with 'A' Grade (CGPA 3.59 out of 4.00) by NAAC
[Affiliated to Madurai Kamaraj University]

M.Sc. Degree (Semester) Examinations, November 2020
Part – III : Core Subject : First Semester : Paper – I
ORGANIC CHEMISTRY-I
Under CBCS and OBE– Credit 4

Time: **3** Hours   Max. Marks: **75**

SECTION – A

Answer ALL Questions: **(5 X 1 = 5 Marks)**

1. Which one of the following is Hard acid

   a)H^+ b)I_2 c)Cu^+ d)Ag^+

2. How many number of unpaired electron present in trriplet carbine

   a)1 b)2   c)3   d)4

3. The number of π-electrons in anthracene as per Huckel's rule is

   a) 12 b) 14   c) 10   d) 20

4. Which of the following does not possess any element of symmetry?

   a) ethane   b) (+) tartaric acid   c) carbon tetrachloride   d) meso-tartaric acid

5. How many optically active forms of aldohexoses are existing in nature

   a) 4 (b) 8 c) 12 (d) 16

SECTION – B

Answer Any Five Questions: **(5 X 2 = 10 Marks)**

6. Define hyper conjugation give an example?

7. Define Hammond postulate

8. Define resonance effect

9. If benzene obeys the Huckel rule, what is the value of n?

10. Name the following bicyclic compounds.
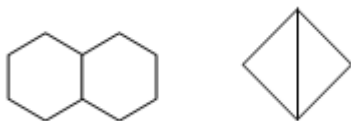
11. Diferentiate between dextrorotatory and leavorotatory.

12. How will you synthesis sucrose?

SECTION – C

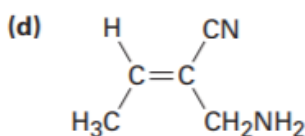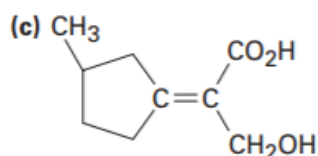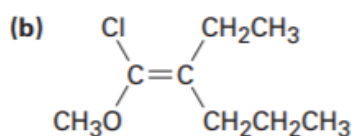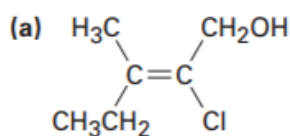**Answer ALL Questions:**   **(5 X 6 = 30 Marks)**

13. a) list out rules of resonance   (OR)

    b) Explain the concept of hard and soft acids and bases

14. a) Describe formation and stability of free radical (OR)

    b) kinetic and non-kinetic methods for determining organic reaction mechanism

15. a) Write the Aromaticity of annulenes

          (OR)

 b) Describe Craig's rule with suitable examples.

16. a) Discuss the optical activity biphenyls, allenes and spiranes.

(OR)

b) Assign E/Z for following alkenes.

(a) H₃C, CH₂OH / CH₃CH₂, Cl — C=C

(b) Cl, CH₂CH₃ / CH₃O, CH₂CH₂CH₃ — C=C

(c) CH₃ ... CO₂H / CH₂OH — C=C

(d) H, CN / H₃C, CH₂NH₂ — C=C

17. a) Describe the preparation and properties of disaccharides   (OR)

b) How Hofmann exhaustive methylation is useful in the determining structucture of alkaloids
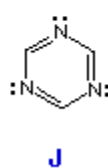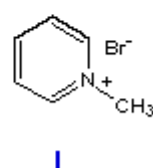
SECTION – D

Answer Any Three Questions: **(3 X 10 = 30 Marks)**

18. Explain the following

i) EDA complexes ii) Crown ether complexes

19. List out the formation and stability of carbocation intermediate with suitable example

20. Of the following compounds (A through J), which would be considered aromatic by application of the Hückel Rule?

A   B   C   D   E

F   G   H   I   J
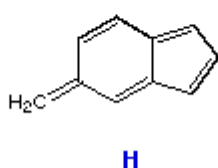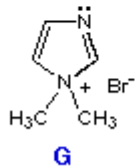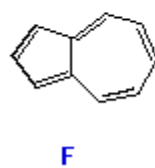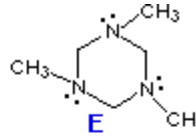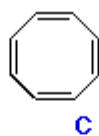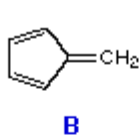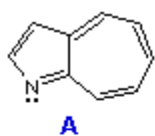
21. Define the following terms with suitable examples

