

कक्षा : ९

विषय : विज्ञान तथा प्रविधि

पूर्णाङ्क : ७५

समय : ३ घण्टा

क्र.स.	एकाइ	कार्य घण्टा	संज्ञानात्मक तह				समूहगत अङ्कभार	एकाइगत अङ्कभार
			ज्ञानद (१५%)	बोध (३०%)	प्रयोग (३०%)	उच्च दक्षता (२५%)		
१	वैज्ञानिक अध्ययन	७					८	३
२	सूचना तथा सञ्चार प्रविधि	१४	बहु वैकल्पिक	बहु वैकल्पिक	बहु वैकल्पिक	बहु वैकल्पिक	२३	५
३	सजीवहरूको वर्गीकरणजत्र	६	प्रश्न	प्रश्न	प्रश्न	प्रश्न		४
४	जीवन चक्र	५	(२×१)	(४×१)	(२×१)	(२×१)		२
५	क्रम विकास	६						८
६	शारीरिक संरचना र जीवन प्रक्रियाजत्र	१६					२५	६
७	प्रकृति र वातावरण	६	धेरै छोटो प्रश्न	धेरै छोटो प्रश्न	धेरै छोटो प्रश्न	धेरै छोटो प्रश्न		३
८	बल र चाल	११	(२×१)	(४×१)	(२×१)	(१×१)		५
९	यन्त्र	५						२
१०	ऊर्जा	८						४
११	तरङ्ग	१६						७
१२	विद्युत्	१२	छोटो प्रश्न	छोटो प्रश्न	छोटो प्रश्न	छोटो प्रश्न		५
१३	ब्रह्माण्ड	५	(२×२)	(३×२)	(५×२)	(४×२)		२
१४	परमाणु संरचना र रासायनिक बन्ड	१३					१९	४
१५	रासायनिक प्रतिक्रिया	६						३
१६	ग्याँसहरू	६						४
१७	धातु र अधात	५	लामो प्रश्न	लामो प्रश्न	लामो प्रश्न	लामो प्रश्न		२
१८	कार्बन र यसका यौगिकहरू	६	(१×४)	(२×४)	(२×४)	(२×४)		३
१९	दैनिक जीवनमा प्रयोग हुने रसायनहरू	७						३
	जम्मा	१६०	१२	२२	२२	१९		७५

क्र.स.	प्रश्नका प्रकार	प्रति प्रश्न अङ्कभार	प्रश्न सङ्ख्या				जम्मा प्रश्न सङ्ख्या	जम्मा अङ्कभार
१	बहुवैकल्पिक प्रश्न	१ अङ्क	२	४	२	२	१०	१०
२	धेरै छोटो प्रश्न	१ अङ्क	२	४	२	१	९	९
३	छोटो प्रश्न	२ अङ्क	२	३	५	४	१४	२८
४	लामो प्रश्न	४ अङ्क	१	२	२	२	७	२८
	कुल		७	१३	११	९	४०	७५

द्रष्टव्य

- प्रश्न निर्माण गर्दा तल्लोतहका प्रश्न (ज्ञान, बोध र प्रयोग) तथा उच्च तहका प्रश्न (विश्लेषण, मूल्याङ्कन र सिर्जना) लाई माथि उल्लिखित कार्यघण्टा र अङ्कभारअनुसार बनाउनुपर्ने छ ।
- बहुवैकल्पिक प्रश्न र अति छोटो प्रश्न १ अङ्क, छोटो प्रश्न २ अङ्क र लामो प्रश्न ४ अङ्कका दरले सोध्नुपर्ने छ ।
- समूहको जम्मा अङ्कभारमा घटबढ गर्न पाइने छैन तर समूहभित्रका एकाइहरूमा +२ हुन सक्ने गरी प्रश्न बनाउन सकिनेछ । तर कुनै एकाइलाई शून्य गर्न पाइने छैन ।
- २ वा ४ अङ्कका प्रश्नको लागि एक तत्वको एक अङ्क (1 mark will be assigned per element expected as correct response) आउने गरी प्रश्न निर्माण गर्नुपर्ने छ ।
- छोटो र लामो प्रश्न एउटै तहको वा दुई वा एक भन्दा बढी संज्ञानात्मक क्षेत्रअन्तर्गतका तहहरू समेट्ने गरी प्रश्न बनाउन पनि सकिने छ । तर समग्रमा उल्लिखित तहको जम्मा भारसँग मिल्ने हुनुपर्छ ।

