Seat No. _____

PAPER CODE : CCU-8850

M. Sc. (Sem. I) Examination

March – 2022

Chemistry : CHNN-401

(Inorganic Chemistry)

(Old Coruse)

Total Time : **60** Minutes
Total Questions : **50**

Total Marks : **70**
Students need to Tick only : **35**

Students need to tick only **35** questions. If more than **35** questions are ticked, the first **35** questions will only be evaluated.

1 Which type of the following reaction is responsible for the depletion of ozone layer in atmosphere ?

(A) Nucleophilicdiplacement (B) Atomic inversion
(C) Barry pseudorotation (D) Free radical

2 Which of the chemicals are responsible for the destruction of ozone layer ?

(A) Nitric oxide (B) CFC
(C) Both (A)and (B) (D) None

3 Ammonia molecule can undergo _____ reaction of the hydrogen atoms about nitrogen atom.

(A) Nucleophilicdiplacement (B) Free radical
(C) Barry pseudorotation (D) Atomic inversion

4 The equation for Free energy change of the system is :

(A) $\Delta G = \Delta H - T\Delta S$ (B) $\Delta H = \Delta G - T\Delta S$
(C) $T\Delta S = \Delta G + \Delta H$ (D) $\Delta G = \Delta H + T\Delta S$

5 The inert and labile are the terms represents the _____ stability of the complexes ?

(A) Thermodynamic (B) Kinetic
(C) Both (A)and (B) (D) None of these

6 Which of the following is the well established general mechanism of one electron transfer reaction ?

(A) Outer sphere
(B) Inner sphere
(C) Both
(D) None of these

7 Which of the following factor(s) is / are responsible for electron transfer reaction in complexes ?

(A) Conductivity of ligands
(B) Reorganization of energy
(C) Identity and concentration of the cations present in solution
(D) All of these

8 Which of the following factor(s) affecting on the magnitude of Dq ?

(A) Nature of metal ion
(B) Nature of the ligand (strong or weak)
(C) Geometry of the complex
(D) All of these

9 What is the correct CFSE value of $[Co(NH_3)_6]^{3+}$?

(A) 0.4 Δ_0
(B) 0.8 Δ_0
(C) $-1.2\ \Delta_0$
(D) $-2.4\ \Delta_0$

10 Which molecules has a linear arrangement of all Components atoms ?

(A) CH_4
(B) H_2O
(C) CO_2
(D) NH_3

11 According to B. Jerrum, the formation of complex in the solution is proceed by :

(A) Step wise addition to ligand to metal
(B) Random addition of ligand to metal
(C) Both (A)and (B)
(D) None

12 Which of the following order is known as Irwing William order of stability ?

(A) $Mn^{+2} > Fe^{+2} > Co^{+2} > Ni^{+2} > Cu^{+2} > Zn^{+2}$

(B) $Mn^{+2} < Fe^{+2} < Co^{+2} < Ni^{+2} < Cu^{+2} < Zn^{+2}$

(C) $Mn^{+2} < Fe^{+2} < Co^{+2} < Ni^{+2} < Cu^{+2} > Zn^{+2}$

(D) None

13 How many chelate rings are present in $M(en)_3$?

(A) 0 (B) 2

(C) 3 (D) 4

14 Which of the following is true relation between stepwise and overall formation constant ?

(A) $\beta 4 = k1 + k2 + k3 + k4$

(B) $\beta 4 = k1 \times k2 \times k3 \times k4$

(C) $\beta 4 = k1 - k2 - k3 - k4$

(D) $\beta 4 = k1 + k2 - k3 - k4$

15 Which of the following statement is false statement ?

(A) As per Lewis, ligand acts as base

(B) As per Lewis, metal acts as acid

(C) More basic ligand can easily donate pair of electrons

(D) H_2O is stronger ligand than NH_3

16 According to VSEPR theory, the shape of $[XeOF_5]^-$ is :

(A) Octahedral

(B) Pentagonal monopyramidal

(C) Trigonal biopyramidal

(D) Square pyramidal

17 CN^- is a σ-donor as well as _____ ligand.

(A) Π accepter (B) σ-donor

(C) Π-donarr (D) None of above

18 Unimolecular nucleophilic substitution follows _____.

(A) Dissociative Mechanism (B) Associative Mechanism

(C) Solvation Mechanism (D) SNI (CB)

19 Crystal field theory was proposed by :

(A) Bethe and van Vleck (B) Orgal

(C) Pauling (D) None of above

20 The Walsh-diagram of tri atomic AB2 type is deals with which two limiting structure of the following :

(A) Planner trigonal and trigonal pyramidal

(B) Linear and Bent V shaped

(C) Both (A)and (B)

(D) None of the above

21 Sunlight initiates many _____ types of reactions in the atmosphere surrounding us.

(A) Nucleophilicdiplacement (B) Free radical

(C) Barry pseudorotation (D) Atomic inversion

22 ClO_x cycle may be _____ times more efficient in the destruction of ozone layer than is the NO_x.

(A) Zero (B) Two

(C) Three (D) Four

23 The stability of the complex is termed as :

(A) Thermodynamic (B) Kinetic

(C) Both (A)and (B) (D) None of these

24 What type of trends shown in Stepwise stability constant ?

(A) $k1 > k2 > k3 > k4$ (B) $k1 = k2 = k3 = k4$

(C) $k1 < k2 < k3 < k4$ (D) $k1 > k2 < k3 > k4$

25 The first optically active compound of sulphur is isolated :

(A) Sulphur dioxide (B) Sulphur trioxide

(C) Sulphuric acid (D) Sulfurane

26 In which mechanism of electron transfer are neither formed nor broken ?

(A) Outer sphere
(B) Inner sphere
(C) Both
(D) None of these

27 The factors affecting on rate of reaction of the complexes is :

(A) Trans effect
(B) Leaving group effect
(C) Solvent effect
(D) All of these

28 Who applied the CFT to coordination compound in 1952 is ?

(A) Bathe and Van Vleck
(B) Laslie Orgel
(C) Hund and Muliken
(D) Lenus Pauling

29 Who calculated the value of CFSE is unit of Dq ?

(A) Sedgwick and Powell
(B) Gillespi and Nyhom
(C) Leinus Pauling
(D) Basalo and Pearson

30 Which of the following theory is used to explain the trans effect ?

(A) Electrostatic polarization
(B) pi-bonding
(C) Both
(D) None of these

31 Which of the following statement is true ?

(A) Larger the number of chelating ring in a complex is greater its stability
(B) The less number of chelating ring in a complex is greater its stability
(C) Chelate is less stable than any common complex
(D) All above mention

32 Which of the following complex is more stable according to change and size of metal ion ?

(A) $[Ba(OH)]^+$
(B) $[Ca(OH)]^+$
(C) $[Mg(OH)]^+$
(D) $[Be(OH)]^+$

33 Write true and false :

(i) The stability of complex is increase with increasing of the charge on the metal ion

(ii) The stability of complex is increase with decreasing of the charge on the metal ion