(i) chirality   (ii) dissymmetry   (iii) diastreomers

(iv) asymmetric synthesis   (v) stereoselective reactions

22. Elucidate the structure of zingiberene.

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M.Sc. Chemistry Degree (Semester) Examinations, November 2020
Part – III : Core Subject : First Semester : Paper – II
Course Title: INORGANIC CHEMISTRY– I
Under CBCS and OBE– Credit 4

Time: **3** Hours   Max. Marks: **75**

SECTION – A

Answer ALL Questions: **(5 X 1 = 5 Marks)**

1. Element 'X' is strongly electropositive and element 'Y' is strongly electronegative. Both are univalent. The compound formed will be
   (a) X^+Y^- (b) Y^+X^- (c) X-Y   (d) $X \rightarrow Y$

2. The liquid range of NH_3 is
   (a) $-87°C$ to $-33°C$ (b) $-77°C$ to $-13°C$
   (c) $-77°C$ to $-33°C$ (d) $-77°C$ to $-23°C$

3. According to valence bond theory, a bond between two atoms is formed when
   (a) Half-filled atomic orbitals overlap   (b) Fully filled atomic orbitals overlap
   (c) Non-bonding atomic orbitals overlap   (d) Electrons of the two atoms overlap

4. The ability of a material to exist in more than one crystal structure is known as _____
   (a) Polymorphism   (b) Allotropy   (c) Polyhedral phase   (d) Lattice

5. Which of the following pairs represents isobars?
   (a) $^{17}O_8$ and $^{16}O_8$ (b) $^{40}K_{19}$ and $^{40}Ca_{20}$
   (c) $^{15}N_7$ and $^{16}O_8$ (d) $^{235}U_{92}$ and $^{238}U_{92}$

SECTION – B

Answer Any Five Questions: **(5 X 2 = 10 Marks)**

6. Write the factors favouring the formation of ionic compounds
7. Draw bcc and fcc
8. Illustrate the autoionization of HF and CH_3COOH
9. Comment on the relationship between bond order, bond length and bond strength.
10. How will you prepare borazine?
11. Define mass defect and binding energy
12. Define and give examples for isotopes and isotones

SECTION – C

Answer ALL Questions: **(5 X 6 = 30 Marks)**

13. (a) Briefly discuss the use of Fajan's rule for dtermination of covalent character in ionic solids
                 (OR)
    (b) Apply Born-Haber cycle for the determination of lattice energy of NaCl

14. (a) List out the postulates and limitations of VSEPR theory.
                 (OR)
    (b) Draw the MO diagram of N_2 and CO molecules

15. (a) Define the following acid-base concept: i) Bronsted-Lowry   ii) Lux-Flood   iii) Lewis
                 (OR)
    (b) Account for the applications of HSAB principle.

16. (a) Write a notes on different types of silicates
                 (OR)
    (b) Write the synthesis and reactivity of S_4N_4 and S_2N_2

17. (a) Differentiate nuclear fission and nuclear fusion reaction

(OR)

(b) How will you detect the radiation using ionisation chamber and scintillation counter

