

पूर्वाञ्चल विश्वविद्यालय



विज्ञान तथा प्रविधि संकायबाट लिइने स्नातक तहको प्रवेश परीक्षाको पाठ्यक्रम तथा अंक र समूह विभाजन निम्नानुसार रहेको व्यहोरा सम्बन्धित सबैलाई जानकारी गराइन्छ :

अंक विभाजन

समूह (क)		समूह (ख)		समूह (ग)	
विषय	अङ्कभार	विषय	अङ्कभार	विषय	अङ्कभार
English	२५	English	२५	English	२५
Math	२५	Math	१५	Math	२५
Physics	२५	Physics	१५	Basic Computer	२५
Chemistry	२५	Chemistry	२०	Apptitude Test	२५
		Biology	२५		

समूह विभाजन

समूह क:

BE (Civil, Electrical, Electronics & Communication, Computer, Mechanical, Geomatic) B. Arch. and Other Engineering Related Program

समूह ख:

Bachelor in: Biomedical Engineering, Agriculture, Bio-Technology, B-Tech Biotechnology, Biochemistry, B. Tech. Food Technology, B. Tech. Dairy Technology, Forestry, Nutrition and other related program

समूह ग:

BCA and BIT

PURBANCHAL UNIVERSITY
FACULTY OF SCIENCE AND TECHNOLOGY

SYLLABUS FOR ENTRANCE EXAM (BACHELOR'S LEVEL)
(EFFECTIVE FROM ACADEMIC SESSION 2075 -76)

Subject: English

F.M.: 25

<u>Unit wise weightage</u>		
Units	Course content	Full marks
A	Phonological questions, dealing with phonemes, Phonemic symbols and word stress	5
B	Laxical Questions, Dealing with word formations and antonyms, a synonyms and one words for many words	2
C	Grammatical Question, dealing with the rest of the items given in the syllabus	18

Unit A:

Phonological questions, dealing with phonemes, Phonemic symbols and word stress

Unit B:

Laxical Questions, Dealing with word formations and antonyms, synonyms and one words for many words.

Unit C:

Grammatical Question, dealing with the rest of the items given in the syllabus.

Each Question is of objective type with multiple choice answer which carries one marks.

Contents

1. Use of Pronouns
2. Relative Pronouns
3. Sound
4. Stress
5. Intonation
6. Subject – Verb Agreements
7. Voice

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8. Narration
9. Use of tense
10. Punctuation
11. Parts of Speech
12. Causative verb
13. Linking Verbs
14. Use of Prepositions
15. Sentence Structure
16. Transformation of Sentences
17. Conditional Sentences
18. To infinitive and gerund forms
19. Question Tag
20. Synonyms and Antonyms
21. One Word Substitution
22. Use of Suffix and Prefix
23. Word Power
24. The expression "AS IF" and "As Though"
25. The expression "NEED" and "In Need of"
26. Idioms and Phrases
27. Sentences: Simple, Compound and Complex
28. Affirmative and Negative Agreements
29. Use of Articles
30. Analogies

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Subject: Mathematics

F.M.: 25



Unit wise weightage

Units	Course content	Full marks
1	Set and functions	4
2	Algebra	4
3	Trigonometry	5
4	Coordinate geometry	4
5	Calculus	4
6	Vectors	4

1. Set and functions

Set, type of sets, operation on sets, law of sets, real number, Cartesian product, relations, functions and graphs, algebraic, exponential, trigonometric and logarithmic, hyperbolic functions and their inverse, basic properties of logarithmic functions.

2. Algebra

Determinants and its properties, matrices, type of matrices, minor, cofactors and inverse of a matrix, uses of complex numbers, polynomial equation, sequences and series, permutation and combination, binomial theorem, exponential and logarithmic series.

3. Trigonometry

Trigonometric equations and general values, inverse trigonometric relations, inverse circular functions, principal values, properties of triangles, centroid, incentre, orthocenter and circumcentre and their properties.

4. Coordinate geometry

Coordinates in a plane, straight lines, pair of lines, circles, conic sections: parabola, hyperbola and ellipse, standard equations and simple properties, coordinates in space, plane and its equation.

5. Calculus

Limit and continuity, derivative and its application, rules of derivative, rate of change, maxima and minima of a function, integration, rules of integration, standard integral, definite integral and its application.

6. Vectors

Vectors in space, addition, subtraction and multiplication of vectors, unit vectors, linear combination of vectors, scalar and vector product of two vectors, application of vectors.