(iii) $[Fe(CN)]^{-3}$ is more stable than $[Fe(CN)]^{-4}$

(A) T, F, T
(B) F, T, F
(C) F, T, T
(D) F, F, F

34 Why Ni(II) with 8-Hydroxy quinoline is more stable than Ni(II) with 2-methyl 8-Hydroxy quinoline ?

(A) Because Ni-has eight electrons in d-orbitals
(B) due to steric hindrance
(C) because 8-Hydroxy quinoline is bidentate ligand
(D) None

35 Which of the following is known as tridentate ligand ?

(A) en
(B) diethylene triamine
(C) edta^{-4}
(D) Pn

36 How many membered chelate rings are present in $M(en)_2$?

(A) 4
(B) 5
(C) 6
(D) 3

37 According to B Jerrum, the average number ligand molecules bound per mole of metal is expressed by _____ ?

(A) $n \rightarrow$
(B) $nH \rightarrow$
(C) K_H
(D) C_S

38 The order of inertness of low spin octahedral complexes formed by d^3, d^4, d^5, d^6 is _____

(A) $d^6 > d^3 > d^4 > d^5$
(B) $d^5 > d^3 > d^4 > d^6$
(C) $d^5 < d^3 < d^4 < d^6$
(D) $d^6 < d^3 < d^4 < d^5$

39 Trans effect is well defined by which type of complex ?

(A) Tetrahedral
(B) Octahedral
(C) Square planner
(D) Tbp

40 $\Delta H = \Delta G + T\Delta S$ is free energy change of the system, negative value of ΔG indicate that the process will occur.

(A) Spontaneously
(B) Opposite direction to suggested one
(C) In equilibrium
(D) None

41 Which of the following is not the electrophilic reagents ?

(A) Br^+
(B) Cl^-
(C) NO_2^+
(D) BF_3

42 Which of the following is the characteristic reactions of coordinated compounds ?

(A) Acid dissociation
(B) Exchange reaction
(C) Electron transfer reaction
(D) All of these

43 How many types of exchange reactions are possible for metal complexes ?

(A) 4
(B) 5
(C) 2
(D) 3

44 The t_2g term is used to represents which of the following group orbital's ?

(A) dxy, dyz, dzx
(B) px, py, pz
(C) Both (A) and (B)
(D) None of these

45 Which of the following is the nucleophilic reagent ?

(A) BF_3
(B) NO_2^+
(C) CN^-
(D) Br^+

46 The correct series of bond angle in CH_4, NH_3, H_2O respectively are :

(A) 109°28', 107°, 105°
(B) 107° 105°, 109°, 28'
(C) 105°, 109° 28', 107°
(D) 109°28', 105°, 107°

47 The total no. of B.P. and L.P. are present in NH_3 molecule is :

(A) 3&3 (B) 3&1

(C) 1&3 (D) 1&1

48 The correct order of repulsive energies is :

(A) lp- lp > lp- bp > bp- bp

(B) lp- bp > bp- bp > lp- lp

(C) bp- bp > lp- bp > lp- lp

(D) lp- lp < lp- bp < bp- bp

49 The VSEPR theory cannot explain the shapes of molecules which have ?

(A) Very polar bonds

(B) Extensive delocalized π-electrons

(C) an inert pair of electrons

(D) All of these

50 The 'Bent rule' is used to defined the structure of various fluorides of :

(A) Transition metals (B) Non-metal

(C) Alkaline earth metals (D) All three

Seat No. _____

PAPER CODE : CCU-8858

M. Sc. (Sem. I) Examination

March – 2022

Chemistry : CHN-402

(Organic Chemistry)

(Old Course)

Total Time : **60** Minutes
Total Questions : **50**

Total Marks : **70**
Students need to Tick only : **35**

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1 Identify the correct sequence according to electro negativity.
(A) $F > NH_2 > CH_3 > OH$
(B) $NH_2 > F > CH_3 > OH$
(C) $NH_2 > OH > CH_3 > F$
(D) $F > OH > NH_2 > CH_3$

2 Identify the correct statement which is related to aromatic hydrocarbon ?
(A) It has only sigma bonds
(B) It has only pi bonds
(C) It has a sigma and two pi bonds
(D) It has a sigma and delocalized pi bond

3 Identify the correct sequence with respect to Inductive effects.
(A) $CF_3 > CH_2F > CHF_2 > CF_3$
(B) $CF_3 > CHF_2 > CH_2F > CH_3$
(C) $CH_3 > CH_2F > CHF_2 > CF_3$
(D) $CH_3 > CHF_2 > CH_2F > CF_3$

4 Select the correct statement regarding the aromatic nitrogen molecule.
(A) It is not hybridized
(B) It is sp hybridized
(C) It is sp^2 hybridized
(D) It is sp^3 hybridized

5 Hyperconjugation involves the delocalization of _____ ?
(A) σ bond orbital
(B) π bond orbital
(C) Both σ and π bond orbital
(D) None of the mentioned

6 Which among these is the simplest example for polycyclic arenes ?

(A) Benzacephenanthrylene (B) Naphthalene
(C) Pyrene (D) Dibenz-anthracene

7 Larger the number of hyperconjugation structures, the stability of free radicals will _____.

(A) Increase (B) Decrease
(C) Remains same (D) None of the mentioned

8 A fullerene is any molecule composed entirely of the carbon not in the form of hollow _____.

(A) Sphere (B) Tube
(C) Ellipsoid (D) Cuboid

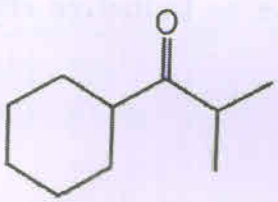
9 Fullerenes are stable with ____ hybridization.

(A) sp (B) sp^2
(C) sp^3 (D) sp^4

10 Spherical fullerenes are otherwise called as _____.

(A) Bucky balls (B) Soccer balls
(C) Cricket balls (D) Tennis balls

11 How many tautomers can you draw for the following ketone ?



(A) 1 (B) 2
(C) 3 (D) 4

12 According to Molecular Orbital theory, the shape and size of a molecular orbital depends upon ____.

(A) Shape and size of the combining atomic orbitals
(B) Numbers of the combining atomic orbitals
(C) Orientation of the combining atomic orbitals
(D) All of the mentioned

13 Choose the incorrect statement from the following options :

(A) In bonding molecular orbital, electron density is low in the region between the nuclei of bonded atoms

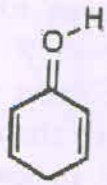
(B) The energy of antibonding molecular orbital is higher than that of atomic orbitals from which it is formed

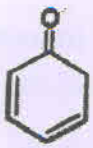
(C) Every electron in bonding molecular orbital contributes toward stability of the molecule

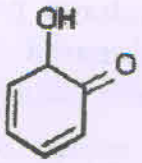
(D) Antibonding takes place when lobes of atomic orbitals have different signs.