SECTION – D

<u>**Answer Any Three Questions:**</u>   **(3 X 10 = 30 Marks)**

18. Explain the following (i) calculation of ionic radiusby Pauling's method
    (ii) Slater's rule for the calculation of effective nuclear charge
19. (i) Identify the hybridization and geometry of the following molecules. **(3)**
        (a) PF_5 (b) ClF_3 (c) SO_4^{2-}
    (ii) Draw the Lewis dot structure for the following molecules. **(3)**
        (a) SF_6 (b) XeF_4 (c) XeO_2F_2
    (iii) Explain inter and intramolecular hydrogen bonding with examples.   **(4)**
20. (i) Discuss any three applications of liq. NH_3 as solvent. **(5)**
     (ii) Write a note on the classifications of solvents. **(5)**
21. Discuss the structure of diboranes
22. Illustrate the applications of radioactivity in activationanalysis and isotopic dilution technique

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M.Sc. Chemistry Degree (Semester) Examinations, November 2020
Part – III : Core Subject : First Semester : Paper – III
PHYSICAL CHEMISTRY - I
Under CBCS and OBE– Credit 4

Time: **3** Hours   Max. Marks: **75**

SECTION – A

Answer ALL Questions: **(5 X 1 = 5 Marks)**

1. Among the following set of operations d/dx ∫ dx √ () 2 the linear operators are

    a) d/dx   b) ∫dx   c) both a & b   d) () 2

2. The zero-point energy of a particle in 1–D box with a = 9 Å is

    a) $h^2/648m$ b) $h^2/64m$ c) $h^2/48m$ d) h/648m

3. For a spontaneous process.

    a) $\Delta G > 0$ b) $\Delta G < 0$ c) $\Delta G = 0$ d) $\Delta G \neq 0$

4. Based on the collision model, the atoms at the top of the potential energy "hill" are called:

    a) transition state   b) activation energy   c) top of the hill   d) steric factor

5. For one mole of a gas, the ideal gas equation is

    a) PV=1/2RT   b) PV= RT   c) PV=3/2RT   d) PV=5/2RT

SECTION – B

Answer Any FIVE Questions: **(5 X 2 = 10 Marks)**

6. Calculate the de-Broglie wavelength of a body of mass 1 kg moving with a velocity of 2000 ms^{-1}.
7. What do you mean by Eigen value and Eigan function?
8. Define tunnelling effect.
9. Give the significance of activation energy.
10. What are the factors influencing the rate of a reaction.
11. Mention the scope of thermodynamics
12. Define the term "Liquid Crystals".

SECTION – C

Answer ALL Questions: **(5 X 6 = 30 Marks)**

13. a) What is an operator? Explain with suitable example of Hamiltonian and laplacian operators.

(OR)

    b) Derive Schordinger wave equation (SWE)

14. a) Derive an expression for Ψ and E of a particle moving in a 1-D box with potential energy
       V = 0 inside the box.

(OR)

    b) Derive Simple Harmonic Oscillator (SHO) for a particle based on quantum theory.

15. a) Derive Gibbs-Duhem equation.

(OR)

   b) Discuss any one method of determination of fugacity of real gases.

16. a) Write down the limitations of collision theory of bimolecular reactions.

(OR)

   b) Explain briefly the Lindeman theory of unimolecular reactions.

17. a) Describe the effect of temperature and pressure on mean free path.

(OR)

   b) Explain the structure of liquids by X-ray method.

SECTION – D

Answer Any THREE Questions: **(3 X 10 = 30 Marks)**

18. (a) Assume the postulates of quantum mechanics.

   (b) Simplify the Hermition operator

19. Derive the expression for for the energy of a rigid rotor using the SWE.

20. Define Chemical potential. Derive effect of temperature and pressure on chemical potential.

21. Describe a comparision of collision theory and absolute reaction rate theory.

22. Discuss the Maxwell-Boltzmann distribution law.

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M.Sc. Chemistry Degree (Semester) Examinations, November 2020
Part – III : Core Subject : Third Semester : Paper – I
Course Title: ORGANIC CHEMISTRY - III
Under CBCS and OBE– Credit 4

Time: **3** Hours   Max. Marks: **75**

SECTION – A

Answer ALL questions   **(5 x 1 = 5)**

1) Which of the following bonds would be expected to have the lowest frequency stretch?
   (a) C-Cl   (b) C-Br   (c) C-I   (d) C-F
2) In the 400 MHz ^{1}H-NMR spectrum, an organic compound exhibited a doublet. The two lines of the doublet are at δ 2.35 and 2.38 ppm. The coupling constant (J) value is
   (a) 3 Hz   (b) 6 Hz   (c) 9 Hz   (d) 12 Hz

