SYLLABUS

FOR

ENTRANCE TEST

2013

UNIVERSITY OF HEALTH SCIENCES
LAHORE, PAKISTAN

STRUCTURE OF ENTRANCE TEST PAPER 2013

Sr.#	Subject	No. of Questions
1.	PHYSICS	44
2.	CHEMISTRY	58
3.	ENGLISH	30
4.	BIOLOGY	88
TOTAL		220

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PHYSICS

STRUCTURE OF THE SYLLABUS (2013)

F.Sc. and Non-F.Sc.

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6. Deformation of Solids
7. Ideal Gases
8. Heat and Thermodynamics
9. Electronics
10. Current Electricity
11. Magnetism and Electromagnetism
12. Modern Physics
13. Nuclear Physics

1. PHYSICAL QUANTITIES AND UNITS:

Learning Outcomes

a) Understand what is physics.

b) Understand that all physical quantities consist of a numerical magnitude and a unit.

c) Recall the following base quantities and their units; mass (kg), length (m), time (s), current (A), temperature (K), luminous intensity (cd) and amount of substance (mol)

d) Describe and use base units and derived units.

e) Dimensional units of physical quantities.

2. FORCES:

Learning Outcomes

a) Show an understanding the concept of weight.

b) Show an understanding that the weight of a body may be taken as acting at a single point known as its centre of gravity.

c) Weightlessness in an elevator.

d) Define and apply the moment of force.

3. FLUID DYNAMICS:

Learning Outcomes

a) Concept of viscosity.

b) Understand the terms steady (Laminar, streamline) flow, incompressible flow, non-viscous flow as applied to the motion of an ideal fluid.

c) Appreciate the equation of continuity.

$A_1V_1 = A_2V_2$ for the flow of an ideal and incompressible fluid.

d) Understand Bernoulli's equation

$$P + \frac{1}{2}\rho v^2 + \rho gh = \text{Constant}$$

e) Understand that the pressure difference can arise from different rates of flow of a fluid (Blood flow).

4. LIGHT:

Learning Outcomes

a) Understand interference of light.
b) Understand diffraction of light.
c) Describe the phenomenon of diffraction of X-rays by crystals and its use.
d) Understand polarization of light.
e) Concepts of least distance of distinct vision.
   - Short sightedness, long sightedness.
f) Understand the terms magnifying power and resolving power

   ($R = \frac{1}{\alpha_{\min}}$, $R = \frac{\lambda}{\Delta\lambda}$) of optical instruments.

g) Derive expressions for magnifying power of simple microscope and compound microscope.
h) Understand the principle of optical fibres, types and its application.

5. WAVES:

Learning Outcomes

a) Understand the simple harmonic motion with examples.
b) Explain energy in simple harmonic motion.
c) Describe practical examples of free and forced oscillations.
d) Understand the resonance with its applications.
e) Understand and describe Doppler's effect and its causes. Recognize the application of Doppler's effect.
f) Understand Ultrasound with its uses in scanning.
g) Show an understanding speed of sound in different media.
h) Audioable frequency range.

6. DEFORMATION OF SOLIDS:

Learning Outcomes

a) Appreciate deformation caused by a force and that is in one dimension.
b) Understand tensile or compressive deformation.
c) Understand the terms stress, stain young's modulus and Bulk modulus.
d) Energy stored in deformed material.

7. IDEAL GAS:

Learning Outcomes

a) Recall and use equation of state of an ideal gas $PV = nRT$.

b) State the basic assumptions of Kinetic theory of gases.

c) Derive gas laws on the basis of kinetic theory of gases.

d) Understand pressure of gas $P = \frac{2}{3} N_0 < \frac{1}{2} mv^2 >$.

8. HEAT AND THERMODYNAMICS:

Learning Outcomes

a) Understand the term thermal equilibrium.

b) Concepts of temperature and temperature scales.

c) Compare the relative advantage and disadvantage of thermocouple, thermometer and mercury thermometer.

d) Understand laws of thermodynamics.

e) Show an understanding the term internal energy.

9. ELECTRONICS:

Learning Outcomes

a) Logic gates:

- OR gate, AND gate, NOT Gate, NOR gate and NAND gate.

b) Understand the basic principle of Cathode Ray Oscilloscope and appreciate its use.

10. CURRENT ELECTRICITY:

Learning Outcomes

a) State Ohm's law and solve problems V= IR

b) Combinations of resistors.

c) Show an understanding of a capacitor.

d) Combinations of capacitors.

11. MAGNETISM AND ELECTROMAGNETISM:

Learning Outcomes

a) Magnetic field due to current in
   i) Straight wire
   ii) Solenoid
b) Understand Magnetic Resonance Imaging (MRI)

12. MODERN PHYSICS:

Learning Outcomes

a) Principle of production of X-rays by electron bombardment on metal target.
b) Describe main features of X-ray tube.
c) Use of X-rays in imaging internal body structures.
d) Show an understanding of the purpose of computed tomography or CT scanning.
e) Show an understanding of the principles of CT scanning.
f) Understand laser principle and its type (Helium – Neon Laser).
g) Describe the application of laser in medicine and industry.

13. NUCLEAR PHYSICS:

Learning Outcomes

a) Understand Radioactivity.
b) Understand Radioactive decay.
c) Radio Isotopes and their biological uses.
d) Nuclear radiation detectors
   - GM tube, Wilson cloud chamber.
e) Radiation hazards and biological effect of radiation.

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F.Sc. and Non-F.Sc.

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SELF TEST QUESTIONS (PHYSICS)

Choose single best option

Q.1 **At the present time, how many frontiers of fundamental science are there:**
A) Two
B) Three
C) One
D) Four

Q.2 **The unit of pressure in base unit is:**
A) Kg ms^{-2}
B) Kg ms^{2}
C) Kg $m^{-1} s^{-2}$
D) Kg $m^{-1} s^{-1}$

Q.3 **The physical quantity which produces angular acceleration in body is called:**
A) Force
B) Momentum
C) Centripetal force
D) Torque

Q.4 **A man in an elevator ascending with an acceleration will conclude that his weight has:**
A) Decreased
B) Increased
C) Reduced to zero
D) Remained constant

Q.5 **The Law of conservation of mass gives us the equation of:**
A) Stoke's law
B) Continuity
C) Bernoulli's theorem
D) Torricelli's theorem

Q.6 **1 torr is equal to :**
A) 135.3 Nm^{-2}
B) 133.3 Nm^{-2}
C) 132.3 Nm^{-2}
D) 130.3 Nm^{-2}

Q.7 **Viscosity of liquids with rise in temperature:**
A) Increases
B) Decreases
C) Remains the same
D) First decreases then increases

Q.8 **The phenomenon of polarization of light reveals that light waves are:**
A) Extremely short waves
B) Longitudinal waves
C) Transverse electromagnetic waves
D) Long wavelength waves

Q.9 **Diffraction of X-rays by crystals show that:**
A) X-rays are just like visible light
B) X-rays are electromagnetic waves
C) X-rays have very short wavelength
D) The intensity of X-rays is high

Q.10 **The image of an object 7mm high is only 1.4 cm high. The magnification produced by lens is:**
A) 0.7
B) 1
C) 2
D) 0.2

Q.11 **Infra-red signals travel through optical fibres of wavelength about:**
A) 2 μm
B) 1.3 μm
C) 1.5 μm
D) 1.9 μm

Q.12 **Total energy of a body executing simple harmonic motion is directly proportional to:**
A) The amplitude
B) Square root of amplitude
C) Reciprocal of amplitude
D) Square of amplitude

Q.13 **The wavelength of the wave produced in a microwave oven is:**
A) 15 cm
B) 13 cm
C) 12 cm
D) 10 cm

Q.14 **The frequencies of ultrasonic waves are:**
A) In audible range
B) Greater than 20 kHz
C) Lower than 20 kHz
D) Greater than 20 Hertz

Q.15 **A train is approaching a station at 90 Kmh^{-1} sounding a whistle of frequency 1000Hz. What will be the apparent frequency of the whistle as heard by a listener sitting on the platform?**
A) 1079.4 Hz
B) 1179.4 Hz
C) 1078.5 Hz
D) 1178.5 Hz

Q.16 Mathematical notation for " NAND" gate is:

A) $X = A + B$

B) $X = \overline{\mathrm{A}.\mathrm{B}}$

C) $X = \overline{A}.\overline{B}$

D) $X = \mathrm{A}.\mathrm{B}$

Q.17 Heat leaves a system; it is taken as:

A) Positive
B) Negative
C) Neither positive nor negative
D) Zero

Q.18 First Law of Thermodynamics is the Law of:

A) Conservation of momentum
B) Conservation of Energy
C) Conservation of mass
D) Conservation of velocity

Q.19 Increase in temperature is due to increase in:

A) Translational K.E
B) Rotational K.E
C) Gravitational K.E
D) Vibrational K.E

Q.20 $V = \frac{2}{3}\frac{N}{P} < \frac{1}{2}$ $mv^2 >$ represents:

A) Boyle's law.
B) Ideal gas
C) Charles law
D) Gas general equation

Q.21 The dimension of strain is:

A) [T]
B) [M]
C) [LT^{-1}]
D) None.

Q.22 The ratio of applied stress to volumetric strain is called:

A) Young's modulus
B) Shear modulus
C) Bulk modulus
D) Modulus of elasticity

Q.23 Beam of electron can be called as:

A) Positive rays
B) Cathode rays
C) Cosmic rays
D) X-rays

Q.24 Pressure of gas given by:

A) $P = \frac{2}{3}$ N $< \frac{1}{2}$ $mv^2 >$

B) P = Constant K.E

C) $P = \frac{2}{3}\frac{N}{V} < \frac{1}{2}$ $mv^2 >$

D) $P = \frac{1}{3}$ No $< \frac{1}{2}$ $mv^2 >$

Q.25 'OR' and 'AND' gates have:

A) Two outputs
B) Single output
C) Three output
D) No output

Q.26 Shunt Resistance is called:

A) Low resistance
B) High resistance
C) Bypass resistance
D) Specific resistance

Q.27 One Coulomb per second is equal to:

A) One volt
B) One ampere
C) One Walt
D) One ohm

Q.28 Ohm is defined an:

A) VC^{-1}
B) VA^{-1}
C) CV^{-1}
D) AV^{-1}

Q.29 A current carrying conductor is surrounded by:

A) Magnetic field
B) Electric field
C) Conservative field
D) Gravitational field

Q.30 Force on a charged particle having charge ' q ' moving with velocity ' v ' parallel to magnetic field of intensity ' B ' is given by:

A) F = q vb
B) F = vb/q
C) F = q v/B
D) F = 0

Q.31 In X-ray tube electrons are accelerated by applying a:

A) High current between anode and cathode
B) High voltage between anode and cathode
C) High stopping potential between anode and cathode
D) High power between anode and cathode

Q.32 In medical science which radiations are used to locate fractures or cracks in bones or teeth:

A) Infra-red radiations
B) Gamma radiations
C) X-rays
D) Ultra violet radiations

Q.33 The minimum wavelength of X-ray produced if 10kvp Potential difference is applied across the anode and cathode of the tube is:

A) 1.24×10^{-10}m
B) 12.4×10^{-10}m
C) 124×10^{-10}m
D) 0.124×10^{-10}m

Q.34 Laser light is highly:

A) Directional
B) Scattered
C) Unpolarized
D) Non- directional

Q.35 A light beam from a high power laser when focused by a lens can produce:

A) A high temperature
B) A low temperature
C) A moderate temperature
D) A very low temperature

Q.36 A laser beam can be employed safely to weld a detached:

A) Bone of body
B) Finger of hand
C) Retina of eye
D) Tooth

Q.37 CT scanning is the abbreviated name of:

A) Computed Technology
B) Computed Tomography
C) Computerized Technique
D) Classical Technique

Q.38 One curie is equal to:

A) 3.70×10^{10} atoms decay in one second
B) 3.70×10^{8} atoms decay in one second
C) 3.70×10^{6} atoms decay in one second
D) 3.70×10^{4} atoms decay in one second

Q.39 In cloud chamber, each track corresponds to the passage of:

A) One group of α– particles
B) One α – particle
C) Two α – particles
D) Three α – particles

Q.40 In β – particle emission its mass of nucleus remains practically the same while its charge changes by:

A) One unit
B) Two unit
C) Three unit
D) Four unit

Q.41 A nuclide $^{220}R_{84}$ decay to a new nuclide S by two α - emissions and two β – emissions; the nuclide S is:

A) $^{218}S_{84}$
B) $^{216}S_{84}$
C) $^{212}S_{82}$
D) $^{216}S_{82}$

Q.42 Beta particles are fast moving particles, called:

A) Protons
B) Electrons
C) Neutrons
D) α-Particles

Q.43 Cobalt-60 is used to:

A) Cure blood cancer
B) Cure bone cancer
C) Cure thyroid cancer
D) Cure tumor

Q.44 In radioactivity, the rate of decay:

A) Can be increased by magnetic field
B) Can be decreased by magnetic field
C) Can be kept constant by electric field
D) Is not effected by electric or magnetic field

CHEMISTRY

STRUCTURE OF THE SYLLABUS (2013)

F.Sc. and Non-F.Sc.

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B. Inorganic Chemistry

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C. Organic Chemistry

1. Fundamental Principles
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8. Macromolecules
9. Environmental Chemistry

A. PHYSICAL CHEMISTRY

1. FUNDAMENTAL CONCEPTS:

In this topic, candidate should be able to:

a) Define relative atomic, isotopic, molecular and formula masses, based on the ^{12}C scale.
b) Explain mole in terms of the Avogadro's constant.
c) Apply mass spectrometric technique in determining the relative atomic mass of an element using the mass spectral data provided.
d) Calculate empirical and molecular formulae, using combustion data.
e) Understand stoichiometric calculations using mole concept involving.
    i) Reacting masses
    ii) Volume of gases

2. STATES OF MATTER:

In this topic, candidate should be able to:

a) Understate gaseous state with reference to:
    i) Postulates of kinetic molecular theory
    ii) Deviation of real gases from ideal behavior
    iii) Gas laws: Boyle's law, Charles law, Avogadro's law and gas equation (PV=nRT) and calculations involving gas laws.
    iv) Deviation of real gases from ideal behaviour at low temperature and high pressure
    v) Causes of deviation from ideal behaviour
    vi) Conditions necessary for gasses to approach ideal behaviour
b) Discuss liquid state with reference to:
    - Evaporation, vapour pressure, boiling and hydrogen bonding in water
c) Explain the lattice structure of a crystalline solid with special emphasis on:
    i) Giant ionic structure, as in sodium chloride.
    ii) Simple molecular, as in iodine
    iii) Giant molecular, as in graphite; diamond; silicon(IV) oxide
    iv) Hydrogen-bonded, as in ice
    v) Metallic as in Cu and Fe.
d) Outline the importance of hydrogen bonding to the physical properties of substances, including NH_3, H_2O, C_2H_5OH and ice.
e) Suggest from quoted physical data the type of structure and bonding present in a substance

3. ATOMIC STRUCTURE:

In this topic, candidate should be able to:

a) Identify and describe the proton, neutron and electron in terms of their relative charges and relative masses

b) Discuss the behaviour of beams of protons, neutrons and electrons in electric fields

c) Calculate the distribution of mass and charges within an atom from the given data

d) Deduce the number of protons, neutrons and electrons present in both atoms and ions for a given proton and nucleon numbers/charge.

e)

i) Describe the contribution of protons and neutrons to atomic nuclei in terms of proton number and nucleon number

ii) Distinguish between isotopes on the basis of different numbers of neutrons present

f) Describe the number and relative energies of the s, p and d orbitals for the principal quantum numbers 1, 2 and 3 and also the 4s and 4p orbitals

g) Describe the shapes of s and p orbitals

h) State the electronic configuration of atoms and ions given the proton number/charge

i) Explain:

i) Ionization energy

ii) The factors influencing the ionization energies of elements

iii) The trends in ionization energies across a Period and down a Group of the Periodic Table

4. CHEMICAL BONDING:

In this topic, candidate should be able to:

a) Characterise electrovalent (ionic) bond as in sodium chloride and Calcium oxide.

b) Use the 'dot-and-cross' diagrams to explain

i) Covalent bonding, as in hydrogen(H_2); oxygen(O_2); chlorine(Cl_2); hydrogen chloride; carbon dioxide; methane and ethene

ii) Co-ordinate (dative covalent) bonding, as in the formation of the ammonium ion and in $H_3N^+ – {}^-BF_3$.

c) Describe the shapes and bond angles in molecules by using the qualitative model of electron-pair repulsion theory up to 4 pairs of electron including bonded electron pair and lone pair around central atom.

d) Describe covalent bonding in terms of orbital overlap, giving σ and Π bonds

e) Explain the shape of, and bond angles in ethane, ethene and benzene molecules in terms of σ and Π bonds

f) Describe hydrogen bonding, using ammonia and water as simple examples of molecules containing N-H and O-H groups

g) Explain the terms bond energy, bond length and bond polarity and use them to compare the reactivities of covalent bonds

h) Describe intermolecular forces (Van der Waal's forces), based on permanent and induced dipoles, as in $CHCl_3$, Br_2 and in liquid noble gases

i) Describe metallic bonding in terms of a lattice of positive ions surrounded by mobile electrons

j) Describe, interpret and/or predict the effect of different types of bonding (ionic bonding; covalent bonding; hydrogen bonding; Van der Waal's forces and metallic bonding) on the physical properties of substances

k) Deduce the type of bonding present in a substance from the given information

5. CHEMICAL ENERGETICS:

In this topic, candidate should be able to:

a) Understand concept of energy changes during chemical reactions with examples of exothermic and endothermic reactions.

b) Explain and use the terms:

i) Enthalpy change of reaction and standard conditions, with particular reference to:
Formation; combustion; hydration; solution; neutralization and atomisation

ii) Bond energy (ΔH positive, i.e. bond breaking)

iii) Lattice energy (ΔH negative, i.e. gaseous ions to solid lattice)

c) Find heat of reactions/neutralization from experimental results using mathematical relationship.

$$\Delta H = mc\Delta T$$

d) Explain, in qualitative terms, the effect of ionic charge and of ionic radius on the numerical magnitude of lattice energy

e) Apply Hess's Law to construct simple energy cycles, and carry out calculations involving such cycles and relevant energy terms, with particular reference to:

i) Determining enthalpy changes that cannot be found by direct experiment, e.g. an enthalpy change of formation from enthalpy changes of combustion

ii) Average bond energies

iii) Born-Haber cycles (including ionisation energy and electron affinity)

6. SOLUTIONS:

In this topic, candidate should be able to:

a) Describe and explain following concentration units of solutions
   i) Percentage composition
   ii) Molarity (M)
   iii) Molality (m)
   iv) Mole fraction (X)
   v) Parts of million (ppm)
b) Understand concept and applications of colligative properties such as:
   i) Elevation of boiling point
   ii) Depression of freezing point
   iii) Osmotic pressure

7. ELECTROCHEMISTRY:

In this topic, candidate should be able to:

a) Explain the industrial processes of the electrolysis of brine, using a diaphragm cell
b) Describe and explain redox processes in terms of electron transfer and/or of changes in oxidation number
c) Define the terms:
   - Standard electrode (redox) potential and Standard cell potential
d) Describe the standard hydrogen electrode as reference electrode
e) Describe methods used to measure the standard electrode potentials of metals or non-metals in contact with their ions in aqueous solution
f) Calculate a standard cell potential by combining two standard electrode potentials
g) Use standard cell potentials to:
   i) Explain/deduce the direction of electron flow in the external circuit.
   ii) Predict the feasibility of a reaction
h) Construct redox equations using the relevant half-equations
i) State the possible advantages of developing the H_2/O_2 fuel cell
j) Predict and to identify the substance liberated during electrolysis from the state of electrolyte (molten or aqueous), position in the redox series (electrode potential) and concentration

8. CHEMICAL EQUILIBRIUM:

In this topic, candidate should be able to:

a) Explain, in terms of rates of the forward and reverse reactions, what is meant by a reversible reaction and dynamic equilibrium
b) State Le Chatelier's Principle and apply it to deduce qualitatively the effects of changes in temperature, concentration or pressure, on a system at equilibrium
c) Deduce whether changes in concentration, pressure or temperature or the presence of a catalyst affect the value of the equilibrium constant for a reaction
d) Deduce expressions for equilibrium constants in terms of concentrations, Kc, and partial pressures, Kp
e) Calculate the values of equilibrium constants in terms of concentrations or partial pressures from appropriate data
f) Calculate the quantities present at equilibrium, given appropriate data
g) Describe and explain the conditions used in the Haber process.
h) Understand and use the Bronsted-Lowry theory of acids and bases
i) Explain qualitatively the differences in behaviour between strong and weak acids and bases and the pH values of their aqueous solutions in terms of the extent of dissociation
j) Explain the terms pH; Ka; pKa; Kw and use them in calculations
k) Calculate $[H^+(aq)]$ and pH values for strong and weak acids and strong bases
l) Explain how buffer solutions control pH
m) Calculate the pH of buffer solutions from the given appropriate data
n) Show understanding of, and use, the concept of solubility product, Ksp
o) Calculate Ksp from concentrations and vice versa
p) Show understanding of the common ion effect

9. REACTION KINETICS:

In this topic, candidate should be able to:

a) Explain and use the terms: rate of reaction; activation energy; catalysis; rate equation; order of reaction; rate constant; half-life of a reaction; rate-determining step

b) Explain qualitatively, in terms of collisions, the effect of concentration changes on the rate of a reaction

c) Explain that, in the presence of a catalyst, a reaction has a different mechanism, i.e. one of lower activation energy

d) Describe enzymes as biological catalysts (proteins) which may have specific activity

e) Construct and use rate equations of the form

$$\text{Rate} = k[A]^m[B]^n$$

with special emphasis on:

i) Deducing the order of a reaction by the initial rates method

ii) Justifying, for zero- and first-order reactions, the order of reaction from concentration-time graphs

iii) Verifying that a suggested reaction mechanism is consistent with the observed kinetics

iv) Predicting the order that would result from a given reaction mechanism (and vice versa)

v) Calculating an initial rate using concentration data

f) Show understanding that the half-life of a first-order reaction is independent of initial concentration and use the half-life to calculate order of reaction.

g) Calculate the rate constant from the given data

h) Name a suitable method for studying the rate of a reaction, from given information