14 Which of the following is a tautometer of phenol ?

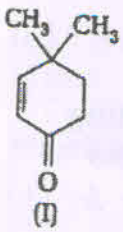
(A) 

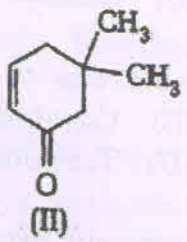
(B) 

(C) 

(D) 

15 Which of the following compound exhibit tautomerism ?


(I)


(II)

(A) (I)

(B) (II)

(C) (I) and (II)

(D) Neither (I) nor (II)

16 Which of the following can make difference in optical isomers ?

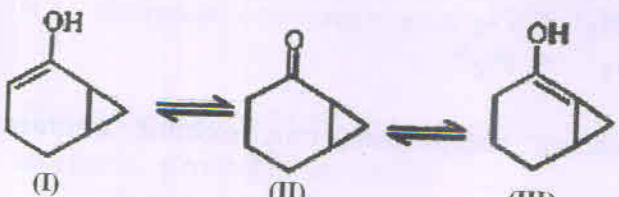
(A) Heat

(B) Temperature

(C) Polarized light

(D) Pressure

17 What is the stability order for the following compounds ?


(I) (II) (III)

(A) (I) > (II) > (III)

(B) (II) > (I) > (III)

(B) (III) > (II) > (I)

(D) (I) > (III) > (II)

18 Which of the following is an alkane which can exhibit optical activity ?

(A) Neopentane
(B) Isopentane
(C) 3-Methylpentane
(D) 3-Methylhexane

19 Identify the incorrect statement regarding cycloalkanes.

(A) These have sp^3 hybridized carbons
(B) These have tetrahedral bond angles
(C) Stability of the cycloalkanes varies directly with their respective size
(D) These undergo nucleophilic substitution reactions

20 Identify the incorrect statement regarding cycloalkenes.

(A) The bonds in them are fewer compared to those in alkenes
(B) They occur in gaseous form in nature
(C) These undergo polymerization
(D) The conjugated double bonds in them increase their stability

21 The infinity of intermediate conformations are called _____.

(A) Skew conformations
(B) Staggered conformations
(C) Eclipsed conformations
(D) Gauche

22 Gauche conformation is less stable due to ____.

(A) Hydrogen bonding
(B) Covalent bonding
(C) Vander Waal's repulsion
(D) Torsional strain

23 Bond order of O_2, F_2, N_2 respectively are ____.

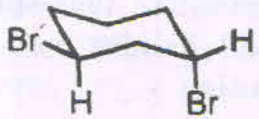
(A) +1, +2, +3
(B) +2, +3, +1
(C) +2, +1,+3
(D) +3, +2, +1

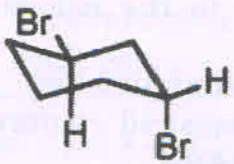
24 Arrange the following molecules in the order of increasing stability.

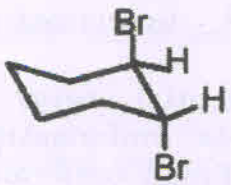
(A) $N_2^+ < N_2 < N_2^- < N_2^{2-}$
(B) $N_2^{2-} < N_2^- < N_2 < N_2^+$
(C) $N_2^{2-} < N_2^- = N_2^+ < N_2$
(D) $N_2 < N_2^+ = N_2^- < N_2^{2-}$

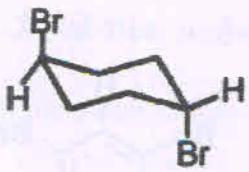
25 Which of the following compounds can exhibit geometrical isomerism ?

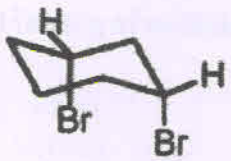
(A) 1-Hexene
(B) 2-Methyl-2-Pentene
(C) 3-methyl-1-pentene
(D) 2-Hexene

26  which of the following is the enantiomer for the following substance ?

(A) 

(B) 

(C) 

(D) 

27 What are diastereomers ?

(A) Molecules with non-superimposable mirror images

(B) Molecules with superimposable mirror images

(C) Molecules which do not have non-superimposable mirror images

(D) None of the mentioned

28 Which of the following is the definition of a meso compound ?

(A) A molecule with chirality centers which is chiral

(B) A chiral compound with more than one chirality center

(C) A diastereomer with no chirality centers

(D) A molecule with chirality centers which is not chiral

29 The infinity of intermediate conformations are called _____.

(A) Skew conformations (B) Staggered conformations

(C) Eclipsed conformations (D) Gauche

30 The reaction which gives exclusively on of several possible isomeric products is called _____.

(A) Dynamicselective (B) Stereoselective

(C) Regioselective (D) Stereospecific

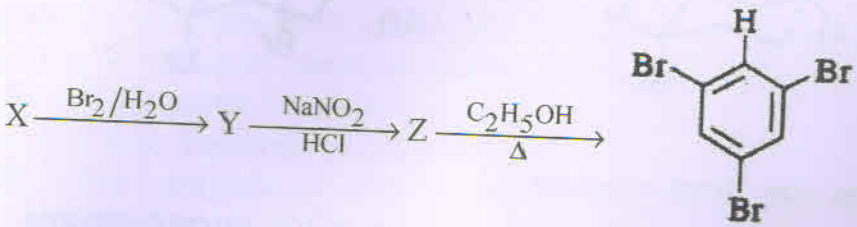
31 Why are aryl halides less reactive towards nucleophilic substitution reactions as compared to alkyl halides ?

(A) The formation of a less stable carbanion
(B) Longer carbon halogen bond
(C) The inductive effect
(D) sp^2 - hybridized carbon attached to the halogen

32 The potential energy of n-butane is minimum for _____.

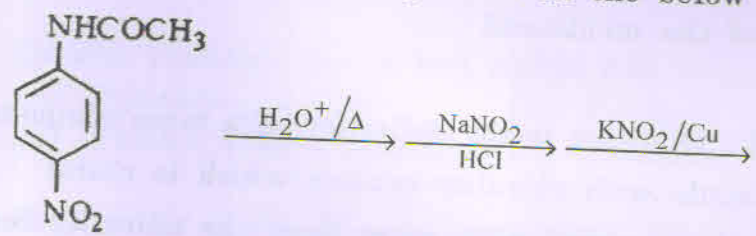
(A) Skew conformations (B) Staggered conformations
(C) Eclipsed conformations (D) Gauche

33 In the following reaction sequence, what will be X ?



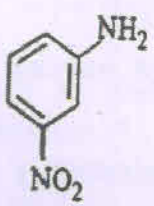
(A) Benzoic acid (B) Salicylic acid
(C) Phenol (D) Aniline

34 What will be the final product in the below reaction ?



(A) 

(B) 

(C) 

(D) 

35 Which of the following is not true for SN^1 reactions ?
(A) They occur through a single step concerted reaction
(B) They are favoured by polar solvents
(C) Tertiary alkyl halides generally react through this mechanism
(D) Concentration of nucleophile does not affect the rate of such reactions

36 What does hydrolysis of Alkyl Chlorides produce ?
(A) Unsaturated compound (B) Alcohol
(C) Aldehyde (D) None of the above

37 Hydrolysis of ester is catalysed by what ?
(A) hydroxyl ion (B) Nitrite ion
(C) Halogen (D) All of mentioned

38 Energy a system possesses because of the force exerted on its mass by a gravitational or electromagnetic field with respect to a reference surface.
(A) Kinetic Energy (B) Potential Energy
(C) Work (D) None of the above