3) In the mass spectrum of the compound given below, during the α-cleavage, the order of preferential loss of groups is
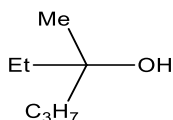
$$Et\text{—}\underset{C_3H_7}{\overset{Me}{\underset{|}{\overset{|}{C}}}}\text{—}OH$$

   a) $Me > C_3H_7 > Et$ b) $C_3H_7 > Et > Me$ c) $Et > Me > C_3H_7$ d) $Et > C_3H_7 > Me$
4) When 3-methyl-1,5-hexadiene is heated to 300 °C yields 1,5-heptadiene. This is an example of ……………rearrangement.
   (a) Cope   (b) Claisen   (c) Zimmerman   (d) Cheletropic
5) A photosensitizer is a
   (a) singlet acceptor   (b) triplet donor   (c) triplet acceptor   (d) singlet donor

SECTION – B

Answer any FIVE questions   **(5 x 2 = 10)**
6) How will you differentiate *cis* and *trans*-1,3,5-Hexatriene by UV-Visible spectroscopy?
7) What is fingerprint region?
8) Draw the NMR spectra for ethanol and toluene.
9) Define isotopic peak.
10) Identify the base peak in ethyl bromide.
11) Illustrate any two characteristics of pericyclic reactions.
12) Write an example for [1,3] and [1,5]-sigmatropic rearrangements.

SECTION – C

Answer ALL questions   **(5 x 6 = 30)**
13) a) Account on solvent effect in UV-Visible spectroscopy.
    (OR)
    b) What is hydrogen bonding? How will you differentiate inter and intra molecular hydrogen bonding by IR spectroscopy?
14) a) Explain nuclear overhauser effect.
    (OR)
    b) Write a note on the following (i) vicinal coupling (ii) germinal coupling   **(3+3)**

15) a) Give an account on (i) McLafferty rearrangement (ii) Nitrogen rule. **(3+3)**

(OR)

b) Give a brief account on molecular ion peak and base peak of toluene and aniline.

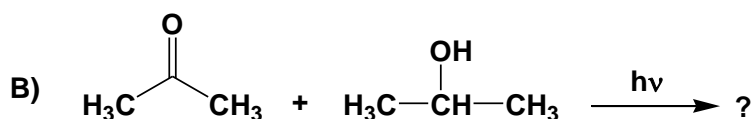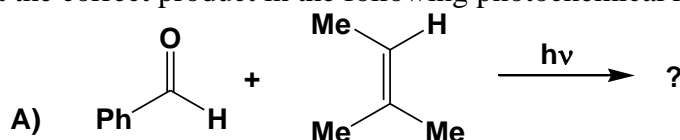16) a) Draw and explain number of nodes and symmetries in the π-molecular orbitals of 1,3-butadiene.

(OR)

b) Write a note on Diels-Alder reaction.

17) a) Write a note on the following: (i) cis/trans-isomerization (ii) Photosensitization **(3+3)**

(OR)

b) Predict the correct product in the following photochemical reactions: **(3+3)**

A)
$$Ph-CHO + \underset{Me}{\overset{Me}{>}}C=C\underset{Me}{\overset{H}{<}} \xrightarrow{h\nu} ?$$

B)
$$H_3C-CO-CH_3 + H_3C-CH(OH)-CH_3 \xrightarrow{h\nu} ?$$

SECTION – D

Answer any THREE questions **(3 x 10 = 30)**

18) Illustrate the factors affects IR vibrational frequencies.

19) Discuss different methods adopted for simplification of NMR spectroscopy.

20) An unknown organic compound with MF $C_5H_{10}O$ shows the following spectral data.