Subject: Physics

F.M.: 25

Unit wise weightage

Units	Course content	Full marks
1	Mechanics	8
2	Heat	3
3	Optics	3
4	Sound	3
5	Electricity	5
6	Atomic Physics	3

1. Mechanics:

- > Dimensions and Error analysis.
- > Equations of motion.
- > Motion of a projectile.
- > Addition, Subtraction and multiplication of vectors, Resolution of a vector.
- > Relative velocity.
- > Laws of motion, Principle of conservation of linear momentum, Impulse, solid friction.
- > Principle of moment, centre of mass, centre of gravity.
- > Work, power and energy, principle of conservation of energy.
- > Centripetal force and its application.
- > Moment of inertia, Torque on a body, angular momentum and its conservation, work done by couple, kinetic energy of rolling body.
- > Law of gravitation, Gravitational potential, Gravitational field intensity, Escape velocity, Total energy of a satellite, Kepler's law of planetary motion.
- > Characteristics of S.H.M., Energy of a particle executing S.H.M., Simple pendulum.
- > Elasticity, Stress & Strain, Moduli of elasticity, Energy Stored in a stretched wire.
- > Surface tension of liquid, Surface energy, Capillarity.
- > Viscosity of fluid, coefficient of viscosity, Stoke's law.
- > Terminal velocity, Energy of fluid.

2. Heat:

- > Heat and Temperature, Scales of temperature, Thermal equilibrium.
- > Measurement of heat, Specific heat capacity, thermal capacity, Latent heat.
- > Expansion of Solid, liquid and gas.
- > Gas laws, Ideal gas equation.
- > Kinetic theory of gas. Root mean square speed of gas molecules.
- > Transfer of heat, Conduction, Convection and Radiation, Stefan's law, Kirchhoff's law.
- > Relative humidity and dew point.
- > First law of thermodynamics, Isothermal and adiabatic processes.
- > Second law of thermodynamics, Carnot's engine, Entropy.

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3. Optics:

- > Formation of images by plane and curved mirrors.
- > Refraction of light through plane surface, Refractive index, Critical angle, Total internal reflection.
- > Refraction through lenses, Achromatic combination of two lenses.
- > Visual angle, Angular magnification, Microscope and Telescope.
- > Interference, Diffraction and Polarization of light.

4. Sound:

- > Damped and forced oscillation, Resonance, progressive waves, principle of superposition.
- > Velocity of Sound in solid, liquid and gas, Laplace's correction.
- > Beat phenomenon.
- > Doppler effect.
- > Stationary waves, waves in pipe, waves in string.

5. Electricity:

- > Electric charge, Electrostatic induction, Surface charge density.
- > Electric field, Electric potential, Electric field intensity, Gauss's law and its applications.
- > Capacitors, Dielectric Strength.
- > Metallic Conduction, Ohm's law, Resistance, Conductance, Resistivity, Conductivity, Combination of resistance.
- > Emf, Potential difference, internal resistance of a cell, Combination of cells.
- > Heating effect of Current, Joule's law, Electric power.
- > Kirchhoff's law and its application.
- > Galvanometer, Conversion of galvanometer into voltmeter and ammeter.
- > Earth's magnetism.
- > Magnetic field, Magnetic flux, Force on Current Carrying Conductor, Biot-Savart's law and their applications. Ampere's law.
- > Electromagnetic induction, Faraday's law and Lenz's law, Emf in rotating coil.
- > AC circuits.

Atomic Physics:

- > Discharge of electricity through gases, Cathode rays, Electronic mass and charge.
- > Bohr's theory of atomic model, Energy level diagram.
- > X-rays, Photoelectric effect.

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- > Radioactivity, Decay law, Half-life period.
- > Nuclear fission and fusion.
- > Semiconductors, junction diode.

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Subject : Chemistry



F.M. : 25

Unit wise weightage

Units	Course content	Full marks
1	STATES OF MATTER	3
2	ATOMIC STRUCTURE	4
3	OXIDATION AND REDUCTION	2
4	PERIODIC TABLE	3
5	HYDROGEN, OXIGEN, OZONE AND WATER	4
6	INTRODUCTION TO ORGANIC CHEMISTRY AND HYDROCARBON	3
7	VOLUMETRIC ANALYSIS AND IONIC EQUILIBRIUM	2
8	ALDEHYDES AND KETONES	2
9	IRON	2

1. STATES OF MATTER:

- The gas laws (Boyle's law, Charles law, combined gas law)
- Kinetic molecular theory of gases
- Ideal and real gases.
- Vander Waals Equation.
- Properties of liquid
- Solutions
- Concentration of solutions
- Saturated, unsaturated and super saturated solutions.
- Solubility and its determination
- Efflorescence and Deliquescence
- Water of crystallization

2. ATOMIC STRUCTURE

- Fundamentals particles and their discovery.
- Thomson's Atomic Model
- Rutherford's Atomic model
- Atomic number and Mass number.
- Composition of an atom.
- Isotopes and isobars.
- Bohr's atomic model
- de Broglie's Relation.
- Heisenberg's uncertainty principle.
- Quantum mechanical model of atom.
- Atomic orbitals.
- Quantum number.
- Pauli's Exclusion principle.
- Hund's rule of maximum multiplicity.
- Aufbau principle and electronic configuration of elements.