39 What will be the product when HNO_3 reacts with NH_4OH ?
(A) $NH_4\ NO_3$ (B) $2NH_4\ NO_3$
(C) $NH_4\ (NO_3)_2$ (D) NH_2NO_3

40 Find the odd one out :
(A) Neutral salt :NaCl
(B) Acid salt : $CuSO_4.5H_2O$
(C) Basic salt : $CuCO_3.Cu(OH)_2$
(D) Nonhydrated salt: KNO_3

41 Stability of free radicals can be explained on the basis of ___.
(A) Inductive effect (B) Electromeric effect
(C) Hyperconjugation (D) Mesomeric effect

42 The atom which defines the structure of a family of organic compounds and their properties is called _____.
(A) Resonating structure (B) Homologous structure
(C) Functional group (D) Nucleophile

43 The halide ion is an extremely_____.
(A) Weak base
(B) Weak acid
(C) Strong base
(D) Strong acid

44 Select the correct statement from the following option.
(A) SN^2 reaction follows second order kinetics
(B) No intermediate is involved in SN^2 mechanism
(C) SN^2 reactions are one-step reaction
(D) All of the mentioned

45 The potential energy of n-butane is maximum for _____.
(A) Skew conformations
(B) Staggered conformations
(C) Eclipsed conformations
(D) Gauche

46 A low concentration of nucleophile favours the _____.
(A) SN^2 reaction
(B) SN^1 reaction
(C) Both (A) and (B)
(D) None of the mentioned

47 Arrange the following in the decreasing order of leaving group in nucleophilic substitution reaction.
(A) $H^- > Cl^- > HO^- > Br^- > CH_3COO^-$
(B) $Cl^- > Br^- > HO^- > H^- > CH_3COO^-$
(C) $Cl^- > Br^- > CH_3COO^- > HO^- > H^-$
(D) $HO^- > CH_3COO^- > H^- > Br^- > Cl^-$

48 Reaction of alcohol with $SOCl_2$ is ____.
(A) SN^1
(B) SN^2
(C) SNAr
(D) SNi

49 Which of the following is least stable ?
(A) Anti conformation
(B) Gauche conformation
(C) Staggered conformation
(D) Eclipsed conformation

50 Which among the following compounds explodes on contact with oxygen ?
(A) Cyclopropane
(B) Cyclobutane
(C) Cyclopentane
(D) Cyclohexane

Seat No. _____

PAPER CODE : CCU-8875

M. Sc. (Chemistry) (Sem. I) Examination

March – 2022

CHN–404(A) – SE : Group Theory & Spectroscopy

(Old Course)

Total Time : **35** Minutes
Total Questions : **35**

Total Marks : **50**
Students need to Tick only : **25**

Students need to tick only **25** questions. If more than **25** questions are ticked, the first **25** questions will only be evaluated.

1 Which of the following molecule showing Td point group ?
(A) PCl^5 (B) PH_3
(C) H_3BO_3 (planner) (D) CH_4

2 Two fold axis of rotation is present in _____.
(A) HCl (B) HCN
(C) N_2F^2 (D) PF_5

3 The matrix [1 2 3 4] is a _____ matrix.
(A) Square (B) Column
(C) Row (D) Both

4 Summation of diagonal elements of a matrix is known as _____.
(A) Order (B) Character
(C) Point group (D) None of these

5 Which of the following condition is satisfied by equivalent matrix ?
(A) Aij = Bij (B) Aij ≠ Bij
(C) Both (A) and (B) (D) None

6 How many base vectors are arise for H_2O molecules ?
(A) 1 (B) 3
(C) 4 (D) 9

7 The first section of character table shows.....
(A) Characters
(B) Point Group
(C) Reducible representations
(D) Irreducible representations

8 Which of the following is correct formula for verifying Ortogonality of any two irreducible representation of any group ?
(A) $\sum_R n_r \chi_i(r)\chi_i(r) = 0$ (B) $\sum_R n_r \chi_i(r)\chi_i(r) \neq 0$
(C) Both (A) and (B) (D) None

9 Among these what is the dimension of irreducible representation A and B ?
(A) 1 (B) 2
(C) 3 (D) 4

10 Asymmetric vibrations in H_2O molecule is _____.
(A) IR active, Raman active (B) IR active, Raman inactive
(C) IR inactive, Raman active (D) IR inactive, Raman inactive

11 Rotational vectors Rx, Ry, Rz can be identified by which section of the character table ?
(A) Section–6 (B) Section–5
(C) Section–4 (D) Section–3

12 Which of the molecule shows three fundamental molecular vibrations ?
(A) H_2O (B) SO_2
(C) Both (A) and (B) (D) NH_3

13 The only idempotent element in a group is :
(A) Identity (E) (B) Inverse (i)
(C) Axies (Cn) (D) Molecular plane (σ)

14 A molecule cannot be polar if it has _____
(A) Centre of inversion (i) (B) No centre of inversion
(C) Dipole movement $(\mu) \perp \sigma$ (D) None of these

15 Correct formula for determining Irreducible representation from Reducible representation is :
(A) $a_i = 1/h\left[\sum_R n_r \chi_i(r)\chi_i(r)\right]$ (B) $a_i = h\left[\sum_R n_r \chi_i(r)\chi_i(r)\right]$
(C) $a_i = \left[\sum_R n_r \chi_i(r)\chi_i(r)\right]$ (D) None of these

16 Electromagnetic waves are _____.
(A) Longitude
(B) Transverse
(C) Both (A) and (B)
(D) None

17 Which one of the following is considered to be ionizing radiation ?
(A) Visible light
(B) Radio waves
(C) X–rays
(D) Microwaves

18 What is the correct order of various energy in molecular spectra ?
(A) $E_{ele} > E_{vib} > E_{rot} > E_{tran}$
(B) $E_{ele} > E_{vib} > E_{trans} > E_{rot}$
(C) $E_{rot} > E_{vib} > E_{ele} > E_{tran}$
(D) $E_{ele} > E_{rot} > E_{vib} > E_{tran}$

19 The Photon of wavelength of 400 nm corresponds to _____
(A) 20000 cm^{-1}
(B) 25000 cm^{-1}
(C) 50000 cm^{-1}
(D) 60000 cm^{-1}

20 What is the property of electromagnetic radiations ?
(A) Transverse
(B) Longitude
(C) High frequency
(D) None of these

21 Radio activity was discovered by _____.
(A) Rutherford
(B) Marie Curie
(C) Parrie Curie
(D) Bequerel

22 The range of UV radiation is _____.
(A) 10–380 nm
(B) 200–500 nm
(C) 400–850 nm
(D) 200–300 nm

23 The Mossbauer Spectroscopy uses _____ radiation.
(A) γ radiation
(B) β radiation
(C) □ radiation
(D) € Radiation

24 The peaks observed in Mossbauer Spectroscopy is depends upon _____
(A) Nuclear density
(B) Electron density
(C) Symmetry density
(D) Ejection