UV (λ_{max})	: 280 nm
IR (cm^{-1})	: 1715
^1H NMR (δ, ppm)	: 0.90 (3H, t), 1.60 (2H, m), 2.20 (3H, s) and 2.40 (2H, t)
Mass (m/z)	: 86, 71, 58 and 43 (100 %)

Deduce the structure of the unknown compound.

21) (i) Explain the correlation diagram approach of cyclobutene to 1,3-butadiene system. **(5)**

(ii) Write down the mechanism for oxy-Cope and aza-Cope rearrangements. **(5)**

22) Write a note on the following: **(4+3+3)**

A) Paterno-Buchi reaction B) Barton reaction C) Norrish type I reaction

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M.Sc. Chemistry Degree (Semester) Examinations, November 2020
Part – III : Core Subject : First Semester : Paper – I
INORGANIC CHEMISTRY-III
Under CBCS and OBE– Credit 4

Time: **3** Hours   Max. Marks: **75**

SECTION – A

Answer ALL Questions: **(5 X 1 = 5 Marks)**

1. $[Co(CO)_4]$ is isolabal with
    (a) CH_4 (b) CH_3 (c) CH_2 (d) CH

2. In linear metal nitrosyls NO acts as a/an

    (a) one electron donor   (b) two electron donor
    (c) three electron donor   (d) four electron donor

3. Ionic mechanism followed in the -------- reaction
    (a) Oxidative addition   (b) free radical substitution

    (c) free radical addition   (d) migratory insertion

4. The sandwich complex $(\eta$-Cp Co C_nH_n is an electron species when n' is

    (a) 6   (b) 4   (c) 3   (d) 5

5. Metals used in automobile catalytic converters are

    (a) Hydrogenation   (b) Epoxidation   (c) Polymerization   (d) Metathesis reaction

SECTION – B

Answer Any Five Questions: **(5 X 2 = 10 Marks)**

6. What do you mean by metal cluster?

7. Arrange the following in the decreasing order of back donation.
    $Cr(CO)_6$, $[Ti(CO)_6]^{2-}$, $[Mn(CO)_6]^+$, $[Ir(CO)_6]^{3+}$, $[V(CO)_6]^-$

8. Draw the structure of dicobalt octacarbonyl.

9. What is β-H elimination give an example?

10. Give any two application of Tebbe's reagent

11. What is Wacker process ?

12. write Stille coupling reaction.

SECTION – C

Answer ALL Questions: **(5 X 6 = 30 Marks)**

13. a) Consider the following complexes. Calculate TEC, PEC and assign each one as *closo, nido, arachno or hypho:* (i) $[Ni_5(CO)_{12}]^{2-}$ (ii) $Os_5C(CO)_{15}$ (iii) $[Ru_5N(CO)_{14}]^-$ (iv) $Os_6C(CO)_{16}$.

(OR).

    b) Describe the applications of organometallic compounds

14. a) Discuss the preparation, properties and structure of iron pentacarbonyl.

(OR)

    b) What are the factors affecting the magnitude of stretching frequency

15. a) Describe salient features of Oxidative addition reactions (OR)

    b) Expalin migratory insertion reaction and its mechanism

16. a) List out comparison between Fischer carbenes and Schrock carbenes (OR)

    b) Expalin Davies-Green-Mingos (DGM) rule and its application

17. a) Write step by step mechanisms of Wilkinson's catalytic process (OR)

    b) Expain Miyaura-Suzuki coupling with example

SECTION – D

Answer Any Three Questions: **(3 X 10 = 30 Marks)**

18. Calculate Metal-Metal bond for following organometallic compounds.

    (i) $Mn_2(CO)_{10}$ (ii) $Fe_3(CO)_{12}$ (iii) $Ir_4(CO)_{12}$ (iv) $Re_4H_4(CO)_{12}$ (v) $Os_3H_2(CO)_{10}$.

