Cadet College Jhelum

Paper Pattern/Syllabus – Entrance Test

Mathematics / Physics / Chemistry / Biology

Group	Subject	Total Marks
Pre-Engineering/ Computer Science	a. English b. Urdu c. Physics d. Chemistry e. Mathematics f. Intelligence Test	50 25 50 50 50 25
Pre-Medical	a. English b. Urdu c. Physics d. Chemistry e. Biology f. Intelligence Test	50 25 50 50 50 25

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مضمون: اردو

جماعت: گیارہویں

سوال نمبر	تفصیل
سوالنمبر 1:	درخواست نویسی
سوالنمبر 2:	علم بیان کی مثالوں کے ساتھ وضاحت۔
سوالنمبر 3:	مضمون نویسی (300/250 الفاظ پر مشتمل)
	نوٹ: تمام سوالات جماعت سیکنڈری سکول سرٹیفکیٹ کے نصاب کے مطابق ہوں گے۔

Syllabus for Entrance Test

Subject: English **Total Marks: 50**

Q-1:	Comprehension	20 Marks
Q-2:	CV/Resume/Job Application Writing.	08 Marks
Q-3:	Translation (English to Urdu).	05 Marks
Q-4:	Choosing the correct Phrasal Verbs to complete a sentence.	05 Marks
Q-5:	Letter Writing.	08 Marks
Q-6:	Stanza's Explanation.	04 Marks

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Syllabus for Entrance Test

Subject: Mathematics **Total Marks: 50**

Note: The learning outcomes from the following units will be at class SSC level.

Unit/Topic	Learning Outcomes
Kinematics	1. Describe using examples how objects can be at rest and in motion simultaneously. 2. Identify different types motion i.e. translatory, (linear, random, and circular); rotatory and vibratory motions and distinguish among them. 3. Differentiate with examples between distance and displacement, speed and velocity. 4. Differentiate with examples between scalar and vector quantities. 5. Define the terms speed, velocity and acceleration. 6. Derive equations of motion for a body moving with uniform acceleration in a straight line using graph. 7. Solve problems related to freely falling bodies using 10 ms^{-2} as the acceleration due to gravity.
Dynamics	1. Define momentum, force, inertia, friction and centripetal force. 2. Solve problems using the equation Force = change in momentum/ change in time. 3. Explain the concept of force by practical examples of daily life. 4. State Newton's laws of motion. 5. Distinguish between mass and weight and solve problems using $F = ma$, and $w = mg$. 6. State the law of conversation of momentum. 7. Use the principle of conservation of momentum in the collision of two objects. 8. Explain the effect of friction on the motion of a vehicle in the context of tyre surface, road conditions including skidding, braking force. 9. Demonstrate that rolling friction is much lesser than sliding friction. 10. List various methods to reduce friction 11. Calculate centripetal force on a body moving in a circle using mv^2/r 12. State what will happen to you while you are sitting inside a bus when the bus a) starts moving suddenly b) stops moving suddenly c)turns a corner to the left suddenly
	1. State kinetic molecular model of matter (solid, liquid and gas forms). 2. Describe briefly the fourth state of matter i.e. Plasma. 3. Define the term density. 4. Compare the densities of a few solids, liquids and gasses. 5. Define the term pressure (as a force acting normally on unit area). 6. Explain how pressure varies with force and area in the context of everyday examples.

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Properties of matter	7. Explain that the atmosphere exerts a pressure. 8. Describe how the height of a liquid column may be used to measure the atmospheric pressure. 9. Describe that atmospheric pressure decreases with the increase in height above the Earth's Surface. 10. Explain that changes in atmospheric pressure in a region may indicate a change in the weather. 11. State Pascale's law. 12. Apply and demonstrate the use with examples of Pascal's law. 13. State relation for pressure beneath a liquid surface to depth and to density i.e.,(P=pgh) and solve problems using this equation. 14. State Archimedes principle. 15. Determine the density of an project using Archimedes principle. 16. State the up thrust exerted by a liquid on a body. 17. State principle of floatation. 18. Explain that a force may produce a change in size and shapes of a body. 19. Define the terms stress, strain and young's modulus. 20. State Hooke's law and explain elastic limit.
Simple Harmonic Motion and Waves	1. State the conditions necessary for an object to oscillate with SHM. 2. Explain SHM with simple pendulum, ball and bowl examples. 3. Solve Problems by using the formula $T = 2\pi\sqrt{\sqrt{\frac{1}{g}}}$ for simple pendulum. 4. Understand that damping progressively reduces the amplitude of oscillation. 5. Describe wave motion as illustrated by vibrations in rope slinky and springs. 6. Define the terms speed(V), frequency(f), wavelength(λ), time period (T), amplitude , crest, trough, cycle, wave front ,compression and reflection. 7. Derive equation $v = f\lambda$. 8. Solve problems by applying the relation $f = 1/T$ and $v = f\lambda$. 9. Describe properties of waves such as reflection, refraction and diffraction with the help of ripple tank.
Sound	1. Describe the longitudinal nature of sound waves(as a series of compressions and rarefactions) 2. Define the terms pitch, loudness and quality of sound. 3. Describe the effect of change in amplitude on loudness and the effect of change in frequency on pitch of sound. 4. Define intensity and state its SI unit. 5. Describe what is meant by intensity level and give its unit. 6. Describe audible frequency range.
	1. State that there are positive and negative charges. 2. Describe the construction and working principle of electroscope.