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3. OXIDATION AND REDUCTION

- Classical concept of oxidation .
- Electronic concept of oxidation and Reduction.
- Oxidising and Reducing agents.
- Oxidation number
- Redox reactions and Electrolysis.

4. PERIODIC TABLE

- Mendeleev's periodic Table
- Advantage and Defect of Mendeleev's Periodic Table.
- Modern periodic law.
- Long form of periodic Table.
- Features of Long form of periodic Table
- Defects of Long form of periodic Table.
- Grouping of Elements into Blocks.
- Bohr's classification of elements .
- Periodic properties and their periodic trends.
- Atomic radius, Ionic radius, Ionization energy,
- Electron affinity and Electronegativity

5. HYDROGEN, OXYGEN, OZONE AND WATER

- Position of Hydrogen in the periodic table.
- Preparation and properties of hydrogen.
- Isotopes of hydrogen
- Position of oxygen in periodic table
- Preparation and properties of oxygen.
- Oxides.
- Structure of Ozone
- Ozone layers and its depletion.
- Composition of water and structure of water.
- Properties of water
- hard and soft water and its removal.
- Heavy water.
- Properties and uses of heavy water.

6. INTRODUCTION TO ORGANIC CHEMISTRY AND HYDROCARBON

- Definition of organic Chemistry and organic compound.
- vital force theory and its limitations
- Tetra valency and catenation property of carbon.
- Functional group and homologous, series
- Meaning of empirical, molecular, structural and contracted formula.
- Qualitative analysis of organic compounds
- IUPAC naming of organic compounds
- Structural isomerism and its type.
- Concept of homolytic fission Heterolytic fission electrophiles nucleophiles and inductive effect
- Preparation of alkynes and its properties with $H_2, X_2, HX, H_2O, O_3, H_2SO_4$ Baeyer's reaction.

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- Preparation of alkynes and its properties with H_2 , X_2 , HX , H_2O , O_3 Acidic nature, Action with ammonical $AgNO_3$ with alkaline KNO_3 and polymerization reaction.

7. VOLUMETRIC ANALYSIS AND IONIC EQUILIBRIUM

- Acidimetry and alkalinimetry
- Equivalent mass of compounds
- Expressing concentration in terms of Normality, Molarity and Molality
- Principles of volumetric analysis
- Theory of chemical indicators and selection of an indicator
- Classification of Electrolytes
- Arrhenius Theory of Ionization
- Ionisation of water, solubility product and Common ion effect
- Arrhenius concept of acid and base
- Bronsted concept of acid and base

8. ALDEHYDES AND KETONES

- Preparation of aldehydes and ketones from dehydrogenation and oxidation of alcohol, ozonolysis of alkene, catalytic hydration of alkynes
- Physical properties of aldehydes and Ketones.
- Chemical properties - Addition reaction, reaction with H_2 , HCN , $NaHSO_3$, Grignard reagents NH_2-NH_2 , Phenyl-hydrazine, semicarbazide and 2,4-DNP.
- Reduction properties of aldehyde-oxidation with Tollen's reagent, Fehling solution
- Aldol condensation Clemmensen's reduction Wolf-Kishner reduction Action with PCl_5
- Preparation of benzaldehyde from Toluene
- Chemical Properties-Perkin condensation, Benzoin condensation, Cannizzaro's reaction

9. IRON

- Occurrence and extraction
- Varieties of iron preparation of iron.
- Manufacture of steel by-Bessemer process and open hearth process
- Heat treatment of Steel.
- Stainless steel.
- Rusting of iron and its prevention
- Biological importance of iron
- Structure and uses of green vitrol, Ferric Chloride, Mohr's salt.

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Subject: Biology

F.M.: 25

Unit wise weightage

Units	Course content	Full marks
1	Bio-molecules and cell Biology	2
2	Biodiversity	6
3	Biota and their Environment	3
4	Anatomy and Physiology of organisms	2
5	Genetics	3
6	Developmental Biology	2
7	Human Biology and Health	4
8	Application of Biology	3

Unit 1: Bio-molecules and cell Biology

Bio-molecules: Carbohydrate, protein, lipid, nucleic acid and minerals.