आन्तरिक मूल्याङ्कन

निर्माणात्मक मूल्याङ्कनको अङ्कको निश्चित भार आन्तरिक मूल्याङ्कनका रूपमा समावेश गरिने छ। यसका लागि निर्माणात्मक मूल्याङ्कनलाई अभिलेखीकरण गरी प्रत्येक विद्यार्थीको कार्यसञ्चयिका व्यवस्थित गरी राख्नु पर्छ। यस्तो अभिलेखका आधारमा निम्नलिखित पक्षमा तोकिए अनुसारको भारको अङ्क आन्तरिक मूल्याङ्कनका रूपमा समावेश गरिने छ।

क्र.स	मूल्याङ्कनका आधार	विस्तृतीकरण	भार
१	सहभागिता	उपस्थिति र सिकाइ सहभागिता	३
२	प्रयोगात्मक तथा परियोजना कार्य	प्रयोगका लागि सामग्री सेटअप, अवलोकन, परीक्षण, तालिकीकरण र निष्कर्ष र प्रस्तुतीकरण	६
		प्रतिवेदन: शीर्षक, उद्देश्य, विधि, नतिजा र निष्कर्ष चार्ट निर्माण, मोडेल निर्माण, सामग्री निर्माण	३
		प्रयोगात्मक र परियोजना कार्यको अभिलेखीकरण	३
		स्पोर्टिङ (चित्राङ्कन, वर्गीकरण, लक्षण, गुणहरू वर्णन) परियोजना कार्यको प्रतिवेदनमध्ये कुनै एउटा परियोजना कार्य प्रस्तुतीकरण कुनै एउटा प्रयोगात्मक कार्य प्रस्तुतीकरण मौलिक परीक्षा (Viva Voce)	४
३	त्रैमासिक परीक्षा		६
	जम्मा		२५

उल्लिखित तालिकाका नं. १ देखि ३ सम्मका क्षेत्रगत क्रियाकलाप नियमित सिकाइ सहजीकरणकै क्रममा गराउनुपर्छ। उक्त क्रियाकलापलाई निर्माणात्मक मूल्याङ्कनसँग अन्तरसम्बन्धित गरी त्यसको अभिलेख पनि राख्नुपर्ने छ।

Unit	Topics	Working hrs	Teaching methods	Teaching materials	Evaluation & technique tools
1	1. Science and Scientific Studies Scientific study introduction 1.1 Fields of science Biology, Physics, Chemistry, Astronomy and Geology, Environmental science 1.2 Professional opportunities in different fields of science 1.3 Achievement and challenges of science and technology. 1.4 Safety measures to be followed during scientific experiment. 1.5 Measurement 1.5.1 Scientific notation (Introduction, things to be considered while representing on scientific notation) 1.5.2 Matric prefix (Prevalent matric prefix (meaning and symbol) Tera (T), Giga (G), Mega (M), Kilo (K), deci (d), Centi (c), Milli (m), Micro (μ), Nano (n) and Pico (p) 1.5.3 Least count (Introduction, Importance and use) 1.5.4 Requirement of average in measurement.	7	Discussion, lecture, question-answer, demonstration	Charts, measuring instruments, balance, stopwatch, ruler, textbook	Class test, homework, viva, observation
2	2. Classification of Plants and Animals (Organisms) Introduction of classification • Binomial system of nomenclature Genus and species • Concepts of five kingdom system • Characteristics and examples of kingdom Monera, Protista and Fungi	6	Discussion, lecture, question-answer	Charts, diagrams, flash cards, textbook	Class test, homework, viva
3	3. Life Cycle of Mushroom Mushroom 3.1 Importance of mushroom • Economic income (mushroom cultivation, mushroom related production by biological technology like: Sukuti, Pickel etc.) • Use of mushroom for human health 3.2 Identification of edible and poisonous mushroom 3.3 Lifecycle of mushroom	5	Discussion, lecture, demonstration	Charts, pictures, samples, videos	Class test, homework, viva
7	Motion and Force 7.1 Equations of motion • Acceleration in straight line motion • Uniform and non-uniform velocity and acceleration • Inertia and its effects	11	Lecture, discussion, demonstration, numerical problem solving	Charts, graphs, stopwatch, meter scale, board and marker	Class test, homework, viva, numerical test