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Electrostatics	3. State and explain Coulomb's law. 4. Define electric field and electric field intensity. 5. Sketch the electric field lines for an isolated +ve and -ve point charges. 6. Describe the concept of electrostatic potential. 7. Define the unit "volt" 8. Describe potential difference as energy transfer per unit charge. 9. Describe one situation in which static electricity is dangerous and the precautions. 10. Taken to ensure that static electricity is discharged safely. 11. Describe that the capacitor is charge storing device. 12. Define capacitance and its unit. 13. Derive the formula for effective capacitance of a number of capacitors. 14. Connected in series and in parallel. 15. Apply the formula for the effective capacitance of a number of capacitors. 16. Connected in series and in parallel. 17. Apply the formula for the effective capacitance of a number of capacitors. 18. Connected in series and parallel to solve related problems.
Current Electricity	1. Define electric current. 2. Describe the concept of conventional current. 3. Understand the potential difference across a circuit component and name its unit. 4. Describe Ohm's law and its limitations. 5. Define resistance and its unit (Ω). 6. Calculate the equivalent resistance of a number of resistance connected in series and also in parallel. 7. Distinguish between conductors and insulators. 8. Describe how energy is dissipated in a resistance and explain Joule's law. 9. Apply the equation E=I,Vt=I^2 Rt =V^2 t/R to solve numerical problem. 10. Calculate the cost of energy when given the cost per kWh. 11. Distinguish Between D.C and A.C. 12. Describe the use of electrical measuring devices like galvanometer,ammeter,voltmeter(construction and working principles not required) 13. Construct simple series (single path)and parallel circuit(multiple paths) 14. State the functions of the live ,neutral and earth wires in the domestic main supply. 15. State reason why domestic supplies re connected in parallel. 16. Explain the use of safety measures in household electricity,(fuse,circuit breaker earth wire).
	1. Describe the structure of an atom in terms of a nucleus and electrons. 2. Describe the composition of the nucleus in terms of protons and neutrons. 3. Explain that number of protons in a nucleus distinguish one element from the other. 4. Represent various nuclides by using the symbol of protons number Z,nucleon number A and the nuclide notation X.

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Radioactivity	5. Explain that some nuclei are unstable, give out radiation to get rid of excess energy and are said to be radioactive. 6. Describe that three types of radiation α β and γ. 7. State, for radioactive emissions: • Their nature • Their relative ionizing effects. • Their relative penetrating abilities 8. Explain that an element may change into another element when radioactivity occurs. 9. When alpha or beta particles are emitted. 10. Explain the meaning of half-life of a radioactive material 11. Describe what are radio isotopes. What makes them useful for various applications? 12. Define briefly the process of fission and fusion. 13. Describe the process of carbon dating to estimate the age of ancient objective. 14. Describe hazards of radioactive materials.

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Syllabus for Entrance Test

Subject: Chemistry **Total Marks: 50**

Note: The learning outcomes from the following units will be at class SSC level.

Unit/Topic	Learning Outcomes
Fundamental Of Chemistry	1. Change atomic mass, molecular mass & formula mass into gram atomic mass, gram molecular mass & gram formula mass. 2. Differentiate between branches of Chemistry. 3. Differentiate between empirical & molecular formula. 4. Differentiate among elements, compounds & mixtures. 5. Differentiate between molecules & molecular ions. 6. Define ions, molecular ions, formula units & free radicals. 7. Define atomic number, atomic mass, atomic mass unit. 8. Define relative atomic mass based on C – 12 scale. 9. Distinguish between atoms & ions. 10. Distinguish between ion & free radical. Classify the chemical species from given examples. 11. Distinguish between matter & substance. 12. Identify the representative particles of elements & compounds. 13. Identify & Provide example of different branches of chemistry.
Periodic Table & Periodicity of Properties	1. Classify the element (into two categories: Groups & Periods) according to the configuration of their outer most shell. 2. Distinguish between a period & a group in the periodic table. (Understanding) 3. State the periodic law. 4. Determine the demarcation of the periodic table into an S block & P block. 5. Explain the shape of the periodic table. 6. Explain how shielding effect influences periodic trends. 7. Identify the relationship between electronic configuration & the position of an element in the periodic table.
Structure of Molecules	1. Describe the formation of cations from an atom of a metallic element. Describe the formation of anions from an atom of non – metallic element. 2. Describe the ways in which bonds may formed. 3. Describe the formation of a covalent bond between two non – metallic elements. 4. Describe with examples single, double & triple covalent bonds. 5. Recognize a compound as having ionic bonds, identify characteristic of ionic compounds. 6. State octet & duplet rules. 7. State the importance of the noble gas electronic configurations in the formation of ion.

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Solutions	1. Explain the differences between saturated, unsaturated & supersaturated solutions. 2. Explain the formation of solutions (mixing liquids into gasses, liquids into liquids, liquids into solids) & give an example of each. 3. Explain what is meant by the concentration of a solution. 4. Convert between the Molarity of a solution & its concentration in g/dm^3 . 5. Define the terms: Solution, aqueous solution, solute & solvent & give an example of each. 6. Define Molarity. 7. Define percentage composition of a solution. Describe how to prepare a solution of given molarity. 8. Describe how to prepare dilute solution from concentrated solution of known Molarity. Solve problems involving the Molarity of a solution. 9. Use the rule that "like dissolves like" to predict the solubility of one substance to another.
Acids, Bases & Salts	1. Define & give examples of Arrhenius acids & bases. 2. Use the Bronsted – Lowry theory to classify substances as acids or bases, or as proton donors or proton acceptors. 3. Classify substances as Lewis acid or bases. 4. Write the equation for self – ionization of water. 5. Complete & balance a neutralization reaction. 6. Perform acid base titrations & related calculations. 7. Explain why the quantity of preservatives in food is restricted by government regulations. 8. Explain the reactions between industrial pollutants & atmospheric water leading to formation of acids. 9. Describe harmful effects of acid rain. 10. Explain stomach acidity.
Organic Chemistry	1. Identify some general characteristics of organic compounds. 2. List the uses of organic compounds. 3. Recognize & identify molecule's functional groups. 4. Distinguish between saturated & unsaturated hydrocarbons. 5. Name the alkenes up to decane. 6. Convert alkenes into alkyl radicals. 7. Define functional group. 8. Differentiate between organic compounds on the basis of their functional groups. 9. Classify organic compounds into straight chain, branched chain & cyclic compounds. 10. Identify carboxylic acids, phenols, amines, aldehydes & ketones in terms of functional groups in the lab. 11. Distinguish between saturated & unsaturated compounds using iodine, bromine & potassium permanganate solutions. 12. Explain why systematic method of naming chemical compounds is necessary. 13. Characterize a hydrocarbon.