Cell Biology: Prokaryotic and eukaryotic cells, cell organelles, cell division (amitosis, mitosis and meiosis).

Unit 2: Biodiversity

Concepts on taxonomy (definition, nomenclature and classification)

Monera: Bacteria and *Nostoc*.

Mycota: General characters of Zygomycetes, Ascomycetes, Basidiomycetes and deuteromycetes; economic importance of fungi; morphology and reproduction of Mucor and Yeast.

Plantae: General characters of algae (green, brown and red), bryophyta, pteridophyta, gymnosperm and angiosperm; morphology and reproduction of Spirogyra, Marchantia, Funaria, Pteridium, Cycas and Pinus; distribution of Pinus in Nepal; morphology and taxonomy of Brassicaceae, Asteraceae, Solanaceae, Papilionaceae and Poaceae; structure and economic importance of Lichens and Virus.

Protista: General characters and classification of Protozoa; habit, habitat, structure and reproduction of Paramecium and Plasmodium.

Animalia: General characters and classification (upto class) of Porifera, Coelenterata (Cnidaria), Platyhelminthes, Aschelminthes (Nema-theminthes), Annelida, Arthropoda, Mollusca, Echinodermata and Chordata; Earthworm (structure; digestive, circulatory, excretory, reproductive and nervous systems); Frog (structure; digestive, circulatory, respiratory, urino-genital, reproductive and nervous systems).

Unit 3: Biota and their Environment

Ecology (definition, ecological factors and their interactions); structure and functional aspects (food chain and food web, trophic level, ecological pyramids) of pond and grassland ecosystems; concepts of community and successions; nitrogen cycle, acid rain, green house effects, depletion of ozone layer; forests of Nepal; meaning of rare, threatened, vulnerable and endangered species; national parks, wildlife reserves and hunting reserves of Nepal.

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Unit 4: Anatomy and Physiology of organisms

Concepts on plant and animal tissues, internal structure of dicot and monocot stems and roots, secondary growth on dicot stem; osmosis, diffusion, water absorption, transpiration, photosynthesis, respiration, growth hormones (auxins, gibberellins, cytokinins), concept on plant movement.

Unit 5: Genetics

Genetic materials: DNA (composition, structure and replication), RNA (types with functions); genetic code, Mendel's laws of inheritance, concept of incomplete dominance and co-dominance, epistasis, polygenic inheritance (skin colour in men), pleiotropic gene, linkage and crossing over, sex linked inheritance (colour blindness in man), mutation and polyploidy.

Unit 6: Developmental Biology

Angiosperms (asexual reproduction, development of male and female gametophytes, pollination and fertilization)

Unit 7: Human Biology and Health

Nutrition, digestion, respiration, circulation (blood groups and Rh-factor, heart structure and action), arterial and venous systems, excretion and osmoregulation; functions of endocrine glands (pituitary, thyroid, parathyroid, pancreatic and adrenal glands); reproduction; structure and functions of eye and ear; human disease (drug abuse, alcoholism, smoking, typhoid, AIDS, cancer)

Unit 8: Application of Biology

Biotechnology (branches, applications in agriculture, medicine, industries, conservation, etc.), tissue culture (types, methods: sterilization, composition of medium and its preparation); plant breeding; green manure; concept on antibiotics and vaccines; amniocentesis and test tube baby; genetic engineering (definition, tools, steps, applications); methods and applications of alcohol and antibiotics fermentation.



Subject: Basic Computer

F.M.: 25

Unit wise weightage

Units	Course content	Full marks
1	Introduction to Computer	1
2	Basic Computer Organization and Computer Peripherals	3
3	Computer Storage	2
4	Computer Software	2
5	Introduction to Database	1
6	Networks and Internet	4
7	Computer Hardware	2
8	Basics of Windows and User Interface	3
9	Basic DOS Commands	1
10	Word Processing	2
11	Spreadsheets	2
12	Presentations	2

Unit 1: Introduction to Computer:

- Characteristics, applications, and components of computer
- Classification of computer based on purpose, size and technology

Unit 2: Basic Computer Organization and Computer Peripherals:

- Block diagram of computer system
- Input devices: Keyboard, mouse, and other types of input devices
- Output devices: Monitor, printer, and other types of output devices

Unit 3: Computer Storage:

- Concepts of memory and requirements of storage devices
- Classification and types of storage devices
- ROM and RAM with their types
- Magnetic devices and Optical devices

Unit 4: Computer Software:

- Introduction and types of software
- Definition and functions of operating system
- Programming languages and their types

Unit 5: Introduction to Database:

- Meaning of data and information
- Concepts and characteristics of database and DBMS

Unit 6: Networks and Internet:

- Introduction and uses of network
- Types and topologies of network
- Introduction, features and applications of Internet
- Concepts of intranet and extranet



- Network media and network software
- WWW, E-mail, E-commerce, web site
- Web browsing, net surfing, chatting, using e-mails
- Computer crime, viruses and threats
- Cyber law and ethical issues

Unit 7: Computer Hardware:

- Motherboard and its parts, slots, daughterboard, and expansion slots
- BIOS, CMOS, and Microprocessor
- utilities and application software, Customizing software

Unit 8: Basics of Windows and User Interface:

- Using mouse and moving icons on the screen
- The My Computer icon, the Recycle Bin icon, Status Bar, Start button, Menu Bar
- Opening, closing and running an application
- Using Windows Explorer to view files, folders and directories
- Creating and renaming files and folders
- Windows settings: control panel, wallpapers, screensavers, date and time, sound
- Advanced features: using right mouse button, shortcuts, notepad, accessories

Unit 9: Basic DOS Commands:

- Comparison of DOS and Windows, External and Internal Commands.

Unit 10: Word Processing:

- Basics: opening and closing documents, saving documents, page setup, printing, scrolling around a document
- Text manipulation and formatting: text selection, cut, copy and paste, font, Bold, Italic and Underline, text alignment, line and paragraph setting, changing font, size and color, bullets and numbering, changing case
- Table manipulation: drawing and inserting table, changing cell width and height, alignment of text in cell, inserting and deleting rows and columns, table borders

Unit 11: Spreadsheets:

- Basics: opening and closing of spreadsheet, multiple sheets, Menu Bar, cell inputting, cell addressing
- Manipulation of cells: entering texts, creating tables, setting cell width and height, copying of cells
- Formulas: sum, average, percentage, and other basic functions
- Preparing invoices/budgets, totaling of transactions, maintaining daily and monthly reports

Unit 12: Presentations:

- Basics: opening a PowerPoint presentation, using Wizard to create a presentation

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- Slide presentation: title, text, picture, table, font color and font size, bullets and indenting, slide design, background, slide numbering, slide show, slide animation, slide sorting, printing slides

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Subject: Aptitude

F.M.: 25

S.No.	Topics	Marks
1	Sentence Completion	2
2	Analogies	2
3	Word Groups	2
4	Logical Reasoning	2
5	Deduction	2
6	Numerical Computation	2
7	Numerical Estimation	2
8	Numerical Reasoning	2
9	Percentage, Ratio and Proportion	2
10	Data Interpretation	2
11	History of Nepal	2
12	Geography of Nepal	1
13	General Information of PU	2

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Model questions

1. Which cell organelle is called suicidal bag of the cell?
a. Mitochondria   b. Chloroplast   c. Lysosome d. Ribosome
2. Coenocytic mycelium is found in
a. Mucor   b. Yeast   c. Spirogyra d. Alternaria
3. Cruciform corolla is found in
a. Mustard   b. Pea   c. Sunflower   d. Maize
4. Which of the following structure helps in reproduction in Paramecium?
a. Macronucleus   b. Micronucleus   c. Food vacuole   d. Contractile vacuole
5. In which of the segment female genital aperture in earthworm is situated?
a. 14   b. 15   c. 17   d. 18
6. Pyramid of biomass in pond ecosystem is
a. Upright   b. Inverted   c. Both a and b   d. None
7. The largest national park of Nepal is
a. Chitwan   b. Shey Phoksundo   c. Bardia   d. Langtang
8. Which one of the following components of xylem is living?
a. Tracheid   b. Vessel   c. Xylem parenchyma   d. Xylem fibre
9. ABO blood group system in human is an example of
a. Incomplete dominance   b. Co-dominance   c. Epistasis   d. Linkage
10. How many sex chromosomes are present in a human cell?
a. 46   b. 44   c. 22   d. 2
11. How many meiotic divisions are required to produce 100 seeds (zygotes)?
a. 125   b. 100   c. 50   d. 25
12. Name the disease caused due to deficiency of iodine
a. Hyponatremia   b. Goitre   c. Rickets   d. Osteomalacia
13. How many pairs of cranial nerves are present in man?
a. 12   b. 31   c. 40   d. 10
14. Which one of the following plant is extensively used as green manure in Nepal?
a. *Crotalaria juncea*   b. *Brassica campestris*
c. *Solanum nigrum*   d. *Zea mays*
15. The vectors used in genetic engineering are
a. Plasmids   b. Cosmids   c. Bacteriophages   d. All

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