25 The Mossbauer spectroscopy is not applicable to _____
(A) Gases
(B) Liquids
(C) Both Gases and Liquids
(D) Solids

26 What is the point group of $SOCl_2$ molecule ?
(A) Cs
(B) C_1
(C) Ci
(D) C2v

27 In the multiplication table of C2v, the multiplication of C2 x σ_{xz} = _____

(A) E
(B) C_2
(C) σ_{xz}
(D) σ_{yz}

28 Representation of vectors Tx and Tz along with σ_{xz} is _____

(A) –Tx, –Ty
(B) No change
(C) –Tx, +Ty
(D) +Tx, +Ty

29 The group characters of all matrices belonging to operations in the same class are _____.

(A) Identical
(B) Different
(C) Depends on group
(D) None of these

30 Radio frequency is the region of electromagnetic spectrum in _____ spectroscopy.

(A) IR
(B) X–ray
(C) UV
(D) NMR

31 The detector in X–ray diffraction that detect the visible radiation is _____.

(A) Proporsonal counter
(B) Silicon diode
(C) Golay detector
(D) Scintillation counter

32 XRD patterns provide information on the _____

(A) Particle nature
(B) Particle size and defects
(C) Chemical nature
(D) None of these

33 Which of the following detector in X–ray diffraction has more resolution ?

(A) Proporsonal Counter
(B) Silicon diode
(C) Goniometer
(D) Scintillation counter

34 X–Rays are generated by _____.

(A) Geiger tube
(B) Goniometer
(C) Coolidge tube
(D) Rotameter

35 What is spectroscopy based on the interaction between _____.

(A) Light and Proton
(B) Light and Matter
(C) Light and neutron
(D) Above all

Seat No. _____

PAPER CODE : CCU-8827

M. Sc. (Sem. I) Examination

March – 2022

Chemistry : CHNN-405-A (Elective Course)

(Computer for Chemists)

Total Time : 25 Minutes | Total Marks : 35

Total Questions : 25 | Students need to Tick only : 18

Students need to tick only **18** questions. If more than **18** questions are ticked, the first **18** questions will only be evaluated.

1 Who is the father of Computers ?

(A) James Gosling (B) Charles Babbage

(C) Dennis Ritchie (D) Bjarne Stroustrup

2 Which of the following is the correct abbreviation of COMPUTER ?

(A) Commonly Occupied Machines Used in Technical and Educational Research

(B) Commonly Operated Machines Used in Technical and Environmental Research

(C) Commonly Oriented Machines Used in Technical and Educational Research

(D) Commonly Operated Machines Used in Technical and Educational Research

3 Which of the following language does computer understand ?

(A) Computer understands only C language

(B) Computer understands only Assembly Language

(C) Computer understands only Binary language

(D) Computer understands only BASIC

4 Which of the following is the brain of the computer ?

(A) Central Processing Unit (B) Memory

(C) Arithmetic and Logic unit (D) Control Unit

5 Which of the following is not a characteristic of a computer ?

(A) Versatility
(B) Accuracy
(C) Diligence
(D) I.Q

6 What is the word length of a personal computer ?

(A) 32 bits
(B) 8 bits
(C) 64 bits
(D) 16 bits

7 Which of the following is not a type of computer code ?

(A) EDIC
(B) ASCII
(C) BCD
(D) EBCDIC

8 Which of the following part of a processor contains the hardware necessary to perform all the operations required by a computer ?

(A) Controller
(B) Registers
(C) Cache
(D) Data path

9 Which is interpreted language ?

(A) C++
(B) C
(C) MATLAB
(D) Fortran

10 The first widely used high level language developed in 1957.

(A) C
(B) Java
(C) Fortran
(D) Cobol

11 First statement in a fortran code is _____.

(A) Include statement
(B) import statement
(C) program statement
(D) @ data statement

12 The delimiter in a FORTRAN code.

(A) Semicolon
(B) Blank space
(C) Colon
(D) Comma

13 A valid variable declaration in FORTRAN is ___.

(A) real::Celcius (B) real Celcius;

(C) Celcius real; (D) real : Celcius

14 In FORTRAN, the declarations of variables can be modified using the ____ parameter.

(A) kind (B) make

(C) select (D) change

15 A Fortran is not ___.

(A) System supported (B) Source supported

(C) Case Sensitive (D) Programmer supported

16 A text file that contains our program is called as _____.

(A) Exe file (B) Doc file

(C) Obj file (D) Source file

17 SDLC stands for ___.

(A) Software development life cycle

(B) System development life cycle

(C) Software design life cycle

(D) System design life cycle

18 Which of the following type of computer is mostly used for automatic operations ?

(A) analog (B) digital

(C) hybrid (D) remote

19 Which of the following is the first neural network computer ?

(A) AN (B) AM

(C) RFD (D) SNARC

20 This describes the objectives of a product and set out the constraints.

(A) SDP (B) SRS

(C) SDD (D) STD

21 The graphical models showing the relationships between the system and its environment.

(A) System models (B) Software models

(C) Class models (D) User models

22 Which of the following devices provides the communication between a computer and the outer world ?

(A) Compact (B) I/O

(C) Drivers (D) Storage

23 SCM stands for ____.

(A) Software configuration monitoring

(B) System Configuration Management

(C) Software Configuration Management

(D) System Configuration Monitoring

24 _____ Conducted at developer's site.

(A) Alpha Testing (B) Beta Testing

(C) Unit Testing (D) System Testing

25 What is responsible for creating a process from a program ?

(A) OS (B) Web

(C) Internet (D) Firewall

Seat No. _____

PAPER CODE : CCU-8851

M. Sc. (Sem. I) Examination

March – 2022

Botany : BOTCC - 101

(Cell Biology) (Old Course)

Total Time : **60** Minutes
Total Questions : **50**

Total Marks : **70**
Students need to Tick only : **35**

Students need to tick only **35** questions. If more than **35** questions are ticked, the first **35** questions will only be evaluated.

1 A plant cell wall is mainly composed of :

(A) Protein
(B) Lipid
(C) Cellulose
(D) Starch

2 Fine strands carried by cytoplasm's small pores are known as _____.

(A) Plasmodeta
(B) Plasmodesmata
(C) Plasmodeta
(D) Plasmodemata

3 Pore-like connections between adjacent cells is an example of :

(A) Gap Junction
(B) Desmosomes
(C) Tight Junction
(D) Cell Junction

4 Glycolipids in the plasma membrane are located at :

(A) Inner leaflet of the plasma membrane
(B) The outer leaflet of the plasma membrane
(C) Evenly distributed in the inner and outer leaflets
(D) It varies according to cell types

5 A cell without a cell wall is termed as :

(A) Tonoplast
(B) Protoplast
(C) Symplast
(D) Apoplast

6 Which organism lacks cell wall ?

(A) Plant cells
(B) Protoza
(C) Bacterial cells
(D) Algae

7 What is S-layer ?

(A) Solid layer
(B) Surface layer
(C) Secondary layer
(D) Soluble layer

8 The protruding invaginated sheets inside mitochondria is known as _____.

(A) Cristae
(B) Fimbrae
(C) Hyphae
(D) Cellular Digestion

9 Cytoskeletal filaments are polymers of _____.

(A) Proteins
(B) Ribonucleic acids
(C) Deoxyribonucleic acids
(D) Carbohydrates

10 Prokayotic cells lack which of the following cell organelles ?

(A) Nucleus
(B) Lysosome
(C) Endoplasmic Reticulum
(D) All of the above

11 Which of the following cell organelles is called the powerhouse of the cell ?

(A) Nucleus
(B) Lysosomes
(C) Chloroplast
(D) Mitochondria

12 A network of microfilaments and microtubules is classified as :

(A) Cytoskeleton
(B) Active skeleton
(C) Vertebral skeleton
(D) Endoplasmic skeleton