	14. Write a chemical equation to show the preparation of alkenes from hydrogenation of alkenes & alkynes & from reduction of alkyl halides. 15. Draw structural formulas of alkanes, alkenes & alkynes from up to 5 carbon atoms.
Hydrocarbons	1. Write a chemical equation to show the preparation of alkenes from dehydration of alcohols & dehydrohalogenation of tetrahalides. 2. Write a chemical equation to show the preparation of alkynes from dehydrohalogenation of 1, 2 - dihalides & dehalogenation of tetrahalides. 3. Write chemical equations showing halogenation of alkanes, alkenes & alkynes. 4. Write chemical equations showing reaction of $KMnO_4$ with, alkenes & alkynes. 5. Determine the boiling point of alcohol. 6. Explain hydrocarbons as fuel.

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Syllabus for Entrance Test

Subject: Mathematics **Total Marks: 50**

Note: The learning outcomes from the following units will be at class SSC level.

Unit/Topic	Learning Outcomes
Matrices and Determinants	1. Matrix and its types 2. Addition and subtraction of matrices 3. Associative law of multiplication 4. Commutative law of multiplication 5. Multiplicative inverse of a matrix 6. Verification of $(AB)^{-1} = B^{-1} A^{-1}$ 7. Matrix Inversion Method and Cramer's Rule
Real and Complex Numbers	1. Properties of real numbers 2. Properties of inequalities of real numbers 3. Radicals and radicands 4. Applications of laws of exponents 5. Basic operations on complex numbers 6. Depiction of real numbers on number line
Factorization	1. Factorization of different expressions 2. Use remainder theorem to find remainder 3. Determine whether given numbers are factor or not 4. Factorize cubic polynomials using factor theorem
Linear Equations and Inequalities	1. Solving a linear equation in one variable 2. Equations involving absolute value 3. Define a linear inequality 4. Solution of linear inequalities
Quadratic Equations	1. Solve a quadratic equation in one variable by factorization 2. Solve a quadratic equation by using quadratic formula 3. Find the quadratic formula of a second degree equation 4. Solve the equation of type a p(x) + b/p (x) = c 5. Solve exponential equation involving variables in exponents 6. Solve equations of type (x+a)(x+b)(x+c)(x+d) = k 7. Solve radical equations of the types $\sqrt{x+a} + \sqrt{x+b} = \sqrt{x+c}$
Theory of Quadratic Equations	1. Determine the nature of roots and verify by solving it 2. Cube roots of unity and their properties 3. Find the sum and product of quadratic equation 4. Form a quadratic equation when roots are given 5. Use synthetic division to find quotient and remainder

	6. Solve the simultaneous equations
Partial Fractions	1. Define fraction and its types 2. Check the quadratic equation for identity 3. Resolve a fraction when roots linear and repeated 4. Resolve a fraction with one linear root and irreducible quadratic factors
Sets and Functions	1. Commutative law of union and intersection 2. Associative law of union and intersection 3. Verification of De-Morgan's laws 4. Find the Cartesian product 5. Calculation of domain and range of a binary relation 6. Check the relation as function or not
Introduction to Trigonometry	1. Conversion of angle from one form to other 2. Area of a circular sector 3. Find the values of remaining trigonometric functions 4. Verify the trigonometric identities 5. Check the quadrant of a point 6. Define angles of elevation and depression

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Syllabus for Entrance Test

Subject: BIOLOGY **Total Marks: 50**

Note: The questions from the following topics will be at SSC Class level.

Unit/Topic	Learning Outcomes
Introduction To Biology	1. Define biology its major divisions i.e botany, zoology & microbiology. 2. Define the branches of biology i.e morphology, anatomy, physiology, embryology, taxonomy, cell biology, histology, paleontology, environmental biology, biotechnology, socio – biology, parasitology, immunology, entomology, genetics, pharmacology. 3. Link the study of biology with that of physics, chemistry, mathematics, geography & economics. 4. Explain how the study of biology can lead to medicine / surgery, Fisheries, Agriculture, Animal husbandry, Biotechnology, Horticulture, Farming, Forestry. 5. Identify that living organism are divided in five groups i.e prokaryotes, protists, fungi, plants & animals. 6. Relate at least three verses from Holy Quran, instructing for the study of the origin & the characteristics of life, with the modern scientific achievements. 7. Describe bio elements as the most basic level of biological organization. 8. Define biomolecules & distinguish them as micro molecules & macromolecules. 9. Describe the level of organization of life (organelles, cells, tissues, organs & organ systems & individuals). 10. Explain division of labor among cells & tissues in a multicellular organism. 11. Compare cellular organization in organism i.e unicellular organization (Amoeba), colonial organization (volvox) & multicellular organization (mustard & frog). (Only brief comparison refer to cellular organization. Details of organs & organs – system of frog & mustard should be avoided).
Solving a Biological Problem	1. Describe the steps in biological method i.e recognition of a biological problem, observation & identification, building up hypotheses, drawing deduction, devising experiments & inferring results (malaria as an example). 2. Describe the use of ratio & proportion in solving biological problems. 3. Justify the mathematics as an integral part of the scientific process.
Cell Cycle	1. Define cell cycle & describe its main phases i.e Interphase & Division. 2. Describe the sub – phases of the interphase of cell cycle. 3. Predict the importance of S – shape of the intershape. 4. Describe the two types of cell Division in Eukaryotic cells i.e Mitosis & Meiosis. 5. Describe the formation of metaphase plate & the division of centromere, during metaphase. 6. State the separation of chromatids during anaphase. 7. Describe the physical cytoplasm during cytokinesis in animal & plant cells.