19. Classify metal carbonyls. Interpret the nature of bonding in mononuclear metal carbonyls.

20. Explain the reductive elimination reactions and its salient features

21. Describe preparation, properties and bonding of ferrocene.

22. Expain Monsanto acetic acid process and Heck reaction

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M.Sc. Chemistry Degree (Semester) Examinations, November 2020
Part – III : Core Subject : Third Semester : Paper – III
Course Title: PHYSICAL CHEMISTRY - III
Under CBCS and OBE– Credit 4

Time: **3** Hours   Max. Marks: **75**

SECTION – A

Answer ALL Questions: **(5 X 1 = 5 Marks)**

1. Allene has _____ dihedral planes
   a) 2   b) 3   c) 1   d) 4
2. The character of inversion matrix is
   a) 4   b) -4   c) -3   d) 3
3. The unit of coupling constant is
   a)Tesla   b) Gauss   c) ppm   d) Hz
4. The species which exhibit ESR spectrum have:
   a) paired electrons   b) unpaired electrons   c) I=0   d) all the above
5. What is the most important function of surfactant?
   a) Lower surface tension   b) prevent pulmonary edema
   c) maintaining the patency of small airway   d) Host defense

SECTION – B

Answer Any Five Questions: **(5 X 2 = 10 Marks)**

6. What do you mean by Point group and Order?
7. Define reducible and irreducible representation.
8. Write the difference between IR and Raman Spectroscopy.
9. Define the two relaxation processes in NMR.
10. Sketch Sternheimer Effect.
11. What for is Mossbauer spectroscopy good in the determination of in a sample?
12. State any two limitations of tracer experiments.

SECTION – C

Answer ALL Questions: **(5 X 6 = 30 Marks)**

13. a) State and explain Great Orthogonally theorem. (OR)
    b) Write the characteristics of point group.
14. a) Discuss the electronic transistion of formaldehyde. (OR)
    b) Apply group theory to solve sp^3 hybridization molecule with an example.
15. a) Elaborate about Nuclear Overhauser Effect. (OR)
    b) Compare and contrast ^1H & ^{13}C NMR.
16. a) Write a short note on isomer shift. (OR)
    b) Discuss the applications of Nuclear Quadrupole Resonance spectroscopy.
17. a) What the various factors affecting viscosity? (OR)
    b) Explain interfacial tension quoting Danielli and Davson model.

SECTION – D

Answer Any Three Questions: **(3 X 10 = 30 Marks)**

18. Construct the character table for C_2V.

19. Establish the symmetry species of the normal modes vibration of water molecule.

20. Explain in detail about Chemical Shift in NMR spectroscopy.

21. Explain in detail the energylevels and hyperfinesplitting in Electron Spin Resonance spectroscopy.

22. Derive Henderson-Hasselbalch equation.

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M.Sc. Chemistry Degree (Semester) Examinations, November 2020
Part – III : Elective Subject : First Semester : Paper – I
Course Title: COMPUTER APPLICATIONS IN CHEMISTRY
Under CBCS and OBE– Credit 5

Time: **3** Hours   Max. Marks: **75**

SECTION – A

Answer ALL Questions: **(5 X 1 = 5)**

1.To apply center alignment to a paragraph we can press
   a) Ctrl+S b) Ctrl+C c) Ctrl+C+A d) Ctrl+E
2.Which of the following is a correct format of Email address?
   a) name@website@info b) name@website.info c) www.nameofebsite.com d) name.website.com
3. Who is the father of C Language?
    a) Bjarne stroustrup b) J.A. Gosling c) Dennis Ritchie d) E.F. Codd
4. An array of arrays is known as
   a) 1Darray b) 2Darray c) 3Darray d) MultiDarray
5. Chemdraw is a
   a) Hardware b) Software c) Toolbar d) Cprograme