B. INORGANIC CHEMISTRY

1. PERIODS:

In this topic, candidate should be able to:

Discuss the variation in the physical properties of elements belonging to period 2 and 3 and to describe and explain the periodicity in the following physical properties of elements.

a) Atomic radius

b) Ionic radius

c) Melting point

d) Boiling point

e) Electrical conductivity

f) Ionization energy

2. GROUPS:

In this topic, candidate should be able to:

Describe and explain the variation in the properties of group II, IV and VII elements from top to bottom with special emphasis on:

a) Reactions of group-II elements with oxygen and water
b) Characteristics of oxides of carbon and silicon
c) Properties of halogens and uses of chlorine in water purification and as bleaching agent
d) Uses of Nobel gases (group VIII)

3. TRANSITION ELEMENTS:

In this topic, candidate should be able to:

Discuss the chemistry of transition elements of 3-d series with special emphasis on:

a) Electronic configuration
b) Variable oxidation states
c) Use as a catalyst
d) Formation of complexes
e) Colour of transition metal complexes

4. ELEMENTS OF BIOLOGICAL IMPORTANCE:

In this topic, candidate should be able to:

a) Describe the inertness of Nitrogen
b) Manufacture of Ammonia by Haber process
c) Discuss the preparation of Nitric acid and nitrogenous fertilizers
d) Describe the presence of Suphur dioxide in the atmosphere which causes acid rain
e) Describe the manufacture of Sulphuric acid by contact method

C. ORGANIC CHEMISTRY

1. FUNDAMENTAL PRINCIPLES:

In this topic, candidate should be able to:

a) Classify the organic compounds
b) Explain the types of bond fission, homolytic and heterolytic
c) Discuss the types of organic reactions; Polar and free radical
d) Discuss the types of reagents; nucleophile, electrophile and free radicals
e) Explain isomerism; structural and cis-trans
f) Describe and explain condensed structural formula, displayed and skeletal formula
g) Discuss nomenclature of organic compounds with reference to IUPAC names of Alkanes, Alkenes, Alcohols and Acids

2. HYDROCARBON:

In this topic, candidate should be able to:

Describe the chemistry of Alkanes with emphasis on

a) Combustion
b) Free radical substitution including mechanism

Discuss the chemistry of Alkenes with emphasis on

a) Preparation of alkenes by elimination reactions
   i) Dehydration of alcohols
   ii) Dehydrohalogenation of Alkyl halide
b) Reaction of Alkenes such as
   i) Catalytic hydrogenation
   ii) Halogenation (Br_2 addition to be used as a test of an alkene)
   iii) Hydration of alkenes
   iv) Reaction with HBr with special reference to Markownikoff's rule
   v) Oxidation of alkenes using Bayer's reagent (cold alkaline $KMnO_4$) and using hot concentrated acidic $KMnO_4$ for cleavage of double bond
   vi) Polymerization of ethene

Discuss chemistry of Benzene with examples

a) Structure of benzene showing the delocalized Π-orbital which causes stability of benzene
b) Electrolphillic substitution reactions of benzene
   i) Nitration including mechanism
   ii) Halogenation
   iii) Friedel Craft's reaction

3. ALKYL HALIDES:

In this topic, candidate should be able to:

a) Discuss importance of halogenoalkanes in everyday life with special use of CFCs, halothanes, CCl_4, $CHCl_3$ and Teflon

b) Reaction of alkyl halides such as:

S_N-reactions, (Reactions of alcohols with aqueous KOH, KCN in alcohol and with aqueous NH_3)

Elimination reaction with alcoholic KOH to give alkenes.

4. ALCOHOLS AND PHENOLS:

In this topic, candidate should be able to:

Discus Alcohols with reference to

a) Classification of alcohols into primary, secondary and tertiary

b) Preparation of ethanol by fermentation process

c) Reaction of alcohol with

i) $K_2Cr_2O_7 + H_2SO_4$

ii) PCl_5

iii) Na-metal

iv) Alkaline aqueous Iodine

v) Esterification

vi) Dehydration

Phenols

a) Discuss reactions of phenol with:

i) Bromine ii) HNO_3

b) Explain the relative acidity of water, ethanol and phenol

5. ALDEHYDES AND KETONES:

In this topic, candidate should be able to:

a) Describe the structure of aldehyde and ketones
b) Discuss preparation of aldehydes and ketones by oxidation of alcohols
c) Discuss following reactions of aldehydes and ketones
   i) Common to both
      - 2,4-DNPH
      - HCN
   ii) Reactions in which Aldehydes differs from ketones
      - Oxidation with $K_2Cr_2O_7 + H_2SO_4$, Tollen's reagent and Fehling solution
      - Reduction with sodium boron hydride
   iii) Reaction which show presence of CH_3CO group in aldehydes and ketones
      - Triiodomethane test (Iodo form test) using alkaline aqueous iodine.

6. CARBOXYLIC ACID:

In this topic, candidate should be able to:

a) Show preparation of ethanoic acid by oxidation of ethanol or by the hydrolysis of CH_3CN
b) Discuss the reactions of ethanoic acid with emphasis on:
   i) Salt formation
   ii) Esterification
   iii) Acid chloride formation
   iv) Amide formation
c) Hydrolysis of amide in basic and acidic medium
d) Describe the strength of organic acids relative to chloro substituted acids

7. AMINO ACIDS:

In this topic, candidate should be able to:

a) Describe the general structure of α-amino acids found in proteins
b) Classify the amino acids on the basis of nature of R-group
c) Describe what is meant by essential amino acids
d) Understand peptide bond formation and hydrolysis of polypeptides/protein

8. MACROMOLECULES:

In this topic, candidate should be able to describe and explain

a) Addition polymers such as polyethene, polypropene, polystyrene and PVC.
b) Condensation polymers such as polyesters, nylon
c) Structure of proteins
d) Chemistry of carbohydrates
e) Chemistry of lipids
f) Enzymes
g) Structure and function of nucleic acid (DNA & RNA)

9. ENVIRONMENTAL CHEMISTRY:

In this topic, candidate should be able to

a) Understand causes of water pollution
b) Discuss disposal of solid wastes
c) Understand chemistry and causes of
   i) Smog
   ii) Acid rain
   iii) Ozone layer

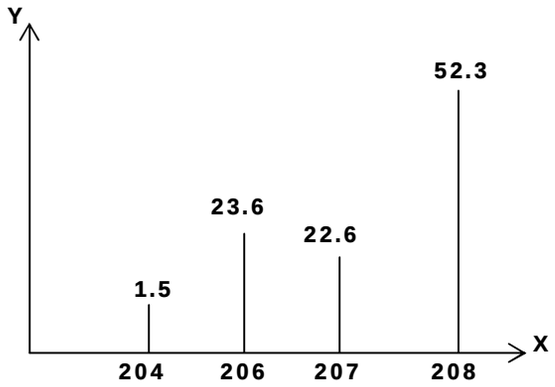
Table of Specification (CHEMISTRY-2013)
F.Sc. and Non-F.Sc.

Topic	MCQs
A. Physical Chemistry	
1. Fundamental concepts	02
2. States of matter	02
3. Atomic structure	02
4. Chemical bonding	02
5. Chemical energetics	02
6. Solutions	02
7. Electrochemistry	02
8. Chemical Equilibrium	02
9. Reaction kinetics	02
B. Inorganic Chemistry	
1. Periods	02
2. Groups	02
3. Transition elements	02
4. Elements of biological importance	04
C. Organic Chemistry	
1. Fundamental principles	02
2. Hydrocarbon	02
3. Alkyl halides	02
4. Alcohols and Phenols	04
5. Aldehydes and Ketones	03
6. Carboxylic acid	03
7. Amino acids	06
8. Macromolecules	06
9. Environmental chemistry	02
Total	**58**

SELF TEST QUESTIONS (CHEMISTRY)

Choose single best option

Q.1 The mass spectrum of lead is shown:



What quantities are represented by X-axis and Y-axis?

	X-axis	Y-axis
A)	Atomic number	Relative abundance
B)	Mass number	Atomic number
C)	Mass number	Height of peak
D)	Atomic number	Mass number

Q.2 Number of atoms of oxygen in 90g of glucose is (C=12, H=1, O=16):

A) 3.011×10^{23}
B) 6.022×10^{23}
C) 6.022×10^{24}
D) 1.8×10^{24}

Q.3 A mixture of 20% NH_3, 55% H_2 and 25% N_2 by volume has a pressure of $9.8 \times 10^4 Nm^{-2}$. What is the partial pressure of NH_3 in Nm^{-2}?

A) 1.96×10^4
B) 2.45×10^4
C) 2.92×10^4
D) 4.90×10^4

Q.4 Density of water (H_2O) is maximum at:

A) 100^0C
B) 0^0C
C) 4^0C
D) 14^0C

Q.5 How many total number of unpaired electrons are shown in the electronic configuration of Cr:

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

Q.6 Energy of s, p and d sub-shells is in the order:

A) s>p>d
B) p>s>d
C) d>p>s
D) s>p<d

Q.7 Hydrogen bonding plays a very important role in stabilizing various structures. In which of the following case hydrogen bonding is not involved?

A) Structure of ice
B) Secondary structure of protein
C) Solid state of iodine
D) Double helix structure of DNA

Q.8 The shape of $SnCl_2$ as predicted by valence shell electron pair repulsion theory is:

A) Linear
B) Bent
C) Tetrahedral
D) Triangular pyramidal

Q.9 A correct equation for the enthalpy change of formation of $NH_{3(g)}$ is:

A) $NH_4Cl_{(s)} \longrightarrow NH_{3(g)} + HCl_{(g)}$
B) $N_{2(g)} + 3H_{2(g)} \longrightarrow 2NH_{3(g)}$
C) $\frac{1}{2} N_{2(g)} + \frac{3}{2} H_{2(g)} \longrightarrow NH_{3(g)}$
D) $N_2O_{(g)} + 4H_{2(g)} \longrightarrow 2NH_{3(g)} + H_2O_{(l)}$

Q.10 Boiling point of water is 100^0C. To a sample of 500g of water 3g of urea $(NH_2)_2CO$ are added. The boiling point of solution is expected to be (N=14, C=12, O=16, H=1):

A) 100^0C
B) 100.052^0C
C) 99.52^0C
D) 99.00^0C

Q.11 The mole fraction of methanol in a solution containing 90g water, 92g ethanol and 96g methanol is (C=12, O=16, H=1):

A) 0.2
B) 0.3
C) 0.5
D) 1.0

Q.12 The relevant $E^{\ominus}$ values for 3 half cells are:

$Mn^{3+} + e^- \rightleftharpoons Mn^{2+}$ $E^{\ominus} = +1.49V$

$Fe^{3+} + e^- \rightleftharpoons Fe^{2+}$ $E^{\ominus} = +0.77V$

$Co^{3+} + e^- \rightleftharpoons Co^{2+}$ $E^{\ominus} = -0.28V$

Which is the strongest oxidizing agent?

A) Mn^{3+}
B) Fe^{2+}
C) Co^{2+}
D) Mn^{2+}

Q.13 Sulphuric acid is manufactured by contact process. One stage in the contact process involves the reaction between sulphur dioxide and oxygen.