	8. Compare the details of events during mitosis in animal & plant cells. 9. Describe the significance of mitosis as giving rise to genetically identical cells & state the role of mitosis in growth, repair of damaged tissues, replacement of worn out cells & asexual reproduction. 10. Describe the events of Prophase – I 11. Describe the events taking place in Metaphase – I 12. Explain what happens during Anaphase – I 13. Describe the events of Telophase – I 14. Explain the events occurring during the second Meiotic Division. 15. Contrast mitosis & meiosis, emphasizing the events that lead to different outcomes. 16. Describe Necrosis & Apoptosis.
Enzymes	1. Define metabolism & differentiate between catabolism & anabolism. 2. Describe enzymes as the proteins that speed up biochemical reactions. 3. Categorize enzymes as intra & extracellular. 4. Comprehend that enzymes increase rate of reaction. 5. State that small quantity of enzyme is effective for large amount of substrate. 6. Infer that enzymes are specific for specific substrates. 7. Explain the effect of pH, temperature & concentration of substrate on the activity of an enzyme. 8. Describe the specificity of different enzymes for different substrates. 9. Relate that specificity of enzyme is due to its shape. 10. Categories that proteases will act on proteins only & lipases will act on lipids or fats only.
Gaseous Exchange	1. Differentiate among respiration, gas exchange & breathing. 2. Describe the process of gaseous exchange in plants by comparing photosynthesis & respiration. 3. Describe the roles of the parts of air passageway & of lungs. 4. Describe the mechanism of breathing in term of movements of ribs & diaphragm. 5. Differentiate between the composition of inspired & expired air. 6. Describe briefly diseases related to respiratory system like bronchitis, emphysema, pneumonia, asthma, & lung cancer. 7. vii. Describe the biological consequences of smoking in relation to the lungs & circulatory system.
Homeostasis	1. Define homeostasis & describe its importance. 2. Explain osmotic adjustments in plants. 3. State skin, lungs, & kidneys as the major organs involved in homeostasis. 4. Explain the role of skin in regulating body temperature. 5. Describe how lungs keep the carbon dioxide concentration down to certain level. 6. Explain that kidneys control the blood composition. 7. Relate the structure of kidney with its function.

	8. Viii. Locate the different parts of nephrons & relate them with their functions. 9. State that main role of kidney is urine formation. 10. Describe that urine formation involves three processes i.e filtration, reabsorption & secretion. 11. Explain that kidney plays an important role in osmoregulation. 12. Outline the causes of kidney failure. 13. Explain that dialysis is one of the treatments in kidney failure. 14. Describe the types of dialysis.
Coordination And Control	1. Identify the two main types of coordination in living organisms, i.e Nervous & Hormonal (chemical). 2. Differentiate between the modes of coordination i.e. electrical in case of nervous & chemical in case of hormonal. 3. Explain the function of these parts of brain; cerebrum, cerebellum, pituitary gland, thalamus, hypothalamus, medulla oblongata. 4. Define neuron & describe the structure of a general neuron. 5. Define reflex action & reflex arc. 6. Name the three types of neurons involved in reflex action. 7. Trace the path of a nervous impulse in case of a reflex action. 8. Define the terms; hormone & endocrine system. 9. Outline the parts of endocrine system; major glands of this system (Pituitary, Thyroid, Pancreas, Adrenal, Gonads) & names of their respective hormone. 10. Describe the term "Negative Feedback" with reference to insulin & glucagon. 11. Explain the two common kinds of nervous disorders (Vascular i.e paralysis & Functional i.e epilepsy). 12. Enlist some of the symptoms & treatments of paralysis & Epilepsy.
Reproduction	1. Define reproduction & describe its importance. 2. Describe different types of asexual reproduction i.e binary fission, budding, spore formation & vegetative propagation. 3. Describe the two methods of artificial vegetative propagation (stem cuttings & grafting). 4. Define cloning. 5. Describe sexual reproduction in plants by explaining the life cycle of a flowering plant. 6. Describe adaptation in the structure of wind – pollinated & insect – pollinated flowers. 7. Describe the structure of seed. 8. Distinguish between epigeal & hypogeal germination. 9. Describe the conditions necessary for germination of seeds. 10. Outline the binary fission, multiple fission, budding & fragmentation as asexual methods of reproduction in animals.
	1. Explain how genes control inheritance of characters. 2. Describe the composition of chromatin material. 3. Define gene (a localized region of DNA that codes for a protein). 4. State clearly the difference between a gene & allele.