13 Which of the following cell organelle are found only in a plant cell ?

(A) Mitochondria
(B) Plastids
(C) Golgi complex
(D) Ribosomes

14 The function of the centrosome is :

(A) Formation of spindle fibres
(B) Osmoregulation
(C) Secretion
(D) Protein synthesis

15 Which of the following is not a component of the nucleus ?

(A) Chromosome
(B) Nucleolus
(C) Cytoplasm
(D) Nuclear envelope

16 Nucleus are absent in :

(A) Red blood cells and bacterium
(B) Red blood cells, sieve cells and bacterium
(C) Red blood cells only
(D) None of these

17 Nucleosome is made up of _____.

(A) DNA, histone core protein
(B) DNA, histone core protein, linker H1
(C) RNA, histone core protein
(D) RNA, histone core protein

18 Why are chromosomes condensed ?

(A) To facilitate accommodation
(B) Always condensed
(C) To facilitate cell division
(D) To facilitate distribution in daughter cells

19 A chromosome with a very short arm and a very long arm is referred to as :

(A) Metacentric
(B) Telocentric
(C) Aerocentric
(D) Sub-metacentric

20 The main function of nucleolus is :

(A) Protein synthesis
(B) ATP production
(C) DNA synthesis
(D) rRNA synthesis

21 Nucleolus is the site of formation of _____.

(A) Spindle fibres
(B) Ribosomes
(C) Peroxisomes
(D) Chromosomes

22 In which typical stage are Lampbrush chromosomes observed ?

(A) Meiotic prophase
(B) Mitotic metaphase
(C) Mitotic prophase
(D) Mitotic anaphase

23 A functional chromosome has :

(A) A centromere
(B) A telomere
(C) An origin of replication
(D) All of these

24 The condensation of chromosomes is observed in _____

(A) Prophase I
(B) Anaphase I
(C) Metaphase I
(D) None of the above

25 In which stage chromosomes align on the equator of spindle fibre ?

(A) Metaphase
(B) Anaphase
(C) Telophase
(D) Prophase

26 The division of cytoplasm is known as :

(A) Mitosis
(B) Synapsis
(C) Cytokinesis
(D) Karyokinesis

27 Nuclear DNA replicates in the _____ phase.

(A) G2 phase
(B) M phase
(C) S phase
(D) None of the above

28 The longest stage in the cell cycle is :

(A) Interphase
(B) Anaphase
(C) Metaphase
(D) None of the above

29 Which of the following is NOT the type of cancer ?

(A) Carcinomas
(B) Sarcomas
(C) Leukemia
(D) Caspases

30 Synapsis is defined as the pairing of _____.

(A) Acentric chromosomes
(B) Non-homologous chromosomes
(C) Any chromosomes
(D) Homologous chromosomes

31 Cancer is related to :

(A) Non-malignant tumor
(B) Uncontrolled growth of tissues
(C) Controlled division of tissues
(D) None of the above

32 Reason of lung cancer is :

(A) Coal mining
(B) Cement factory
(C) Calcium fluoride
(D) Bauxite mining

33 What is the origin of the cancerous cells ?

(A) Monoclonal (B) Polyclonal

(C) Stem cells (D) Mesodermal cells

34 Programmed cell death is termed as :

(A) Oxidative stress (B) Apoptosis

(C) Cell cycle (D) Cell division

35 This cannot be killed by apoptosis :

(A) Immune cells

(B) Cancer cells

(C) Cells with DNA damage

(D) A cell infected with viruses

36 The G-proteins bind only to _____.

(A) Cytosine (B) Guanine

(C) Thymind (D) Adenine

37 Name the part of a chromosome where t-loop is found.

(A) Telomere (B) Centromere

(C) Acromere (D) Tetraplex

38 Name the chemical carcinogen which causes prostate cancer.

(A) Radon (B) Cadmium

(C) Asbestos (D) Arsenic

39 Cancer research is referred to as :

(A) Microbiology (B) Oncology

(C) Pathology (D) Physiology

40 Cell signaling is _____.

(A) Intercellular (B) Intracellular

(C) Both A and B (D) None of the above

41 Cancerous cells are more easily damaged by radiation than normal cells as they _____.

(A) Differ in structure (B) Undergo rapid division

(C) Are nutrition-starved (D) None of these

42 Name the cells which lost their control of the regulated division, differentiation, and apoptosis.

(A) Tumor cell (B) Immune cell

(C) Platelets (D) Stem cells

43 Which therapies will involve only the cancerous cells not the normal cells in treatment ?

(A) Chemotherapy (B) Surgery

(C) Aromatherapy (D) Immunotherapy

44 Which signal molecule does not interact with cell surface receptor ?

(A) Insulin (B) Glucagon

(C) Testosterone (D) Gastrin

45 The separation of daughter chromosome is known as :

(A) Cytokinesis (B) Karyokinesis

(C) Both A and B (D) None

46 Which of the following signal molecule is NOT used for extracellular signalling ?

(A) Autocrine (B) Endocrine

(C) Cyclic AMP (D) Paracrine

47 Which of the following cellular structures always disappears during mitosis and meiosis ?

(A) Plasma membrane

(B) Nucleolus and nuclear envelope

(C) Plastids

(D) None of these

48 CREB is a _____.

(A) Transcription factor

(B) Primary messenger

(C) Secondary messenger

(D) Surface receptor

49 PCD stand for :

(A) Programmed Cell Death

(B) Progress Cell Death

(C) Programmed Cycle Death

(D) None

50 Which stage denotes the termination of the cell cycle ?

(A) S

(B) G1

(C) G2

(D) G0

Seat No. _____

PAPER CODE : CCU-8878

M. Sc. (Sem. I) Examination

March - 2022

BOT CC-104 : Botany

(Plant Taxonomy and Resource Utilization)

(Old Course)

Total Time : **60** Minutes | Total Marks : **70**

Total Questions : **50** | Students need to Tick only : **35**

Students need to tick only **35** questions. If more than **35** questions are ticked, the first **35** questions will only be evaluated.

1 Hierarchy of categories was introduced by

(A) Linnaeus (B) De Candolle

(C) Bauhin (D) John Ray

2 ICBN is connected with ____.

(A) Correct nomenclature of animals

(B) Correct nomenclature of plants

(C) Correct nomenclature of biochemicals

(D) All the above

3 Holotype is a specimen.

(A) Nomenclature type used by author

(B) Nomenclature type when the original is missing

(C) Nomenclature type when the lectotype is missing

(D) Synonym of paratype

4 Isotype is a specimen.

(A) Duplicate of holotype

(B) Described along with holotype

(C) Nomenclature type when the original is missing

(D) Cited by author when there is no holotype

5 "Genera Plantarum" was written by

(A) Hutchinson (B) Bessey

(C) Engler and Prantl (D) Bentham and Hooker

6 'New Systematics' term was coined by.