SECTION – B

Answer Any Five Questions: **(5 X 2 = 10)**

6. Write down the features of MS-Word.

7. What are the uses of Internet?

8. What is meant by character set?

9. List out the differences between Internet & Intranet.

10. How will you create an E-Mail?

11. Define the term ' Regrusion'

12. What is meant by Chemdraw?

SECTION – C

Answer ALL Questions: **(5 X 6 = 30)**

13. (a). Write a short notes on Increment and Decrement Operators.
                         (OR)
   (b). Describe how MS-Word is used for typing texts and equations in Chemistry?
14. (a). Write down the applications of Internet.
                         (OR)
   (b). Discuss in detail about the E-mail
15. (a). Explain the basic structures of programming in C.
                         (OR)
   (b). Give a short notes on Keywords and Variables.
                         (OR)
16. (a). Explain in detail about the library function.
                         (OR)
   (b) Write a program for one-dimension array using C programme.
17. (a). List out the applications of Chemdraw.
                         (OR)
   (b). Mention the important tools which are used in Chemdraw.

SECTION – D

Answer Any Three Questions: (3 X 10 = 30)

18. How MS Access can be used for creating and accessing database?
19. Explain in brief about www.
20. Discuss about the different types of operators used in C programme
21. Write a short notes on array and its types.
22. Explain the procedure to draw the structural framework of strychnine using Chemdraw.

VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST

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[Affiliated to Madurai Kamaraj University]

M.Com./M.Sc. Degree (Semester) Examinations, November 2020
Part – IV : Core Subject : Third Semester : Paper – I

Course Title: FORENSIC CHEMISTRY
Under CBCS and OBE– Credit 5

Time: **3** Hours   Max. Marks: **75**

SECTION – A

Answer ALL Questions: **(5 X 1 = 5 Marks)**

1. Which of the following is a basic unit of a crime lab?
   a) The Latent Fingerprint Unit   b)The Evidence Collection Unit
   c) The Toxicology Unit   d) The Physical sciences unit
2. Which method is generally used to test alcohol in human
   a) Colorimetric   b) Calorimetric   c) Fluorimetric   d) Iodometric
3. The oldest chemical method used to visualize latent prints is
   a) laser illumination b) iodine fuming c) cyanoacrylate ester fuming d) silver-nitrate reagent
4. The accuracy of paternity tests is in the range of
   a) 60-70   b) 70-80   c) 80-90   d) 90-100
5. Among the following which one is not used as biological material in DNA analysis
   a)Hair   b) Semen   c) Saliva   d) Urine

SECTION – B

Answer Any Five Questions: **(5 X 2 = 10 Marks)**

6. Define Forensic Odontology.
7. Define the term ' Polygraph'.
8. Write any three initial enquires done by a forensic pathologist.
9. What is meant by Narco Analysis?
10. Define forensic specialist?
11. Why is forensic serology important?
12. What is forensic Analysis?

SECTION – C

Answer ALL Questions: **(5 X 6 = 30 Marks)**

13. a)   Give the outline of Forensic Toxicology and Entomology.   **(OR)**
    b)   Explain following forensic science disciplines:
       (i) Forensic Pathology and (ii) Forensic Psychiatry
14. a) Write down the uses of Narco Analysis.   **(OR)**
    b)   Mention the main procedures involved in Polygraph.
15. a) Discuss what are the roles of a forensic scientist?   **(OR)**
    b)   Discuss the following tems:
       (i) Latent fingerprints (ii) Plastic fingerprints and (iii) negative fingerprints
16. a) What kind of results can be expected from blood pattern analysis? **(OR)**
    b) Discuss in detail about presumptive and confirmatory tests for semen.
17. a) When the forensic pathologist shall perform a forensic autopsy?   **(OR)**
    b) Mention any six preliminary procedures involved in external examinations.

SECTION – D

Answer Any Three Questions: **(3 X 10 = 30 Marks)**

18. Define forensic science? Discuss the following forensic division:
    (i) Chemistry Division (ii)Fingerprint division   (iii) Biology Division (iv) Ballistics Division
19. Account in detail about the guidelines for interrogating the suspect during Narco Analysis Test.
20. What is the difference between identification and individualization? Discuss comparative
    analysis in forensics?
21. Explain in detail about blood types and paternity determination.
22. List out the important aspects of external and internal examinations involved in Autopsy.

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