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Inheritance	5. Explain that gene is a unit of inheritance & that it can be copied & passed on to the next generation. 6. State Mendel's law of Segregation. 7. Demonstrate that 9 : 3 : 3 : 1 dihybrid F_2 phenotypic ratio is an evidence of independent assortment. 8. State Mendel's law of Independent Assortment. 9. Selecting the example of ABO blood group system, explain co – dominance. 10. Describe the sources of variation. 11. Relate meiosis with variation.
Biotechnology	1. Define biotechnology & explain its importance. 2. Relate biotechnology with genetic engineering & fermentation. 3. Define fermentation. 4. Explain the method of fermentation by yeast & bacteria. 5. Identify different fermentation products & their importance in daily life i.e yogurt making, bread making, making of cheese & production of alcohol. 6. Define genetic engineering & describe its objectives. 7. Describe how a gene is transplanted 8. Describe the application of genetic engineering in the production of human insulin & growth hormones.

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Subject: Biology **Model Paper** **Total Marks:50**

OBJECTIVE SECTION

Q No. : Choose the correct answer **(Marks: 12)**

1. Which of these major bio-element is present in lowest percentage by mass in human body?
(a) Oxygen (b) Phosphorous (c) Calcium (d) Nitrogen
2. Part of the digestive system, which is not in contact with food, is:
(a) Small intestine (b) Stomach (c) Liver (d) Caecum
3. The function of dismantling and recycling in a cell is undertaken by:
(a) Nucleus (b) Chromosome (c) Lysosomes (d) Mitochondria
4. Which part of the brain detects temperature change in the blood?
(a) Cerebrum (b) Pons (c) Hypothalamus (d) Medulla
5. The structure that create the insulating blanket of warm air is:
(a) Dermis (b) Lung (c) Goosebumps (d) Abdomen
6. The drugs which reduce anxiety and high dose induce sleep:
(a) Sedative (b) Analgesics (c) Narcotics (d) Hallucinogen
7. The enzyme which seal or paste the desired gene with the DNA of vectors is:
(a) Endonuclease (b) Ligase (c) Permease (d) Lyase
8. Which of these tissues also make the glandular tissue in animals?
(a) Nervous tissue (b) Connective tissue (c) Muscular tissue (d) Epithelial tissue
9. Urea amount in the normal synthesis of urine:
(a) 9.3 g/l (b) 9.6 g/l (c) 9.7 g/l (d) 9.9 g/l
10. Enrichment of water with inorganic nutrients (nitrates and phosphates):
(a) Bryophytes (b) Fungal Bloom (c) Eutrophication (d) All of these
11. Acrylic acid is produced by fermentation of micro-organisms:
(a) Aspergillus (b) Yeast (c) Bacillus (d) Saccharomyces
12. Which part of the female reproductive system receives egg cells from the ovary?
(a) Cervix (b) Fallopian tube (c) Vagina (d) Uterus

SUBJECTIVE SECTION

SHORT QUESTION: **(Marks: 7×2=14)**

1. Why it is impossible to eradicate malaria?

2. In light reactions of photosynthesis why photosystem II occurs before photosystem I?

3. Write the four differences between respiration and photosynthesis with examples.

4. What do you mean by co-dominance? Give an example.

5. Why do plants not need specialized respiratory system?

6. The right kidney is slightly lower than the left one. Why?

7. Define reflex action and reflex arc with suitable example.

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LONG QUESTION **(Marks: 24)**

Q No.1 What are drugs? What are the sources of drugs? **(08)**

Q No.2 What is the functional unit of the kidney? Describe its structure and draw a labeled diagram. **(08)**

Draw a labeled diagram.

Q No.3: Explain the composition of chromatin materials. And also, draw a labeled diagram. **(08)**

Draw a labeled diagram.

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Subject: English **Model Paper** **Total Marks:50**

Q-1: Comprehension **20 Marks**

Aspirants will be given an unseen passage to summarize and answer the questions given at the end.

Q-2: CV/Resume/Job Application Writing. **08 Marks**

One of the following topics will be given.

i. **HR Manager**
ii. **English Teacher**
iii. **Medical Officer**
iv. **Financial Advisor**

e.g. Write a Job Application/CV for the post of HR Manger in ABC company.

Q-3: Translation (English to Urdu). **05 Marks**

An unseen paragraph will be given.

Q-4: Choosing the correct Phrasal Verbs to complete a sentence. **05 Marks**

Five (05) Phrasal Verbs will be given.

e.g. My car ----------on the way. (Break Up/Break Down)

Q-4: Letter Writing. **08 Marks**

Aspirants will be asked to write a Formal/Informal Letter.

One of the following topics will be given.

i. **About Poor Sanitation of your locality.**
ii. **Reckless driving by the teenagers.**
iii. **To father for some extra funds.**
iv. **To brother- telling him about the importance of sports**

e.g. Write a letter to the News Editor highlighting the problems of poor drainage system.

Q-5: Stanza's Explanation. **04 Marks**

A Stanza will be given from the Following poems.

i. **Stopping by Woods on a Snowy Evening.**
ii. **Dreams**
iii. **Daffodils**

e. g.

The woods are lovely, dark, and deep,

but I have promises to keep.

And miles to go before I sleep,

And miles to go before I sleep.