Unit	Topics	Working hrs	Teaching methods	Teaching materials	Evaluation & technique tools
	7.2 Graph of motion (distance–time, velocity–time, acceleration–time) 7.3 Newton’s laws of motion and applications 7.4 Elasticity and plasticity				
8	Machines 8.1 Simple machines: inclined plane (with wedge and screw), pulley, wheel and axle 8.2 Mechanical advantage and velocity ratio 8.3 Working principle and efficiency of simple machines 8.4 Complex machines 8.5 Efficiency of machines	5	Discussion, demonstration, problem solving	Models of machines, charts, weights, pulley setup	Class test, homework, viva, numerical problems
14	Atomic Structure and Chemical Bond 14.1 Atomic structure (Bohr’s atomic model) 14.2 Radioactivity 14.3 Nuclear fission and fusion; alpha, beta and gamma rays; atomic energy and uses 14.4 Valence shell, valence electron, octet and duplet rule 14.5 Ions (types, formation, elements up to atomic number 20) 14.6 Chemical bonds and types 14.7 Formation of chemical bonds 14.8 Molecular formula and molecular weight (criss-cross method)	13	Lecture, discussion, demonstration, numerical practice	Atomic models, charts, periodic table, textbook	Class test, homework, viva, numerical problems
—	Revision	—	Discussion, practice	Question sets, textbook	Unit test, oral test

Unit	Topics	Working hrs	Teaching methods	Teaching materials	Evaluation & technique tools
5	Physiological Structure and Life Processes 5.1 Tissue • Introduction to types of tissue 5.1.1 Plant tissue • Meristematic tissue • Permanent tissue (simple, complex, special) 5.1.2 Animal tissue • Epithelial tissue • Muscular tissue • Connective tissue 5.2 Human Nervous System • Central Nervous System and parts • Peripheral Nervous System • Autonomic Nervous System 5.3 Human Glandular System • Exocrine glands and functions • Endocrine glands and functions 5.4 Plant hormones • Cytokinin and its functions • Tissue culture and its uses	16	1. Discussion 2. Question–answer 3. Demonstration 4. Practical 5. Field observation	Charts, diagrams, plant and animal tissue slides, microscope, gland models, tissue culture samples	1. Class Test 2. Homework 3. Viva 4. Practical observation 5. Project work
9	Energy • Solar energy • Nuclear reactions in Sun • Solar energy technology • Biomass energy and its importance • Alternative sources of energy	8	1. Discussion 2. Question–answer 3. Demonstration 4. Multimedia presentation	Charts, solar panel model, biomass samples, videos, diagrams	1. Class Test 2. Homework 3. Viva 4. Practical / Project observation
15	Chemical Reactions 15.1 Introduction to chemical reactions 15.2 Writing balanced chemical equations 15.3 Importance of chemical reactions in daily life 15.4 Endothermic and exothermic reactions	6	1. Discussion 2. Question–answer 3. Demonstration 4. Practical / Numerical practice	Chemical apparatus, reactants, indicators, charts	1. Class Test 2. Homework 3. Viva 4. Practical and numerical problem solving
16	Some Gases 16.1 Hydrogen, Oxygen, Nitrogen 16.2 Preparation of H ₂ , O ₂ , N ₂ in lab 16.3 Chemical and physical properties of H ₂ , O ₂ , N ₂ 16.4 Ozone layer • Formation and depletion • Effects of ozone layer depletion	6	1. Discussion 2. Question–answer 3. Demonstration 4. Practical	Gas preparation setup, charts, diagrams, samples	1. Class Test 2. Homework 3. Viva 4. Practical observation
—	Revision	—	Discussion, practice, Q&A	Textbook, question sets, multimedia	Unit test, oral test