$2SO_{2(g)} + O_{2(g)} \rightleftharpoons 2SO_{3(g)}$; $\Delta H = -197KJ^{-1}mol$

Which statement about this step is true?

A) High temperature favours the formation of SO_3
B) High pressure favours the formation of SO_3
C) No catalyst is used in this step
D) This process is carried out at 200^0C

Q.14 Kp and Kc for a gaseous reversible chemical reaction may be same or different. Select the reaction for which the two constants have same numerical value:

A) $N_2 + 3H_2 \rightleftharpoons 2NH_3$

B) $PCl_5 \rightleftharpoons PCl_3 + Cl_2$

C) $N_2 + O_2 \rightleftharpoons 2NO$

D) $2SO_3 \rightleftharpoons 2SO_2 + O_2$

Q.15 The oxidation of Iodine ion by H_2O_2 takes place according to the equation,

$H_2O_{2(aq)} + 2H_3O^+_{(aq)} + 2I^-_{(aq)} \longrightarrow I_{2(aq)} + 4H_2O_{(l)}$

The rate equation may be written as:

$Rate = k[H_2O_2]^x [H_3O^+]^y [I^-]^z$

This reaction takes place in three steps:

Step 1 $H_2O_2 + I^- \longrightarrow IO^- + H_2O$
Step 2 $IO^- + H_3O^+ \longrightarrow HIO + H_2O$
Step 3 $HIO + H_3O^+ + I^- \longrightarrow I_2 + 2H_2O$

What is the value of x, y and z if step 1 is the rate determining step:

	x	**y**	**z**
A)	1	1	1
B)	1	0	1
C)	1	2	0
D)	2	1	1

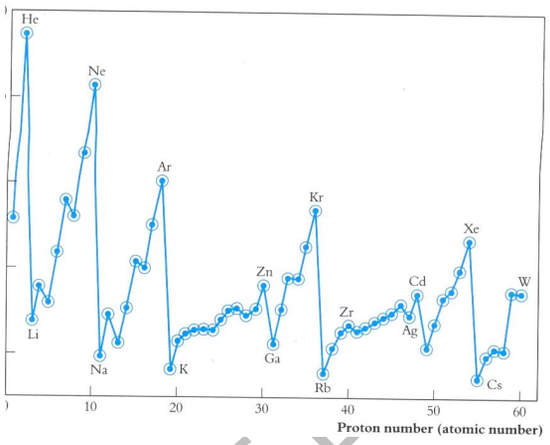
Q.16 States of reaction were measured at different initial concentration of reactants A and B. Data collected is given below in tabular form:

[A]	[B]	Initial Rate(atm min^{-1})
0.009	0.001	0.1
0.018	0.002	0.4
0.018	0.001	0.2
0.009	0.002	0.2

Select the rate expression that corresponds to the data:

A) Rate α [A][B]
B) Rate α [A][B]^2
C) Rate α [A]^2[B]
D) Rate α [A]^2[B]^2

Q.17 The periodic variation in a physical property of elements with proton number 1 to 60 is shown in the figure below:



Which property is shown in the figure?

A) Melting point
B) Atomic radius
C) Boiling point
D) First ionisation energy

Q.18 Four elements of period-2 are given, select the element with highest first ionization energy:

A) B
B) C
C) N
D) O

Q.19 An element of group IV shows the following properties:

i It is high melting.
ii It is lubricant.
iii It is used as an electrical conductor.

What could be the substance?

A) Silicon
B) Graphite
C) Tin
D) Lead

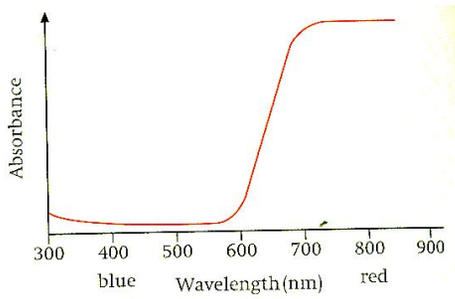
Q.20 Disinfection of water by chlorine is avoided if organic matter like phenol or humic acid is present in water. It is due to the formation of toxic and carcinogenic products with chlorine. Chlorine combines with humic acid to form:

A) Chloramines
B) Nitrogen trichloride
C) Chloroform
D) Carbon tetrachloride

Q.21 Visible spectroscopy is used to relate colour of a complex and the wavelength of absorption. The relation between absorbed wavelength and observed colour is shown below:

λ (nm) Absorbed	Colour of complex
400	Green-Yellow
450	Yellow
490	Red
580	Blue
650	Green

The visible spectrum of a complex is shown. What is the colour of complex observed?



A) Green-Yellow
B) Yellow
C) Blue
D) Red

Q.22 Transition element complexes show colour. The colour shown by different elements is different due to:

A) Different number of shells
B) Energy difference of d-orbitals varies with nature of ligand
C) Absorbance of same wavelength from visible light
D) Different geometry of complexes

Q.23 What is not the use of H_2SO_4:

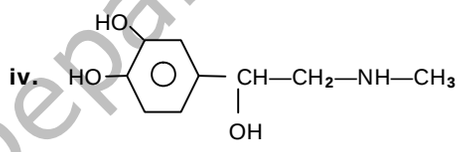
A) Paint and pigments
B) Detergents
C) Food preservation
D) Dye stuff

Q.24 Fertility of acidic soil is restored by adding:

A) Lime
B) Caustic soda
C) Baking soda
D) Milk of magnesia

Q.25 Which pair of the following compounds is optically active:

i. $H_2N—CH_2—CO_2H$
ii. $HOCH_2—CH_2—CO_2H$
iii. $CH_3—CH(OH)—CO2H$
iv.



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

Q.26 Which one of the following reagents is not an electrophile:

A) NO_2^+
B) CH_3^+
C) SO_3
D) CH_3OH

Q.27 When ethene reacts with bromine in the presence of a little NaCl, many electrophilic addition products are formed. Which of the following is not a possible product:

A) $CH_2(Br)—CH_2(Br)$

B) $CH_2(Br)—CH_2(OH)$

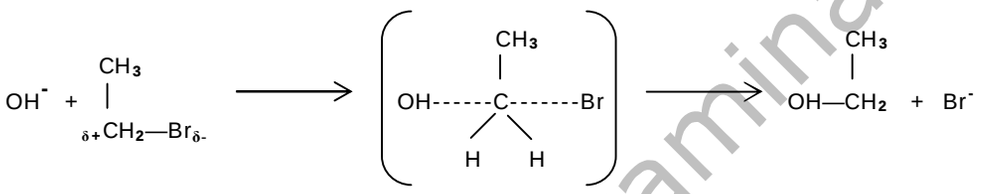
C) $CH_2(Br)—CH_2(Cl)$

D) $CH_2(Cl)—CH_2(OH)$

Q.28 Chlorination of methane in the presence of sunlight involves mechanism of:

A) Electrophilic substitution
B) Free radical substitution
C) Free radical addition
D) Free radical alkylation

Q.29 Alkaline hydrolysis of bromoethane takes place by S_N2 mechanisms as given below:



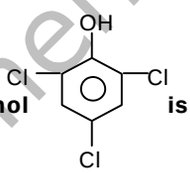
Intermediate

What is charge on the intermediate?

A) +2
B) +1
C) -1
D) -2

Q.30 Nucleophilic substitution of tertiary alkyl halide gives tertiary alcohol. What is the type of this reaction:

A) S_N1
B) S_N2
C) Addition-elimination
D) Elimination-addition

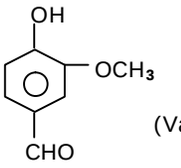
Q.31 2,4,6-Trichlorophenol  **is strongest antiseptic present in Dettol. Which of the following reagent is suitable for its preparation from phenol:**

A) PCl_5
B) $SOCl_2$
C) HCl
D) Cl_2

Q.32 Rectified spirit contains 95% ethanol in water. It is converted to absolute alcohol by:

A) Fractional distillation
B) Filtration
C) Treating with lime
D) Steam distillation

Q.33 Vanillin is a constituent of the vanilla bean and has the structure:



(Vanillin)

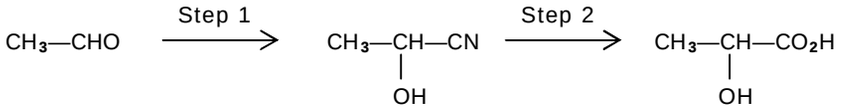
Which of the following reagent will not react with vanillin?

A) 2,4-Dinitrophenyl hydrazine
B) $[Ag(NH_3)_2]^+$ (Tollen's reagent)
C) Br_2 in CCl_4
D) Aqueous NaOH + I_2

Q.34 Acetaldehyde and acetone can be distinguished by:

A) Tollen's test
B) Iodoform test
C) Bayer's test
D) 2,4 DNPH test

Q.35 2-hydroxy propanoic acid can be prepared in the following two steps starting from ethanal:



What is the reagent and condition for the two steps?

A) HCN, Acid hydrolysis
B) NaCN in alcohol, oxidation with H_2O_2
C) HCN, basic hydrolysis
D) NaCN in alcohol, reduction Sn+HCl

Q.36 Highest acid strength in aqueous medium is associated with:

A) CH_3COOH
B) $ClCH_2COOH$
C) $Cl_2CHCOOH$
D) $CH_3—CH_2—COOH$

Q.37 20 α-amino acids found in protein are bifunctional compounds having at least a carboxylic acid group and an amino group. Which of the following α-amino acid has the secondary amino group in its structure?

A) Valine
B) Alanine
C) Proline
D) Glycine

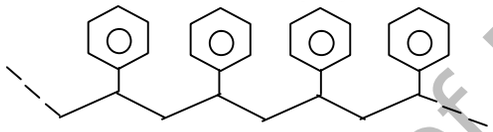
Q.38 On hydrolysis, protein yield amino acids. In all proteins about 20 different amino acids are found. Which is not a characteristic property of these 20 amino acids?

A) All are optically active
B) Those optically active have L-configuration
C) Proline has secondary amino group at 2-position
D) They decompose before melting

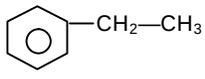
Q.39 When an alkali is added to the aqueous solution of an amino acid, net charge on a molecule of amino acid is:

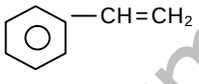
A) +ve
B) –ve
C) Zero
D) May be +ve or -ve

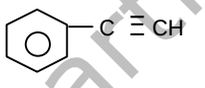
Q.40 A reaction of an addition polymer is shown:

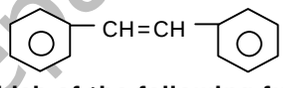


What is the structure of the monomer?

A) 

B) 

C) 

D) 

Q.41 Which of the following functional groups is present in fats?

A) Carboxylic acid
B) Aldehyde or ketone
C) Alcohol
D) Ester

Q.42 Starch is a mixture of two polysaccharides, amylase and amylopectin. Amylase has linear structure where as amylopectin is branched. In amylopectin, branching is due to:

A) α-1,4 glycosidic linkage
B) β-1,4 glycosidic linkage
C) α-1,6 glycosidic linkage
D) β-1,6 glycosidic linkage

Q.43 Natural rain water has a pH of 5.6. What is the pH of the acid rain?