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Questions:

i. **Paraphrase the given stanza.**
ii. **Find out two figures of speech with examples.**

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Subject: Chemistry **Model Paper** **Total Marks:50**

OBJECTIVE SECTION

Q No. 1. Choose the correct answer **(Marks: 12)**

1. The empirical formula of benzene is:

(a) C_6H_6 (b) C_6H_5 (c) CH (d) C_5H_6

2. How many moles of molecules are there in 16g of oxygen:

(a) 1 (b) 0.5 (c) 0.1 (d) 0.05

3. All the elements of group ΠA are less reactive than alkali metals. This is because these elements have:

(a) High ionization energies (b) Relatively grater atomic sizes

(c) Similar electronic configuration (d) Decrease nuclear charge

4. How many electrons loss by aluminum during the formation of AlF_3:

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

5. Which of the following solution is more dilute:

(a) 1M (b) 2 M (c) 0.1 M (d) 0.009

6. Which of the following is a lewis base:

(a) BF_3 (b) HCl (c) $AlCl_3$ (d) F^-

7. The functional group of amine is:

(a) --OH (b) –COOH (c) $–NH_2$ (d) --CHO

8. Which process produces an alkane:

(a) Combustion (b) Hydration (c) Dehydration (d) Hydrogenation

9. Most air pollution is caused by:

(a) Ozone (b) Acid rain (c) Acid rain (d) Carbon monoxide

10. Which is used to remove permanent hardness of water:

(a) Slaked lime (b) washing soda (c) boiling water (d) The burning of fossil fuels

11. Percentage of sodium chloride in sea water is:

(a) 0.02 (b) 3.4 (c) 97 (d) 2

12. A carbon carbon double bond is present in:

(a) Ethane (b) Ethene (c) Ethyne (d) None

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SUBJEVTIVE SECTION

SHORT QUESTION: (Marks:2×7=14)

1. What is Lewis base? Give example.

2. Define functional group? Identify the functional group present in acetone?

3. Write down the reaction of alkene with potassium per manganate?

4. Differentiate between soft and hard water?

5. Write the trend of electron affinity along a group with reason?

6. Write the name of three acid base indicators?

7. Can temperature affect the solubility? Explain.

LONG QUESTION (Marks:24)

Q No.1: Explain self-ionization of water with equation? (08)

Q No.2: Explain global warming? List some effects of global warming. (08)

Q No.3: What is ozone depletion? Explain the depletion of ozone by CCl_4? (08)

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Subject: Physics **Model Paper** **Total Marks:50**

(OBJECTIVE SECTION)

Q No. : Choose the correct answer **(Marks: 14)**

1. Which of the following is a vector quantity

(a) Speed (b) Velocity (c) Distance (d) Power

2. The coaster cars move around the loop, the track provides: _____.

(a)Centripetal Force (b) Frictional Force (c) Applied Force (d) Normal Force

3. A body has a weight of 20N. How much force is required to move it vertically upward with an acceleration of $2ms^{-2}$?

(Note: Use the value of acceleration due to gravity 'g' as 10 m/s^2.)

(a) 10 N (b) 24 N (c) 2.040 N (d) 4.1 N

4. When a horse pulls a cart, the action is on the:

(a) Cart (b) Earth (c) Horse (d) Earth and cart

5. SI unit of pressure is Pascal, which is equal to:

(a) 10^4 Nm^{-2} (b) 1 Nm^{-2} (c) 102 Nm-2 (d) 103 Nm-2

6. If amplitude of simple pendulum is doubled, what happens to its time period?

(a) Becomes doubled (b) Becomes half

(c) Becomes four time (d) Remains same

7. The relationship between speed, frequency and wavelength of a wave is known as:

(a) Wave equation (b) Frequency equation

(c) SHM equation (d) Wavelength equation

8. According to Coulomb's law, if distance between charges increases, the force of attraction:

(a) Will be increased (b) Will be decreased

(c) Will be unchanged (d) Will be repulsion

9.When we apply more voltage to an ohmic conductor, we get:

(a) More resistance (b) More flow of current

(c) Decrease in power (d) Less flow of current

10.Which one of the following particles has the greatest penetrating power?

(a) Alpha particle (b) Beta particles (c) Gamma particles (d) Protons

11.Sound travel faster in:

(a) Rubber (b) Air (c) Water (d) Steel

12. What is the voltage across a 6 Ω resistor when 3A of current passes through it?

(a) 2V (b) 9V (c) 18V (d) 36V

13.Minimum distance of a person from obstacle for sound to hear echo is:

(a) 17 m (b) 34 m (c) 0.1 m (d) 50 m

14.Beta particles are fast moving:

(a). Electrons (b) Photons (c) hydrogen nuclei (d) Helium nuclei

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(SUBJECTIVE SECTION)

SHORT QUESTION: **(2 × 10 = 20)**

Q#2: Write the answers to the following short questions.

1- **How do riders in a Ferris wheel possess translatory motion but not rotatory motion?**
2- **Describe ways to reduce the friction.**
3- **Why does a piece of stone sink in water but a ship with a huge weight floats?**
4- **A simple pendulum has time period T. what will happen to its time period if its thread length is become doubled?**
5- **Malik saw lightning and then heard sound of thunder with a gap of about 3.0 seconds. How far away is the lightning, talking speed of sound as $343ms^{-1}$?**
6- **Differentiate between ohmic and non ohmic conductors.**
7- **Define capacitance and write its formula and unit.**
8- **Why ionization power of Alpha particle is greater than Beta particle in air with same energy?**
9- **A current of 3mA is flowing through a wire for 10 minutes. What is the charge flowing through the wire?**
10- **How much time is required to change 22 Ns momentum by a force of 20 N?**

Section – III (Long Questions) **Marks: 16 (2 x 8)**

Q#3: Derive time independent equation of motion for a body moving with a uniform acceleration in a straight-line using graph.

Q#4: Show that vibrating mass spring system performs simple harmonic motion. What is its time period? On what factors it depends?