Unit	Topics	Working hrs	Teaching methods	Teaching materials	Evaluation & technique tools
13	Information and Communication Technology 13.1 Introduction of telecommunication technology 13.2 Introduction of artificial satellite in telecommunication • Significance of satellites in telecommunication 13.3 Use of Internet in modern communication technology • Searching information using Internet • Search using filetype, inurl, site, maps, weather • Understanding copyright of search material 13.4 Uses of online security	14	1. Discussion 2. Lecture 3. Demonstration 4. Practical 5. Multimedia presentation	Computers, internet connection, browser, charts, multimedia, videos	1. Class Test 2. Homework 3. Viva 4. Practical observation / project work
4	Evolution 4.1 Concept of evolution 4.2 Evidences of organic evolution • Fossils • Comparative morphology and anatomy • Vestigial organs • Bridge animals • Embryonic evidences 4.3 Theory of evolution • Darwin's Theory • Lamarck's Theory • Hugo de Vries' Mutation Theory	6	1. Discussion 2. Question-answer 3. Demonstration 4. Lecture	Charts, fossil samples, diagrams, comparative anatomy models, multimedia	1. Class Test 2. Homework 3. Viva 4. Practical / diagram drawing
10	Waves 10.1 Introduction and types of waves • Longitudinal vs transverse • Mechanical vs electromagnetic waves 10.2 Electromagnetic spectrum • Introduction and applications • Radio, infrared, light, ultraviolet, X-ray, gamma ray 10.3 X-ray • Photography and usage methods 10.4 CT scan • Introduction and usage 10.5 Reflection of sound waves • Uses of reflected sound 10.6 Ultrasonography • Uses in health examination	16	1. Discussion 2. Demonstration 3. Lecture 4. Multimedia / Practical observation	Charts, diagrams, multimedia videos, sound and light apparatus, X-ray/CT scan images	1. Class Test 2. Homework 3. Viva 4. Practical observation / project work
17	Metal and Non-Metal 17.1 Introduction • Physical and chemical properties of metals and non-metals 17.2 Sources and importance of minerals for human body 17.3 Effect of mercury and lead on human health	5	1. Discussion 2. Demonstration 3. Lecture 4. Practical	Metal and non-metal samples, charts, mineral samples, multimedia	1. Class Test 2. Homework 3. Viva 4. Practical observation

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Unit	Topics	Working hrs	Teaching methods	Teaching materials	Evaluation & technique tools
—	Revision	—	Discussion, practice, Q&A	Textbook, question sets	Unit test, oral test

Unit	Topics	Working hrs	Teaching methods	Teaching materials	Evaluation & technique tools
6	Nature and Environment 6.1 Ecosystem • Components of ecosystem (biotic and abiotic) • Terrestrial ecosystem (grassland) • Aquatic ecosystem • Food chain and food web 6.2 Interaction between living beings	6	1. Discussion 2. Question–answer 3. Demonstration 4. Field observation	Charts, diagrams, ecosystem models, plant and animal samples, multimedia	1. Class Test 2. Homework 3. Viva 4. Field report / Project work
11	Electricity 11.1 Introduction of electric current and solving problems using $I=Q/t$ 11.2 Electromotive force vs potential difference 11.3 Ohm's law ($R=V/I$) 11.4 Series and parallel combination of potential differences 11.5 Effect of heat and light on electricity 11.6 Electrical potential and related simple problems 11.7 Electricity consumption and tariff problems	15	1. Discussion 2. Lecture / demonstration 3. Practical 4. Problem-solving	Electric circuit models, bulbs, wires, resistors, ammeter, voltmeter, charts, multimedia	1. Class Test 2. Homework 3. Viva 4. Numerical problem solving / Practical observation
18	Carbon and Its Compounds 18.1 Introduction of carbon and its compounds 18.2 Physical and chemical properties of carbon 18.3 Organic and inorganic compounds 18.4 Differences between organic and inorganic compounds 18.5 Importance of organic compounds in daily life	6	1. Discussion 2. Lecture 3. Demonstration 4. Practical	Carbon samples, compounds, charts, diagrams, multimedia	1. Class Test 2. Homework 3. Viva 4. Practical observation / Diagram drawing
19	Materials Used in Daily Life • Nutrients for plants • Fertilizers and types • Advantages and disadvantages of organic and inorganic fertilizers • Single fertilizers • Factors to consider when using chemical fertilizers • Impact of chemical fertilizers on the environment	7	1. Discussion 2. Question–answer 3. Demonstration 4. Practical / Field visit	Fertilizer samples, soil samples, charts, diagrams, multimedia	1. Class Test 2. Homework 3. Viva 4. Project work / Field report
—	Revision	—	Discussion, practice, Q&A	Textbooks, question sets, multimedia	Unit test, oral test