A) 1-2
B) 6-7
C) 8-9
D) 4-5

Q.44 Four statements regarding the characteristics of ozone are given, select the INCORRECT:

A) Ozone is produced in most of the tropical regions
B) In polar regions it causes various health problems
C) It reduces the durability of paint
D) It is useful to plants

ENGLISH

STRUCTURE OF THE SYLLABUS (2013)

F.Sc. and Non-F.Sc.

The English section shall consist of four parts:

Part I:

- It will be comprised of Four Questions in which the candidate will have to select the appropriate/suitable word from the given alternatives.

Part II:

- It will contain sentences with grammatical errors and the candidate will have to identify the error. There will be Six Questions from this part.

Part III:

- There will be Ten Questions consisting of a list of Four sentences each. The candidate will have to choose the grammatically correct sentence out of the given four options.

Part IV:

- In this part, the candidate will be asked to choose the right synonyms. Four options will be given and He/She will have to choose the most appropriate one. There will be Ten Questions from this part.

Essential Word Power

1.	Acupuncture
2.	Aberration
3.	Abnegate
4.	Aboriginal
5.	Absolution
6.	Abstruse
7.	Acclimate
8.	Accolade
9.	Accrue
10.	Acquiesce
11.	Actuary
12.	Acumen
13.	Adage
14.	Adamantine
15.	Addled
16.	Admonition
17.	Adonis
18.	Adroitness
19.	Aerobic- exercise
20.	Aerodynamic
21.	Affect
22.	Affinity
23.	Afflatus
24.	Akimbo
25.	Alacrity
26.	Allay
27.	Altruistic

28.	Amazon
29.	Ambulatory
30.	Ameliorate
31.	Amenities
32.	Amorphous
33.	Ampere
34.	Analogue
35.	Anaphylactic
36.	Aneurysm
37.	Angina
38.	Anomaly
39.	Anomie
40.	Antagonist
41.	Antibody
42.	Apocryphal
43.	Apprehension
44.	Aquaplane
45.	Aquifer
46.	Arbiter
47.	Arboreal
48.	Arcane
49.	Archives
50.	Argosy
51.	Aria
52.	Armada
53.	Articulated
54.	Artifice

55.	Ascetic
56.	Asgard
57.	Askance
58.	Aspersion
59.	Assimilate
60.	Assume
61.	Atrophy
62.	Attire
63.	Audacious
64.	August
65.	Auspicious
66.	Avatar
67.	Avid
68.	Avoirdupois
69.	Bacchanal
70.	Baedeker
71.	Balk
72.	Bamboozle
73.	Bantam
74.	Barbaric
75.	Basilica
76.	Batik
77.	Batter
78.	Battery
79.	Bauble
80.	Bayou
81.	Beguile

82.	Behest
83.	Belated
84.	Benediction
85.	Beneficence
86.	Benign
87.	Bequeath
88.	Berate
89.	Berm
90.	Beset
91.	Bifurcated
92.	Bistro
93.	Blandish
94.	Blasphemous
95.	Blathering
96.	Blaze
97.	Bloom
98.	Bonk
99.	Bonsai
100.	Botanicals
101.	Bouquet
102.	Bowdlerize
103.	Braille
104.	Brambles
105.	Brassy
106.	Bravura
107.	Bray
108.	Brio
109.	Broach
110.	Broadside
111.	Buckle
112.	Buoyant
113.	Burgeoning
114.	Cachet
115.	Caesarean
116.	Caliph
117.	Calisthenics
118.	Camber
119.	Cameo
120.	Candelabra
121.	Capital
122.	Capsule
123.	Carapace
124.	Cardigan
125.	Career
126.	Caricature
127.	Cartographer
128.	Cast
129.	Catacomb
130.	Catalyst
131.	Catharsis
132.	Caulk
133.	Cause célèbre
134.	Cay
135.	Centennial
136.	Cerberus
137.	Chassis
138.	Chastise
139.	Chiaroscuro
140.	Chicane

141.	Chimerical
142.	Chivalry
143.	Chromosome
144.	Churn
145.	Chutzpah
146.	Clamorous
147.	Claret
148.	Classic
149.	Classical
150.	Clement
151.	Close
152.	Cloud nine
153.	Coast
154.	Cobble
155.	Coccyx
156.	Coercive
157.	Coif
158.	Collage
159.	Comatose
160.	Comely
161.	Commiserate
162.	Commute
163.	Compact
164.	Compatible
165.	Complacent
166.	Concerted
167.	Condone
168.	Conciliatory
169.	Confiscatory
170.	Confound
171.	Congeal.
172.	Congruent
173.	Contemporary
174.	Contiguous
175.	Contradow
176.	Contravention
177.	Contrive
178.	Contumely
179.	Contusion
180.	Copacetic
181.	Coquetry
182.	Cordial
183.	Cordiality
184.	Corked
185.	Corollary
186.	Corpuscle
187.	Corroborating
188.	Cosset
189.	Coterie
190.	Covert
191.	Coveted
192.	Crass
193.	Craven
194.	Crenelate
195.	Crescendo
196.	Crescent
197.	Criterion
198.	Cue
199.	Cul-de-sac

200.	Cut and run
201.	Cuvee
202.	Cygnet
203.	Cynical
204.	Dacha
205.	Dale
206.	Dam
207.	Dappled
208.	Dark horse
209.	Dead-ender
210.	Deadhead
211.	Debility
212.	Debunk
213.	Debut
214.	Decant
215.	Decathlon
216.	Decelerate
217.	Decorum
218.	Decry
219.	Defenestration
220.	Deferential
221.	Deferment
222.	Delegate
223.	Delta
224.	Demographics
225.	Demure
226.	Denomination
227.	Deracinate
228.	Desiccate
229.	Deuce
230.	Devious
231.	Dexter
232.	Diaspora
233.	Diffidence
234.	Diffident
235.	Diligence
236.	Diligent
237.	Diocese
238.	Diorama
239.	Diptych
240.	Discombobulate
241.	Discourse
242.	Discrepancy
243.	Discretion
244.	Disdain
245.	Disingenuous
246.	Dissension
247.	Dissent
248.	Dissenter
249.	Dissonance
250.	Diva
251.	Divagate
252.	Divulge
253.	Docent
254.	Dote
255.	Downy
256.	Droll
257.	Dryad
258.	Dulcet

259.	Dunce
260.	Duplicitous
261.	Edda
262.	Effect
263.	Effervescent
264.	El dorado
265.	Electrolytes
266.	Elicit
267.	Elucidate
268.	Elusive
269.	Embed
270.	Embedded
271.	Emblazon
272.	Emblematic
273.	Emboss
274.	Emit
275.	Empathy
276.	Emulate
277.	Encomium
278.	Encumber
279.	Encyclical
280.	Enhance
281.	Ennui
282.	Epicenter
283.	Equipoise
284.	Equivocate
285.	Ergometer
286.	Eschew
287.	Espalier
288.	Ethic
289.	Etude
290.	Euphonious
291.	Evanescent
292.	Evasive
293.	Evocative
294.	Excavate
295.	Execrable
296.	Exhortation
297.	Exonerate
298.	Exploitation
299.	Extemporaneous
300.	Extrapolate
301.	Extricate
302.	Extrinsic
303.	Fabricate
304.	Facile
305.	Facilitate
306.	Fait accompli
307.	Fakir
308.	Fartlek
309.	Fascia
310.	Fateful
311.	Faux
312.	Fawning
313.	Feasible
314.	Feckless
315.	Felicitous
316.	Felicity
317.	Feral

318.	Fermentation
319.	Fiesta
320.	Figment
321.	Filigree
322.	Finagle
323.	Fistmele
324.	Flaunt
325.	Flibbertigibbet
326.	Florid
327.	Flotsam and jetsam
328.	Flux
329.	Fop
330.	Forswear
331.	Frowsy
332.	Funicular
333.	Gable
334.	Galoot
335.	Galvanize
336.	Gambit
337.	Garnish
338.	Gaudy
339.	Genocide
340.	Geodesic
341.	Gesticulate
342.	Gesundheit
343.	Gild
344.	Glaucoma
345.	Glaze
346.	Glib
347.	Glucose
348.	Gradient
349.	Grapevine
350.	Green
351.	Gridlock
352.	Guileless
353.	Guise
354.	Gull
355.	Guru
356.	Habiliments
357.	Hackles
358.	Hail
359.	Halcyon
360.	Hallux
361.	Hammer and tongs
362.	Harangue
363.	Hawk
364.	Hector
365.	Heinous
366.	Hem and haw
367.	Herbicide
368.	Herculean
369.	Hermetic
370.	Heterogeneous
371.	Hiatus
372.	Holistic- medicine
373.	Homeopathy
374.	Hone
375.	Horse latitudes

376.	Hue and cry
377.	Humane
378.	Hydra
379.	Hypertension
380.	Hypothermia
381.	Ichor
382.	Idealist
383.	Ilk
384.	Illicit
385.	Imam
386.	Immobilize
387.	Immolate
388.	Impediment
389.	Impending
390.	Impetuous
391.	Impetus
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393.	Implacable
394.	Importune
395.	Imprecation
396.	Impregnable
397.	Improvise
398.	Impugn
399.	Impute
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402.	Incentive
403.	Incisive
404.	Inculcate
405.	Indigent
406.	Ineradicable
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413.	Iniquity
414.	Innocuous
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416.	Inoculate
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419.	Inscrutable
420.	Inter
421.	Intransigent
422.	Intrinsic
423.	Irrefutable
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458.	Lacerating
459.	Laconic
460.	Lacunae
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465.	Latent
466.	Lathe
467.	Laud
468.	Lee
469.	Leitmotif
470.	Lemming
471.	Liement
472.	Ligament
473.	Ligature
474.	Lineage
475.	Lion's share
476.	Lipid
477.	Lissome
478.	Litter
479.	Liturgy
480.	Lodestar
481.	Lucidity
482.	Lulu
483.	Macrame
484.	Magnanimous
485.	Magnum
486.	Malevolence
487.	Mandala
488.	Maneuver
489.	Manicured
490.	Manifestation
491.	Mansard
492.	Matriculation
493.	Mausoleum
494.	Maverick
495.	Mean
496.	Medley
497.	Melange
498.	Memento
499.	Menial
500.	Mentor
501.	Meritorious
502.	Mesa
503.	Mesmerize
504.	Metabolism
505.	Microcosm
506.	Militate
507.	Minatory
508.	Mirth
509.	Misanthropy
510.	Misapprehension
511.	Mitigation
512.	Modish
513.	Monolithic
514.	Monotheism
515.	Montage
516.	Moot
517.	Morass
518.	Moratorium
519.	Mordant
520.	Mosaic
521.	Mosey
522.	Mote
523.	Motif
524.	Motley
525.	Mountebank
526.	Mulct
527.	Mumbo jumbo
528.	Murky
529.	Muse
530.	Must
531.	Myriad
532.	Nadir
533.	Nary
534.	Née
535.	Neologism
536.	Nexus
537.	Nibelung
538.	Niche
539.	Nike
540.	Nip and tuck
541.	Non sequitur
542.	Nuance
543.	Nuclear family
544.	Obeisance
545.	Obi
546.	Obliterate
547.	Obsequious
548.	Obstreperous
549.	Obtuse
550.	Odometer
551.	Onerous
552.	Onslaught
553.	Onyx
554.	Opaque
555.	Opportune
556.	Optimum
557.	Orb
558.	Origami
559.	Orthodox
560.	Orthotic
561.	Otiose
562.	Overdraft
563.	Oxymoron
564.	Pad
565.	Paddy
566.	Palatable
567.	Palaver
568.	Palazzo
569.	Palpitation
570.	Pampas
571.	Pan
572.	Pandemic
573.	Paper tiger
574.	Papier-mache
575.	Par
576.	Paradox
577.	Paragon
578.	Paramedic
579.	Parameter
580.	Parcel
581.	Pare
582.	Parlous
583.	Paroxysm
584.	Pathos
585.	Patisserie
586.	Peccadillo
587.	Pedestrian
588.	Peerless
589.	Pending
590.	Pendulous
591.	Peninsula
592.	Penultimate
593.	Perfidious
594.	Perfidy
595.	Perfunctory
596.	Perimeter
597.	Peripheral
598.	Periphery
599.	Permeate
600.	Permutation
601.	Peroration
602.	Perpetuate
603.	Perseverance
604.	Persnickety
605.	Perspicacious
606.	Phalanx
607.	Phlegmatic
608.	Picayune
609.	Piety
610.	Pilaster
611.	Placate