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Subject: Mathematics **Model Paper** **Total Marks:50**

OBJECTIVE SECTION

Q No.1 : Choose the correct answer **(Marks: 12)**

1. The idea of matrices was given by:

(a) Newton (b) Babbage (c) Cayley (d) Napier4

2. 4/11 = 0.363636… is a/an decimal fraction:

(a) Terminating (b) Non-terminating (c) Continuous (d) Recurring

3. Set of real numbers is subset of:

(a) Integers (b) Whole numbers (c) Natural numbers (d) Complex numbers

4. If a polynomial p(x) is divided by a linear divisor (x – a) then the remainder is:

(a) p(a) (b) p(-a) (c) p(0) (d) p(1)

5. Solution set of $|x+3| = -21$ is:

(a) - 24 (b) - 18 (c) { } (d) - 7

6. The study of geometrical shapes in a plane is called:

(a) Coordinate geometry (b) Plane geometry (c) Practical geometry (d) Coordinate plane

7. A triangle which has all sides different in measurement is:

(a) Equilateral (b) Isosceles (c) Right angled (d) Scalene

8. The highest degree of a quadratic equation is:

(a) One (b) Two (c) Three (d) Four

9. The nature of roots is found by:

(a) $b^2 + 4ac$ (b) $b^2 + ac$ (c) $b^2 – 4ac$ (d) $b^2 – ac$

10. Quadratic equation with roots 1 + i and 1 – i is:

(a) $x^2 – 2x + 2$ (b) $x^2 + 2x + 2$ (c) $x^2 – 2x - 2$ (d) $x^2 – x + 2$

11. $(x+3)^2 = x^2 + 6x + 9$ is a/an:

(a) Linear equation (b) Inequality (c) Identity (d) Equality

12. The relation {(1,2), (2,3), (3,3), (3,4)} is:

(a) Onto function (b) Into function (c) One-one function (d) Not a function

13. 20^0 =

(a) 360 / (b) 630 / (c) 1200 / (d) 3600 /

14. There are …. trigonometric ratios (functions):

(a) six (b) five (c) four (d) three

Section – II (Short Questions) Marks: 20 (10 x 2)

(1) Differentiate square and rectangular matrices.

(2) Simplify $\sqrt[3]{-\frac{8}{27}}$

(3) Use remainder theorem to find the remainder when $x^3 - 3x^2 + 4x - 14$ is divided by x+2

(4) Solve the equation $\frac{x-3}{3} - \frac{x-2}{2} = -1$

(5) Find distance and mid-point of A (3, -11), B (3, -4)

(6) Solve $3y^2 = y(y - 5)$ using factorization.

(7) Write the quadratic equation having roots $3 + \sqrt{2}, 3 - \sqrt{2}$

(8) Write $\frac{x^4+1}{x^2(x-1)}$ **in proper fraction.**

(9) If Y = {- 2, 1, 2} then make two binary relations in Y x Y. Also find domain and range.

(10) Prove that $tan\theta + cot\theta = sec\theta cosec\theta$

Section – III (Long Questions) Marks: 16 (2 x 8)

(1) Use Cramer's Rule to solve the system of equations: 3x – 4y = 4, x + 2y = 8

(2) If U = N, A = { } and B = P then verify De-Morgan's Laws.

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Subject: Urdu **Model Paper** **Total Marks:25**

سوال نمبر1: اپنے کالج کے پرنسپل کے نام حصول کریکٹر سرٹیفکیٹ کے لیے درخواست لکھیں۔ (10)

سوال نمبر2: علم بیان کی قسم "استعارہ" کی تعریف کریں نیز استعارہ کے ارکان کی مثالوں سے وضاحت کریں۔(05)

سوال نمبر3: درج ذیل عنوانات میں سے کسی ایک پر (۲۵۰ سے ۳۰۰) الفاظ پر مشتمل مفصل مضمون تحریر کریں۔(10)

(ا) حب الوطنی (ب) سائنس کے کرشمے (ج) ہر فرد ہے ملت کے مقدر کا ستارہ

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Intelligence Test
Sample Paper

Instructions: Possible answers to each question are given. The choice which you think is correct fill that circle with marker or pen ink. Cutting or filling two or more circles will result in zero marks in that question.

1- What number comes next? 2 6 12 20 30

O 40 **O** 42 **O** 44 **O** 46

2- 831 is to 25 as 731 is to …..?

O 20 **O** 21 **O** 22 **O** 24

3- DECEMBER is to OCTOBER as JUNE is to ……....

O APRIL **O** MAY **O** JUNE **O** AUGUST

4- Needle is to Sew as Pen is to _____.

O Pencil **O** Paper **O** Write **O** Ink

5- Out of 500 students, 360 are boys. The percentage of girls will be

O 16% **O** 18% **O** 26% **O** 28%

6- If 4^{th} day of month is Tuesday then the 26^{th} day of month will be

O Monday **O** Tuesday **O** Wednesday **O** Thursday

7- 90% of 90 is …….

O 63 **O** 72 **O** 81 **O** 90

8- 2+2/2 =

O 1 **O** 2 **O** 3 **O** 4

9- Point out the different from the following:

o angle **o** rectangle **o** square **o** hexagon

10- There are 30 passengers in a bus, 2/3 of them are men then the number of women are

O 5 **o** 10 **o** 15 **o** 20

11- Salman is 4 years old. Ali's age is twice of Salman. When Salman is 12 years old what will be the age of Ali?

O 8 years **O** 12 years **O** 16 years **O** 20 years

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12- We get education because?

O To polish ourselves in every aspect.
O To earn money to live in this world.
O To get jobs in good place.
O To show others that we have degrees.

13- If 3 × 4 = 916, 2 × 5 = 425 then 4 × 5 = ……..?