(A) Linnaeus (B) Bentham and Hooker

(C) A.P. de Candolle (D) Juliane Huxley

7 Taxonomy is connected with.

(A) Collection of plants and animals

(B) Classification of organisms

(C) Identification, nomenclature and classification of organisms

(D) All of the above

8 Karyotaxonomy is a component of ___.

(A) Cytotaxonomy

(B) Experimental Taxonomy

(C) Biochemical Taxonomy

(D) Numerical Taxonomy

9 Father of Botany is ____.

(A) Hippocrates (B) Aristotle

(C) Plato (D) Theophrastus

10 A genus with a single species is ?

(A) Monotypic (B) Typical

(C) Atypical (D) Polytypic

11 Who is father of taxonomy ?

(A) Linnaeus (B) Lamarck

(C) Parasara (D) Darwin

12 Cytotaxonomy is a form of

(A) Classical systematics (B) New systematics

(C) Morpho-systematics (D) All of the above

13 The highest category in taxonomy is ___.

(A) Phylum (B) Class

(C) Kingdom (D) Species

14 Cocculus villosus belong to which family ?

(A) Menispermaceae (B) Pontaderiaceae

(C) Polygonaceae (D) Liliaceae

15 Inflorescence in Euphorbia genus is :

(A) Head (B) Cyathium

(C) Catkin (D) Spike

16 Calotropis procera belong to which family ?

(A) Menispermaceae (B) Asclepiadaceae

(C) Polygonaceae (D) Liliaceae

17 Fruit in family Euphorbiaceae is :

(A) Siliqua (B) Nut

(C) Regma (D) Legume

18 Achyranthus aspera belong to which family ?

(A) Menispermaceae (B) Asclepidaceae

(C) Polygonaceae (D) Amranthaceae

19 Fruit in family Rutaceae is :

(A) Berry (B) Nut

(C) Regma (D) Legume

20 Number of Perianth in family Chenopodiaceae is :

(A) 3 (B) 4

(C) 5 (D) None

21 Inflorescence of family Lamiaceae is :

(A) Verticillaster (B) Cyathium

(C) Catkin (D) Spike

22 Fruit in family Lamiaceae is :

(A) Capsule (B) Nut

(C) Regma (D) Carcerulus

23 Leaves in family Liliaceae are :

(A) Compound (B) Radical

(C) Reticulate (D) None

24 Number of perianth in family Liliaceae are

(A) 3 (B) 5

(C) 6 (D) 10

25 Fruit in family Poaceae is :

(A) Capsule (B) Caryopsis

(C) Regma (D) Nut

26 This is an adulterant.

(A) Pesticides (B) Urea

(C) Iron filings in tea (D) All of the above

27 Which one of the following is a synthetic fibre ?

(A) Nylon (B) Rayon

(C) Polyester (D) All of these

28 The natural dye present in turmeric is known as ____.

(A) Cinnamon (B) Phenolphthalein

(C) Methyl orange (D) Curcumin

29 Which is a natural fibre ?

(A) Silk (B) Nylon

(C) Rayon (D) All of these

30 The clothes are made up of thinner and thinner strands called

(A) Yam (B) Thread

(C) Fibre (D) Fabric

31 Separation of fibres of cotton from its seeds is known as

(A) Weaving (B) Spinning

(C) Knitting (D) Ginning

32 Jute fibres are obtained from

(A) Stem of jute plant

(B) Seeds of jute plant

(C) Fruit covering of jute plant

(D) Roots of jute plant

33 Which of the following is a plant fibre ?

(A) Wool (B) Silk

(C) Cotton (D) Nylon

34 The right time to cut jute plants is

(A) Matured stage

(B) before flowering stage

(C) Flowering stage

(D) Any time after flowering

35 Which of the following is synthetic fibre ?

(A) Nylon (B) Cotton

(C) Silk (D) Wood

36 The basic component of plant fibres is ____.

(A) Protein (B) Cellulose

(C) Starch (D) None of these

37 Synthetic fibres are __.

(A) Durable (B) Wrinkle free

(C) Economical (D) All of these

38 Scientific name of Desai Baval.

(A) Acacia nilotica (B) Dalbergia sissoo

(C) Terminalia arjuna (D) Tectona grandis

39 Established in 1936, ____ is India's first National Park.

(A) Bandhvgarh National Park

(B) Indravati National Park

(C) Jim Corbett National Park

(D) Gir National Park

40 Botanical name of Sisam.

(A) Acacia nilotica (B) Dalbergia sissoo

(C) Terminalia arjuna (D) Tectona grandis

41 Where is Sundarban National Park located ?

(A) Arunachal Pradesh (B) Bihar

(C) Uttar Pradesh (D) West Bengal

42 _____ is the largest National Park of India ?

(A) Gir National Park

(B) Jim Corbett National Park

(C) Indravati National Park

(D) Hemis National Park

43 The smallest National Park of India is __.

(A) Campbell Bay National Park

(B) Keoladeo National Park

(C) South Button National Park

(D) Betla National Park

44 Added to the UNESCO list of World Heritage Sites in 2014, the Great Himalayan National Park is located in which state in India ?

(A) Uttarakhand (B) Haryana

(C) Himachal Pradesh (D) Punjab

45 ___ is the state with the highest number of National Park in India.

(A) Rajasthan (B) Kerala

(C) Maharashtra (D) Madhya Pradesh

46 We can find the Ranthambore National Park in ___.

(A) Rajasthan (B) Gujarat

(C) Maharashtra (D) Uttarakhand

47 Scientific name of Sag.

(A) Acacia nilotica (B) Dalbergia sissoo

(C) Terminalia arjuna (D) Tectona grandis

48 The endangered Asiatic lions can be found in which National Park ?

(A) Kaziranga National park

(B) Orang National Park

(C) Ranthambore National Park

(D) Gir National Park

49 Botanical name of Ardusi.

(A) Atropa belladonna (B) Adhatoda vasica

(C) Allium sativum (D) Aloe barbadense

50 Use of Rauwolfia (Sarpgandha).

(A) Diabetes (B) Hyper blood pressure

(C) Fever (D) Malaria

Seat No. _____

PAPER CODE : CCU-8859

M. Sc. (Sem. I) Examination

March – 2022

Botany : BOTCC - 102

(Molecular Biology & Genetics)

(Old Course)

Total Time : **60** Minutes | Total Marks : **70**

Total Questions : **50** | Students need to Tick only : **35**

Students need to tick only **35** questions. If more than **35** questions are ticked, the first **35** questions will only be evaluated.