612.	Placebo
613.	Plague
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616.	Pollex
617.	Polyunsaturated
618.	Pomp
619.	Porcinely
620.	Portmanteau
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626.	Précis
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633.	Preplate
634.	Prevail
635.	Prevalent
636.	Prig
637.	Primal
638.	Privation
639.	Pro forma
640.	Procrastinate
641.	Procure
642.	Prodigious
643.	Prolific
644.	Proponent
645.	Proscription
646.	Provender
647.	Provident
648.	Provocative
649.	Prowess
650.	Prune
651.	Purchase
652.	Putrid
653.	Quadriceps
654.	Quagmire
655.	Quarter
656.	Queasy
657.	Querulous
658.	Queue
659.	Quintessential
660.	Quintile
661.	Quorum
662.	Radiant
663.	Rakish
664.	Rambunctious
665.	Rapacious
666.	Rapport
667.	Raze
668.	Reactionary
669.	Recapitulate
670.	Reciprocal

671.	Reclamation
672.	Reclusive
673.	Reconnoitre
674.	Rectify
675.	Red herring
676.	Redolent
677.	Regatta
678.	Regime
679.	Regnant
680.	Relegate
681.	Relief
682.	Remedial
683.	Renege
684.	Renovate
685.	Repute
686.	Resonance
687.	Resound
688.	Restitution
689.	Resuscitate
690.	Retrench
691.	Riff
692.	Robust
693.	Roil
694.	Rope-a-dope
695.	Roster
696.	Ruddy
697.	Rue
698.	Ruminant
699.	Sagacity
700.	Sampan
701.	Sampler
702.	Sanatorium
703.	Sanctity
704.	Sandbagger
705.	Sanguine
706.	Sarong
707.	Satiate
708.	Satire
709.	Scam
710.	Sceptic
711.	Sciatica
712.	Score
713.	Scorned
714.	Scruple
715.	Scrutinize
716.	Scut work
717.	Scuttle
718.	Sear
719.	Sec
720.	Sedate
721.	Seder
722.	Sediment
723.	Segment
724.	Seminary
725.	Senescent
726.	Sensibility
727.	Septic
728.	Serendipity
729.	Seriatim

730.	Shaman
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735.	Silhouette
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750.	Spa
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757.	Stalwart
758.	Stanch
759.	Staples
760.	Static
761.	Stay
762.	Stentorian
763.	Steppe
764.	Sticky wicket
765.	Stilted
766.	Stimuli
767.	Stipulate
768.	Stoicism
769.	Stratagem
770.	Subdivision
771.	Succumb
772.	Sui generis
773.	Sunder
774.	Superficial
775.	Superfluous
776.	Supposition
777.	Surplice
778.	Surrealism
779.	Surrealistic
780.	Sward
781.	Swivel
782.	Sycophantic
783.	Syllogism
784.	Symbiosis
785.	Table d'hote
786.	Taboo
787.	Tactile
788.	Tai chi

789.	Tailgate
790.	Talk turkey
791.	Tank
792.	Tariff
793.	Taxidermy
794.	Tchotchkes
795.	Telepathy
796.	Temperance
797.	Tenacious
798.	Tessellate
799.	Therapeutic
800.	Tinge
801.	Tipping point
802.	Titan
803.	Torpid
804.	Totem
805.	Totemic
806.	Traction
807.	Tranquil
808.	Transcend
809.	Transient
810.	Transmute
811.	Trash talk
812.	Treacly
813.	Trepidation
814.	Triage
815.	Trifle
816.	Trilogy
817.	Trundle

818.	Tussle
819.	Uber
820.	Uncanny
821.	Undergird
822.	Understeer
823.	Undulate
824.	Undulating
825.	Unmitigated
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830.	Vanquish
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832.	Vaud
833.	Vegetate
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840.	Ventricle
841.	Veracity
842.	Vertex
843.	Verve
844.	Viability
845.	Vintage
846.	Vintner

847.	Virago
848.	Virulent
849.	Vista
850.	Viticulture
851.	Vituperative
852.	Vociferous
853.	Voguism
854.	Voracious
855.	Voraciousness
856.	Vortex
857.	Vulcanize
858.	Wadi
859.	Wan
860.	Wheedle
861.	Whiplash
862.	Woof
863.	Wry
864.	Wunderkind
865.	Xanadu
866.	Xanthic
867.	Xanthippe
868.	Xenophobic
869.	Xeric
870.	Xyloid
871.	Yarmulke
872.	Yin and yang

SELF TEST QUESTIONS (ENGLISH)

Choose single best option

Q.1 **He was _____ of all valuable possessions.**

A) Robbed.
B) Stolen.
C) Pinched.
D) Established.

Q.2 **The presence of armed guards _____ us from doing anything disruptive.**

A) Defeated.
B) Excited.
C) Irritated.
D) Prevented.

Q.3 **Our flight was _____ from Lahore to Islamabad airport.**

A) Diverted.
B) Reflected.
C) Deflected.
D) Shifted.

Q.4 **I am _____ forward to our picnic scheduled in next month.**

A) Looking.
B) Planning.
C) Seeing.
D) Going.

SPOT THE ERROR: *In the following sentences some segments of each sentence are underlined. Your task is to indentify that underlined segment of the sentence, which contains the mistake that needs to be corrected. Fill the bubble / circle corresponding to that letter under the segment in the MCQ Response form.*

Q.5 They did not (A) guess how closely (B) he had kept (C) in touch with across (D) the road.

Q.6 He proved that if (A) only germs were (B) excluded of wounds, inflammation was (C) averted. (D)

Q.7 The man felt his hair flutter (A) and the tissues of his body drew (B) tight as if he were standing (C) at the centre of a vacuum (D).

Q.8 He came to the hurdles (A) that he remember (B), over which once (C) he had one so easy a (D) victory.

In each of the following question, four alternative sentences are given. Choose the* CORRECT *one and fill the bubble / circle corresponding to that letter in the MCQ Response Form.

Q.9

A) He lacked both the training and the equipment needed in the job.
B) He lacked both the training and the equipment needed by the job.
C) He lacked both the training and the equipment needed on the job.
D) He lacked both the training and the equipment needed for the job.

Q.10

A) They tried to pacify him for kindness and affection.
B) They tried to pacify him in kindness and affection.
C) They tried to pacify him by kindness and affection.
D) They tried to pacify him with kindness and affection.

Q.11

A) Then he sat down in corner and remained queit.
B) Then he sat down in corner and remained quite.
C) Then he sat down in corner and remain quiet.
D) Then he sat down in corner and remained quiet.

Q.12

A) He was drenched with the hotness of his fear.
B) He was drenched in the hotness of his fear.
C) He was drenched by the hotness of his fear.
D) He was drenched off the hotness of his fear.

In each of the following question, four alternative meanings of a word are given. You have to select the* NEAREST CORRECT MEANING *of the given word and fill the appropriate Bubble / Circle on the MCQ Response Form.

Q.13 VEXING
A) Annoying
B) Aggressive
C) Viable
D) Waxy

Q.14 VAGUE
A) Respectful
B) Uncertain
C) Warlock
D) Snow white

Q.15 MANGLED
A) Dodged
B) Grained
C) Indisputable
D) Damaged

Q.16 PRODIGIOUS
A) Productive
B) Enormous
C) Prudential
D) Waddle

Q.17 ASTOUNDED
A) Shocked
B) Discarded
C) Assured
D) Attracted

Q.18 SAGACITY
A) Foolishness
B) Large City
C) Onions
D) Wisdom

Q.19 GRIM
A) Gratis
B) Restless
C) Severe
D) Grater

Q.20 INDOLENTLY
A) Lazily
B) Indecently
C) Ideally
D) Gaily

Q.21 PERISH
A) Furious
B) Come to death
C) Secret
D) Frustrated

Q.22 DOZE
A) Dogged
B) Diet
C) Sleep
D) Medicine to be taken

BIOLOGY

STRUCTURE OF THE SYLLABUS (2013)

F.Sc. and Non-F.Sc.

TABLE OF CONTENTS

1. Introduction to Biology
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3. Biological Molecules
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5. Kingdom Animalia and Plantae
6. Human Physiology
7. Bioenergetics
8. Biotechnology
9. Ecosystem
10. Evolution and Genetics

1. INTRODUCTION TO BIOLOGY:

Content

Branches of Biology

Learning outcomes:

a) Define the following terms:

Ecology, Physiology, Histology, Genetics, Zoogeography, Molecular Biology, Microbiology, Marine and Fresh water Biology, Biotechnology, Parasitology.

b) What are the various levels of Biological organization starting with atomic and subatomic levels to community level?

c) Define the following terms:

Transgenic plants, Cloning, Biological control, Biopesticides, Pasteurization, Disease Control (Preventive measure, Vaccinization, Drug therapy)

2. CELL BIOLOGY:

Content

Cell structure

Structure and Function of cellular organelles

Cell division

Learning outcomes:

a) Compare the structure of typical animal and plant cell

b) Compare and contrast the structure of Prokaryotic cell with Eukaryotic cells

c) Fluid mosaic model of cell membrane and transportation (diffusion, facilitated diffusion, active and passive transport), endocytosis and exocytosis.

d) Outline the structure and function of the following organelles:
Nucleus, Endoplasmic reticulum, Golgi apparatus, Mitochondria, Centrioles, Ribosomes

e) Explain Mitosis, what is its significance?

f) What is Meiosis, describe it in detail.

g) Describe Meiotic errors (Down's syndrome, Klinefelter's syndrome, Turner's syndrome)

h) Discuss the terms Karyokinesis and Cytokinesis;

i) Discuss and explain:

- Uncontrolled cell division (cancer)
- Programmed cell death (Apoptosis)
- Necrosis

3. BIOLOGICAL MOLECULES:

Content

Carbohydrate

Proteins

Lipids

Nucleic acids

Deoxyribonucleic acid (DNA)

Ribonucleic acid (RNA)

Enzymes

Learning outcomes:

a) Discuss carbohydrates: Monosaccharides (Glucose), Oligosaccharides (Cane sugar, sucrose), Polysaccharides (Starches)

b) Describe Proteins: Amino acids, Primary, Secondary, Tertiary and Quaternary structure of proteins

c) Describe Lipids: Acylglyceroles, waxes, Phospholipids, Terpenoids

d) Describe the structure along its back bone composition and function of DNA as hereditary material, Replication of DNA (Semi-conservative), Role of triplet codons, Transcription (making up of mRNA), Translation (protein synthesis: role of ribosomes, mRNA, tRNA)

e) Give the structure and types of RNA (mRNA, rRNA, tRNA)

f) What is enzyme and its role in reducing activation energy?

g) Define the following terms:

- Enzymes, Coenzyme, Co-factor, Prosthetic group, Apoenzyme and Holoenzyme

h) Explain the mode/mechanism of enzyme action

i) Describe the effects of temperature, pH, enzyme concentration and substrate concentration on the rate of enzyme catalysed reaction

j) Explain the effects of reversible and irreversible, competitive and non-competitive inhibitors on the rate of enzyme activity

4. MICROBIOLOGY:

Content

Virus

Bacteria

Fungi

Learning outcomes

a) Which are the viral diseases in humans?

b) Reteroviruses and Acquired Immunodeficiency diseases

c) Describe the Life cycle of Bacteriophage (in detail with its all steps) including:

- Lytic cycle
- Lysogenic cycle

d) Describe the structure and types of bacteria

e) Discuss in detail:

- Gram +ve bacteria
- Gram –ve bacteria
- Nutrition in bacteria

f) What are the uses and misuses of antibiotics?

g) What are molds (fungi)? How they are useful and harmful to mankind, give examples.

h) Describe the Life cycle of fungus (Rhizopus).