O 20 **o** 21 **o** 2516 **o** 1625

14- If FELLOW is coded as 465531 then ELLOW is coded as…….

O 65531 **o** 1356 **o** 3561 **o** 1653

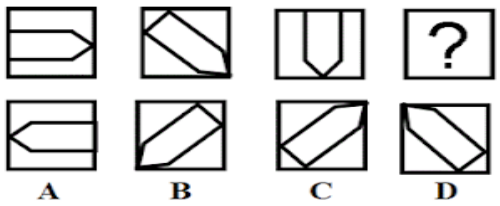
15- A man walks towards north and then turn left then turn right, his present direction is……

O North **O** South **O** East **O** West

16- Which one is different from the rest?

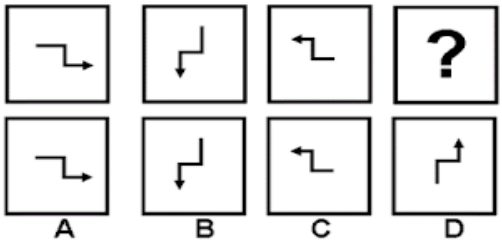
O RED **O** BLUE **O** GREEN **O** CHAIR

17- Which comes next in the following?



O A **O** B **O** C **O** D

18- Which comes next in the following?



O A **O** B **O** C **O** D

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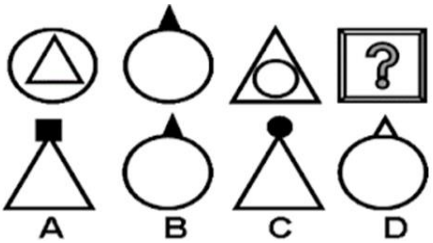
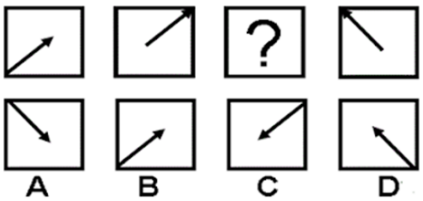
19- Which comes next in the following?



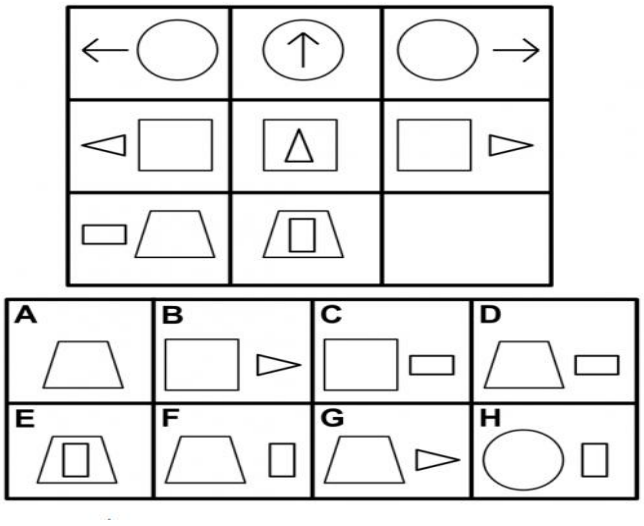
O A **O** B **O** C **O** D

20- Select the correct answer.



O A **O** B **O** C **O** D

21- Select the correct answer.



O A **O** B **O** C **O** D **O** E **O** F **O** G **O** H

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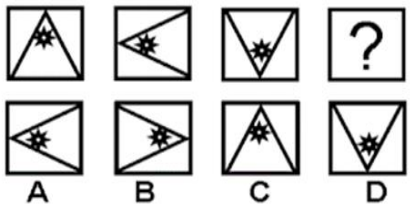
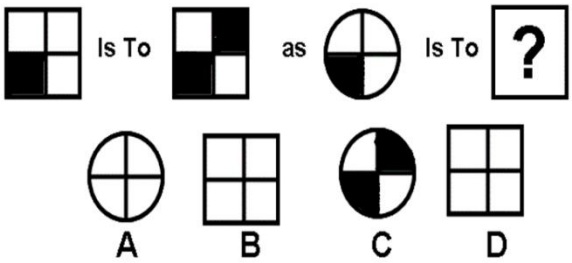
22- Which comes next in the following?



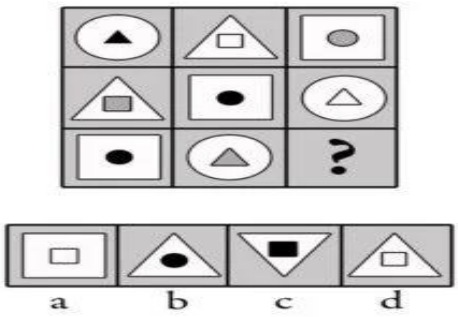
O A **O** B **O** C **O** D

23- Which comes next in the following?



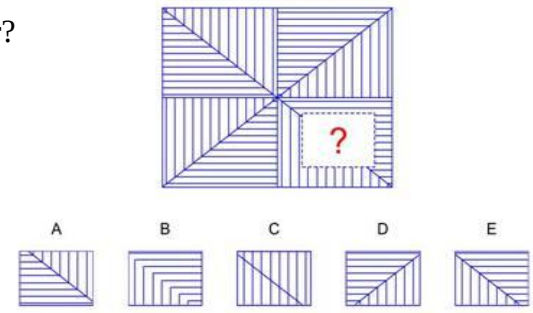
O A **O** B **O** C **O** D

24- Which comes next in the following?



O A **O** B **O** C **O** D

25- Select the correct answer?



O A **O** B **O** C **O** D