1 Which nucleotide bases is not present in RNA ?

(A) Adenine (B) Gunanine

(C) Cytosine (D) Thymine

2 Which type of bond found in nucleotides ?

(A) Glycoside Bond

(B) Phosphodiester bond

(C) Peptide bond

(D) None of the above

3 The replication mode of a rolling circle is :

(A) Conservative (B) Non Conservative

(C) Semi-Conservative (D) Dispersed

4 What is the constant ratio for DNA ?

(A) A + T / G + C (B) A + G / T + C

(C) A + C / U + G (D) A + U / G + C

5 Okazaki fragments stretch during replication from :

(A) lagging strand away from the replication fork

(B) lagging strand towards the replication fork

(C) leading strand away from the replication fork

(D) leading strand towards the replication fork

6 Which of the following enzymes joins the fragments of DNA together ?

(A) Endonuclease (B) DNA Ligase

(C) Primase (D) DNA Polymerase

7 In prokayotes, one of the following processes does not take place ?

(A) Replication (B) Splicing

(C) Transcription (D) Translation

8 Transcription is the process of transferring genetic material from :

(A) tRNA to mRNA (B) mRNA to tRNA

(C) DNA to mRNA (D) DNA to RNA

9 The sigma factor is a part of :

(A) DNA Polymerase (B) RNA polymerase

(C) Endonuclease (D) DNA ligase

10 Protein chain synthesis begins in both prokaryotic and eukaryotic cells with :

(A) Methionine (B) Arginine

(C) Valine (D) Serina

11 The term "translation" refers to the process of :

(A) synthesis of protein from a mRNA template

(B) synthesis of RNA from a DNA template

(C) synthesis of DNA from a mRNA template

(D) synthesis of RNA from a mRNA template

12 In eukaryotes, translation is initiated by binding of ribosome to the :

(A) Hogness box
(B) Pribnows box
(C) Poly A tail
(D) 5' cap

13 A functional unit in genomic DNA is a group of genes regulated by promoters is known as :

(A) Operons
(B) Anticodon
(C) Codon
(D) Genes

14 RNAi stands for :

(A) RNA inducer
(B) RNA interference
(C) RNA intron
(D) RNA insertion

15 The process of combining of DNA of two organisms into a single DNA molecule is known as :

(A) Recombinant DNA technology
(B) Crossing over
(C) Genetic recombination
(D) Gene amplification

16 Vaccines made with recombinant DNA technology are :

(A) First-generation vaccines
(B) Third generation vaccines
(C) Second-generation vaccines
(D) None

17 Restriction enzymes are also referred to as :

(A) Restriction endonuclease
(B) Molecular scissors
(C) Restriction Indonuclease
(D) All of these

18 The sequence recognized by the restriction enzyme to cut the DNA is called :

(A) Recognition site
(B) Restriction site
(C) Both A and B
(D) Cleavage sites

19 Any DNA molecule that can replicate in an appropriate host cell and contains the desired gene for cloning is referred to as :

(A) Vector
(B) Linker
(C) Plasmid
(D) Adaptor

20 A vector that can only clone a small DNA fragment is called :

(A) Yeast artificial chromosome
(B) Bacterial artificial chromosome
(C) Cosmid
(D) Plasmid

21 A genomic library is a set of :

(A) Recombinants
(B) Proteins
(C) Vectors
(D) Genes

22 The polymerase chain reaction is referred to as the _____.

(A) It is a DNA degradation technique
(B) It is a DNA amplification technique
(C) It is a DNA sequencing technique
(D) All of the above

23 After four PCR cycles, how many DNA duplexes can be obtained from a single DNA duplex ?

(A) 4
(B) 8
(C) 16
(D) 32

24 The technique of DNA profiling is used in :

(A) In Forensic studies and in cases of disputed parentage
(B) In pedigree analysis and to study migration pattern
(C) To confirm cell line identity
(D) All of these

25 For DNA sequencing, which of the following is not required ?

(A) Cloning
(B) Restriction digestion
(C) Electrophoresis
(D) Polymerase chain reaction

26 An organism that has two identical alleles for a trait is known as :

(A) Heterozygous
(B) Homozygous
(C) Codominant
(D) Tall

27 The smallest unit of genetic material that has a phenotypic impact on mutation is called :

(A) Recon
(B) Gene
(C) Muton
(D) Nucleic acid

28 A structural gene's alternative is :

(A) Operon
(B) Recon
(C) Muton
(D) Cistron

29 During transcription, introns are removed and exons are joined in a specific order what process is called ?

(A) Splicing
(B) Capping
(C) Looping
(D) Inducing

30 Which are following is not termination codon ?

(A) UAA
(B) AUG
(C) UGA
(D) UAG

31 In the genetic code dictionary, how many nonsense codons are there ?

(A) 4
(B) 3
(C) 2
(D) 1

32 Which of the following is not a genetic code property ?

(A) Overlapping
(B) Universal
(C) Degenerate
(D) With commas

33 X rays causes mutation by :

(A) Base substitution
(B) Deletion
(C) Transition
(D) Transversion

34 The Wooble Theory was first suggested by :

(A) Crick
(B) Watson and Crick
(C) Watson
(D) Nirenberg

35 The codon is a _____.

(A) Singlet
(B) Duplet
(C) Triplet
(D) Quadruplet

36 Out of following which is an example of lac opron ?

(A) Inducible operon
(B) Overlapping genes
(C) Arabinose operon
(D) Repressible operon

37 Extranuclear DNA can be present in :

(A) Lysosome and chloroplast
(B) Mitochondria and lysosome
(C) Chloroplast and mitochondria
(D) Golgi and e.r.

38 In plants, the genes that cause cytoplasmic male sterility are mostly found in :

(A) Chloroplast genome
(B) Nuclear genome
(C) Cytosol
(D) Mitochondrial genome

39 The main type of mutation is which of the following ?

(A) Genetic mutation
(B) Somatic mutation
(C) Heterosis
(D) None of these

40 Change in sequence of nucleotide in DNA is called as :

(A) Mutagen
(B) Translation
(C) Recombination
(D) Mutation

41 In agriculture, mutations are mostly used :

(A) Spontaneous
(B) Induced
(C) Recessive and lethal
(D) Lethal

42 Which base is responsible for spontaneous point mutation hotspots ?

(A) Adenine
(B) 5-methylcytosine
(C) 5-Bromouracil
(D) Guanine

43 Mutagens are agents that are either physical :

(A) Chemical
(B) Mechanical
(C) Hybrid
(D) Exogenous

44 _____ mutation occurs during meiosis, while a _____ mutation occurs during mitosis.

(A) Germinal, somatic
(B) Germinal, spontaneous
(C) Somatic, germinal
(D) None of the above

45 Except for _____ all of the following are significant aspects of Hardy-Weinberg equilibrium.

(A) Mating patterns
(B) Mutations
(C) Population size
(D) Temperature

46 Which form of selection causes a population to have more genetic variance ?

(A) Diversifying selection

(B) Stabilizing selection

(C) Directional selection

(D) Positive frequency-dependent selection

47 When males and females of a population look or act differently, it is referred to as :

(A) Sexual selection (B) Sexual dimorphism

(C) Diversifying selection (D) A cline

48 Natural selection operates on the _____ of an individual organism.

(A) Phenotype (B) Survival

(C) Genotype (D) Environment

49 In which environment, genetic drift is the most strong.

(A) Changing environments (B) Large populations

(C) Stable environments (D) Small populations

50 Which of the following does not result in the evolution of a species ?

(A) Directional selection (B) Gene flow

(C) Genetic drift (D) None of the above