5. KINGDOM ANIMALIA AND PLANTAE:

Content

Kingdom Animalia (phyla)

Kingdom Plantae

Learning outcomes:

a) Porifera (with respect to their capacity to regenerate)

b) Coelenterata (coral reefs as habitat for sea animals)

c) Platyhelminthes (Harmful effects on human beings) with examples

d) Aschelminthes (Infection in humans) with examples

e) Arthropoda (Economic importance of Arthropods and harmful impacts on Man)

f) Define the following terms:

- Coelomata, Acoelomata, Pseudocoele, Radiata, Bilateria, Diploblastic and Triploblastic organization.

g) Economic importance of families with reference to food and other usefulness:

- Cassia
- Solanaceae
- Gramineae

6. HUMAN PHYSIOLOGY:

Content

a) Digestive System
b) Gas exchange and Transportation
c) Excretion and Osmoregulation
d) Nervous System
e) Reproduction
f) Support and Movement
g) Hormonal Control (Endocrine Glands)
h) Immunity

Learning outcomes:

a) Digestive System:

- Anatomy of digestive system and specify the digestion in:
  - Oral cavity (role of teeth, tongue, saliva and enzymes)
  - Stomach (enzymes)
  - Small intestine
  - Large intestine

b) Gas exchange and Transportation:

- Anatomy of respiratory system (nostrils, trachea, lungs)
- Explain the term breathing
- Discuss Blood composition, lymph, structure of heart, carriage of oxygen and carbon dioxide

c) Excretion and Osmoregulation:

- Describe the structure of kidney and its functions with respect to homeostasis
- What are Kidney problems and cures?
  - Kidney stones, lithotripsy, kidney transplant, dialysis, renal failure
- What do you understand by the term Homeostasis?

d) Nervous System:

- What is Nervous system and its types?
- Explain CNS (Central Nervous System) including forebrain, mid brain, hind brain and spinal cord
- Explain PNS (Peripheral Nervous System) and its types (Autonomic and Sympathetic Nervous System)
- Neurons (Associative, motor and sensory neuron)
- Discuss the Nervous disorders (Parkinson's disease, Epilepsy and Alzheimer's disease)
- What do you understand by Biological clock and circadian Rhythms?

e) Reproduction:

- Explain the Reproductive system in male in detail
- Explain the Reproductive system in female / Menstrual cycle
- Explain:
  - Spermatogenesis
  - Oogenesis
- Discuss the following Diseases in detail which are sexually transmitted:
  - Gonorrhea, Syphilis, Genital Herpes, AIDS and how these diseases can be controlled (treatment is not required)

f) Support and Movement:

- Explain the role of Human skeleton and skeletal muscles in locomotion
- Explain the process of muscle contraction
- What is Muscle fatigue, Tetani, Cramps?
- Describe the structure and functions of involuntary, voluntary and cardiac muscles

g) Hormonal control (Endocrine glands):

- What are hormones?
- Describe Hypothalamus with its hormones.
- Describe Pituitary gland with hormones secreted from its Anterior, Median and Posterior lobe
- Describe adrenal gland with its hormones.
- What are Islets of langerhans?
- What are the hormones of alimentary canal (Gastrin, secretin)?
- The hormones of ovaries and testes

h) Immunity:

- Immune system and define its components:
  - Antigen
  - Antibody (structure of antibody)
  - Lymphocytes (B and T cells)
- What is cell mediated response and humoral immune response?
- Types of Immunity:
  - Active immunity
  - Passive immunity
- What do you mean by vaccination?

7. BIOENERGETICS:

Content

Photosynthesis and cellular respiration

Learning outcomes

a) Photosynthetic pigments and their absorption spectrum

b) Light dependent stage

c) Light independent stage

d) Describe the respiration at cellular level including:

- Glycolysis, Krebs cycle, Electron Transport Chain

8. BIOTECHNOLOGY:

Content

DNA technology

Learning outcomes

a) Explain Recombinant DNA Technology

b) Discuss Polymerase Chain Reaction (detailed procedure)

c) What do you understand by the following terms:

- Gene therapy
- Transgenic animals

9. ECOSYSTEM:

Content

Components of Ecosystem

Biological succession

Energy flow in ecosystem

Impacts of Human activity on ecosystem

Learning outcomes:

a) Abiotic and biotic components of ecosystem

b) What is succession, give various stages of succession on land.

c) Explain the following terms:

- Predation, parasitism, symbiosis, mutualism, commensalism, grazing

d) Describe the flow of energy in an ecosystem

- Food chain
- Food web

e) What is the significance of Human activity on ecosystem as population, deforestation, ozone depletion, atmospheric pollution, Green house effect, industrial effluents (insecticides and herbicides).

10. EVOLUTION AND GENETICS:

Content

Darwin's theory

Lamarck's theory

Evidences of evolution

Genetics

Learning outcomes

a) Theory of Darwin and Lamarck, also discuss the merits and demerits

b) Evidences of evolution from paleontology and comparative embryology

c) Sex determination and sex linkage in humans

d) Define the following terms:

- Mutations, Epistasis, Gene, Allele, Multiple allele, Pleiotropy.

Table of Specification (Biology-2013)
(For F.Sc. and Non-F.Sc.)

Topic	MCQs
1. Introduction to Biology	**04**
2. Cell Biology	**10**
3. Biological Molecules	
a) Carbohydrates	02
b) Proteins	01
c) Lipids	01
d) Nucleic Acids	01
e) Enzymes	04
4. Microbiology	
a) Virus	01
b) Bacteria	02
c) Fungi	01
5. Kingdom Animalia and Plantae	**05**
6. Human Physiology	
a) Digestive System	04
b) Gas exchange and Transportation	04
c) Excretion and Osmoregulation	05
d) Nervous System	04
e) Reproduction	05
f) Support and Movement	05
g) Hormonal Control (Endocrine Glands)	04
h) Immunity	05
7. Bioenergetics	**05**
8. Biotechnology	**05**
9. Ecosystem	**05**
10.Evolution and Genetics	**05**
Total	**88**

SELF TEST QUESTIONS (BIOLOGY)

Choose single best option

Q.1 The branch of biology that deals with cell functions is called:
A) Histology.
B) Physiology.
C) Molecular biology.
D) Microbiology.

Q.2 Different tissues having related functions together form:
A) Organ.
B) Individual.
C) Organelles.
D) Molecules.

Q.3 Statement made by a scientist that may or may not be true is:
A) Theory.
B) Hypothesis.
C) Scientific law.
D) Statement.

Q.4 The method by which pests are destroyed by using some living organisms is called:
A) Bio-pesticide.
B) Integrated management.
C) Biological control.
D) Pasteurization.

Q.5 Robert Hook was the first person to see cells in:
A) Various plants.
B) Animals.
C) Fungi.
D) Cork.

Q.6 The concept "OMNIS cellula-e-cellala" means that, new cells are formed from:
A) Non living materials.
B) Dead organic matter.
C) Pre-existing living cells.
D) As the result of chemical reactions.

Q.7 In generalized plant cell the nucleus is:
A) Present in middle of the cell.
B) Displaced to the side of the cell.
C) Absent.
D) Modified into endoplasmic reticulum.

Q.8 Plasma membrane is found in the cells of:
A) Animals only.
B) Plants only.
C) Both in plants and animals.
D) Bacteria only.

Q.9 The semicircular channels and system of tubes found in cytoplasm are known as:
A) Ribosomes.
B) Glyoxisomes.
C) Endoplasmic reticulum.
D) Vacuoles.

Q.10 The structures that are involved in the manufacture and supply of energy to the cell are:
A) Centrioles.
B) Plastids.
C) Nucleolus.
D) Mitochondria.

Q.11 In a plant cell chlorophyll is present in:
A) Chromoplasts.
B) Leucoplasts.
C) Stroma.
D) Chloroplasts.

Q.12 Cytokinesis is a division of:
A) Cytoplasm.
B) Chromosomes.
C) Nucleus.
D) Nucleolus.

Q.13 During cell division the plant cell is not seen to have:
A) Spindle fibers.
B) Chromatids.
C) Centromere.
D) Centrioles.

Q.14 Which human disease is due to meiotic errors:
A) Typhoid.
B) Cholera.
C) Measles.
D) Down's syndrome.

Q.15 The basic element of all organic compounds is:
A) Oxygen.
B) Nitrogen.
C) Hydrogen.
D) Carbon.

Q.16 The most abundant carbohydrate in nature is:
A) Cellulose.
B) Glycogen.
C) Fructose.
D) Starch.

Q.17 Terpenoids are important group of compounds that are made up of simple repeating units:

A) Acylglycerols.
B) Isoprenoids.
C) Phospholipids.
D) Ketones.

Q.18 The number of types of amino acid that are found to occur in cells are:

A) 20.
B) 25.
C) 100.
D) 170.

Q.19 Biochemically enzymes are:

A) Carbohydrates.
B) Fatty acids.
C) Hormones.
D) Proteins.

Q.20 The presence of enzymes:

A) Slows down the rate of reaction.
B) Increases the rate of reaction.
C) Does not show any change.
D) Completely stops the reaction.

Q.21 Lock and key model of enzyme reacting with substrate was originally proposed by:

A) Emil Fisher.
B) Koshland.
C) Robert Hook.
D) Robert Brown.

Q.22 The major RNA in the cell is ribosomal RNA. It makes up:

A) 80% of total RNAs.
B) 58% of total RNAs.
C) 90% of total RNAs.
D) 40% of total RNA.

Q.23 Optimum pH for pepsin to work efficiently is:

A) 4.50
B) 2.00
C) 6.80
D) 9.00

Q.24 Viruses are simplest organisms and:

A) Have their own enzymes.
B) Have cell membrane but not cell wall.
C) Undergo cell division.
D) Are only DNA or RNA particles without cellular structure.

Q.25 The most ancient bacteria are:

A) Eubacteria.
B) Archaeobacteria.
C) Escherichia coli.
D) Streptococci.

Q.26 The bacteria that cause diseases in human beings, are called:

A) Photosynthetic bacteria.
B) Chemosynthetic bacteria.
C) Facultative bacteria.
D) Pathogenic bacteria.

Q.27 The mutualistic association between certain fungi and roots of vascular plants is called:

A) Lichens.
B) Parasitism.
C) Budding.
D) Mycorrhizae.

Q.28 Sponges which belong to phylum Porifera have:

A) Maximum capacity to regenerate.
B) Very little capacity to regenerate.
C) Moderate capacity to regenerate.
D) No regeneration capacity.

Q.29 The platyhelminthes liver fluke is:

A) Ectoparasite in humans.
B) Blood parasite.
C) Parasite of respiratory tract.
D) Parasite in the bile duct.

Q.30 Which of the following is of economic importance to man:

A) Daphnia.
B) Millipede.
C) Silkworm.
D) Scorpion.

Q.31 The name Nicotiana tabacum is given to:

A) Potato.
B) Tomato.
C) Red pepper.
D) Tobacco.

Q.32 Family Gramineae has:

A) Only wheat.
B) Only corn.
C) Only rice.
D) All of the above.

Q.33 During swallowing the food travels from oral cavity to the stomach by way of oesophagus:

A) Very quickly.
B) By anti-peristalsis.
C) Pushed down by pharynx.
D) Moving due to peristalsis.

Q.34 The pancreas is a:

A) Part of Stomach.
B) Part of Small intestine.
C) Part of Large intestine.
D) Separate gland.

Q.35 The term chyme is applied to:

A) Semi-digestive food in oral cavity.
B) Semi-solid food in stomach.
C) Semi-digested food in the small intestine.
D) Completely digested food in the last part of small intestine.

Q.36 Villi and micro villi are present:

A) In pharynx.
B) In small intestine (jejunum).
C) In oesophagus.
D) In large intestine.

Q.37 Exchange of gases during orginismic respiration is carried out by:

A) Diffusion.
B) Active transport.
C) Osmosis.
D) Facilitated diffusion.

Q.38 The opening in the oral cavity (throat) through which air enters the wind pipe is called:

A) Glottis.
B) Bronchus.
C) Larynx.
D) Pharynx.

Q.39 The double layer of thin membranes which line and cover lungs are called:

A) Diaphragm.
B) Alveoli.
C) Pleura.
D) Bronchioles.

Q.40 Transportation of oxygen from lungs to the tissue cells is by means of:

A) Complete blood.
B) Lymph.
C) Red blood cells.
D) White blood cells.

Q.41 Podocytes are present in:

A) Epithelium of renal capsule.
B) Endothelium of blood capillary.
C) Basement membrane of blood capillary.
D) Epithelium of the PCT.

Q.42 Which of the following are the functions of proximal convoluted tubule:

A) Ultrafiltration and reabsorption.
B) Selective reabsorption and retention of water.
C) Selective reabsorption and active tubular secretion.
D) Reabsorption of water by the help of ADH.

Q.43 The walls of descending limb of loop of Henle are:

A) Permeable to water as well as to sodium and chloride.
B) Permeable to water but impermeable to salts.
C) Impermeable to water and permeable to sodium and chloride.
D) Impermeable to both water and salts.

Q.44 ADH affects which of the following for retention of water:

A) Walls of collecting duct.
B) Walls of loop of Henle.
C) Glomerulus.
D) Proximal convoluted tubule.

Q.45 The counter-current multiplier mechanism is shown by which of the following:

A) Loop of Henle.
B) Proximal convoluted tubule.
C) Distal convoluted tubule.
D) Bowman's capsule.

Q.46 Mechanoreceptors detect stimulus of:

A) Smell.
B) Light.
C) Pressure (touch).
D) Cold and warmth.

Q.47 The effectors in the human body which respond to a stimulus are:

A) Glands only.
B) Muscles only.
C) Both muscles and glands.
D) Bones.

Q.48 Loss of memory (Dementia) is also known as:

A) Alzheimer's disease.
B) Epilepsy.
C) Parkinson's disease.
D) Graves disease.

Q.49 A mix nerve consists of:

A) Motor and sensory nerve fibers.
B) Sensory and associative nerve fibers.
C) Motor and associative nerve fibers.
D) Dendrons and dendrites.

Q.50 Which one of the following hormones is essential for the successful production of sperms:

A) LH (Luteinizing Hormone).
B) Gonadotropin hormone.
C) Testosterone.
D) Follicle stimulating hormone (FSH).

Q.51 Treponema pallidum cause a disease (sexually transmitted) called:

A) Genital Herpes.
B) AIDS.
C) Gonorrhoa.
D) Syphilis.

Q.52 The fertilization of ovum takes place in the proximal part of the:

A) Uterus.
B) Oviduct.
C) Placenta.
D) Urethra.

Q.53 Pregnancy is maintained by the:

A) LTH (Luteotropic hormone).
B) Progesterone.
C) Corticosteroids.
D) LH and FSH.

Q.54 At which month of pregnancy the human embryo is referred to as the fetus:

A) 3^{rd} month.
B) 4^{th} month.
C) 6^{th} month.
D) 2^{nd} month.

Q.55 Muscle fatigue is due to accumulation of:

A) Lactic acid.
B) ATP.
C) Glucose.
D) Fats.

Q.56 Diameter of skeletal muscle fiber is:

A) 2-50 µm.
B) 30-90 µm.
C) 10-100 µm.
D) 1-80 µm.

Q.57 Lining of digestive system contain the:

A) Skeletal muscles.
B) Skeletal and cardiac muscles.
C) Cardiac muscles.
D) Smooth muscles.

Q.58 The vertebral column consists of _____ vertebrae:

A) 33
B) 30
C) 28
D) 38

Q.59 The most abundant type of bone found on moveable joints is:

A) Bone.
B) Hyaline cartilage.
C) Fibro-cartilage.
D) Bone and fibro-cartilage.

Q.60 Which of the following is a hormone:

A) Gastric juice.
B) Pancreatic juice.
C) Bile.
D) Insulin.

Q.61 The hormones in the human body are produced by:

A) Brain only.
B) Liver only.
C) Pancreas only.
D) Different endocrine glands.

Q.62 Insulin is a hormone produced by:

A) Thyroid gland.
B) Parathyroid.
C) Adrenaline gland.
D) Pancreas.

Q.63 The hormone called Parathormone regulates calcium level in the blood. This hormone is produced by:

A) Gonads.
B) Gut.
C) Thyroid gland.
D) Parathyroid.

Q.64 The chemical nature of antibody is:

A) Glycoproteins.
B) Glycolipids.
C) Lipoproteins.
D) Polysaccharides.

Q.65 Which chemicals are secreted by T-helper cells to stimulate B-plasma cells to divide:

A) Interferons.
B) Cytokines.
C) Histamines.
D) Fibrin.

Q.66 Which of the following is described as vaccination:

A) Artificial active immunity.
B) Natural active immunity.
C) Artificial passive immunity.
D) Natural passive immunity.

Q.67 B-lymphocytes and T-lymphocytes are formed:

A) Before birth in bone marrow.
B) Before birth in thymus gland.
C) After maturity in blood.
D) After birth in blood.

Q.68 The antibodies provided to infant through mother's milk is an example of:

A) Natural passive immunity.
B) Artificial passive immunity.
C) Natural active immunity.
D) Artificial active immunity.

Q.69 Which of the following is not the end product of glycolysis:

A) Pyruvate.
B) ATP.
C) Oxaloacetate.
D) Reduced NAD.

Q.70 Which of the following process does occur for the formation of acetyl Co-A from pyruvate:

A) Decarboxylation.
B) Hydrogenation.
C) Carboxylation.
D) Deaminaiton.

Q.71 At the beginning of Krebs cycle, acetyl Co-A combines with which substance to form citrate (6-C):

A) Oxaloacetate.
B) Oxoglutarate.
C) Fumarate.
D) Succinate.

Q.72 Which of the following are the end products of light dependent stage, used in the Calvin cycle to change glycerate-3-phosphates into triose phosphates:

A) NADPH + ATP
B) NADH + ATP
C) RuBp + ATP
D) O_2 + NADPH

Q.73 Which of the following is not the end product of non-cyclic photophosphorylation:

A) Reduced NADP.
B) ATP.
C) O_2.
D) CO_2.

Q.74 Enzymes restriction endonucleases were isolated from:

A) Viruses.
B) Bacteria.
C) Fungi.
D) Protozoan.

Q.75 During polymerase chain reaction, how DNA double helix is separated:

A) By heat treatment.
B) By use of enzyme DNA Polymerase.
C) By use of enzyme DNA Helicase.
D) By use of enzyme DNA Ligase.

Q.76 Which enzyme is used to join the desired gene into the plasmid DNA during genetic engineering:

A) DNA Helicase.
B) DNA Ligase.
C) DNA Polymerase.
D) Taq Polymerase.

Q.77 Which of the following is an example of benefits of transgenic organisms produced through genetic engineering:

A) Production of antibiotics.
B) Production of insulin.
C) Production of anti-rabies vaccine.
D) Production of anti-malarial drugs.

Q.78 In cystic fibrosis transportation of which ion is faulty, resulting into the production of disease:

A) Chloride.
B) Fluoride.
C) Calcium.
D) Magnesium.

Q.79 A group of inter-breeding individuals occurring together in a space and time is called:

A) Community.
B) Population.
C) Niche.
D) Species.

Q.80 Which of these is biotic factor of the ecosystem:

A) Air.
B) Water.
C) Soil.
D) Photosynthetic plants.

Q.81 An association between organisms which brings benefit to both the organisms is known as:

A) Predation.
B) Commensalism.
C) Grazing.
D) Symbiosis.

Q.82 When succession is completed, a great diversity of plants and a stable community is seen, which is called:

A) Hydrosphere.
B) Pioneers.
C) Climax community.
D) Secondary succession.

Q.83 A thin layer of earth in which all living organisms exists is called:

A) Ecosystem.
B) Biosphere.
C) Habitat.
D) Xerosere.

Q.84 The branch of biology that provide evidence through fossil record is called:

A) Vestigial structures.
B) Comparative anatomy.
C) Biogeography.
D) Palaeontology.

Q.85 One of the factors given below does not effect gene frequency:

A) Mutation.
B) Migration.
C) Genetic drift.
D) Food.

Q.86 Charles Darwin gave the:

A) Theory of special creation.
B) Theory of Natural selection.
C) Inheritance of acquired characters.
D) Cell theory.

Q.87 A gene which has multiple phenotypic effect is called:

A) Pleiotropic.
B) Epistasis.
C) Multiple allele.
D) Locus.

Q.88 Change in the nature of gene is known as:

A) Incomplete dominance.
B) Pleiotropy.
C) Mutation.
D) Polygenic trait.

APTITUDE FEEDBACK FOR ENTRANCE TEST 2013

A compulsory feedback shall be administered to all candidates after the completion of Entrance Test 2013, collection and secure packing of the Question Papers and Response Forms. The feedback is for University and Government use only and SHALL NOT IN ANY WAY affect the merit of the candidates.