

Entrance Mark Division

- ◆ Student has to score 33 marks in the entrance exam conducted by the Purbanchal University to be eligible and get admission in Purbanchal University affiliated college.
- ◆ In case of any entrance appeared student achieve equal marks in entrance exam, then respective student's immediate exam result will be taken in consideration while publishing the entrance result.
- ◆ Objective questions of total weightage 100 marks will be asked in entrance exam as per entrance syllabus.

Group A		
S.N	Subject	Mark Weightage
1	English	15
2	Mathematics	35
3	Physics	30
4	Chemistry	20

* Group A

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

ELIGIBILITY CRITERIA: FOR BE CIVIL AND BE ELECTRICAL:

Eligibility Criteria to appear in Entrance Exam of Purbanchal University

1. Must have completed I.Sc. or +2 (Science) or A level or Diploma in Engineering (3 Years) with minimum 45% or minimum "C" Grade in all subjects with CGPA 2.0 or more.

REQUIRED DOCUMENT TO FILL THE ENTRANCE FORM

1. SLC/SEE or equivalent Marksheet and character certificate photocopy
2. I. SC. or +2 (Science) or Diploma in Engineering or equivalent Marksheet and character certificate photocopy
3. Admit card of class 12 if class 12 result has not been published
4. 2 pcs recent passport size photo of the candidate
5. Entrance Exam Fee Rs 1500

Purbanchal University

Faculty of Science and Technology

Faculty of Engineering and Technology

Syllabus for Entrance Exam (Bachelor's Level)
Effective from Academic Session 2076-77

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

Subject: English

F.M: 15

Unit wise weightage

Units	Course content	Full marks
A	Phonological questions, dealing with phonemes, Phonemic symbols and word stress	3
B	Lexical 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	10

UNIT A

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

UNIT B

- ◆ Lexical 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.

Contents

1. Use of Pronouns
2. Relative Pronouns
3. Sound
4. Stress

5. Intonation
6. Subject - Verb Agreements
7. Voice
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

Unit wise weightage

Units	Course content	Full marks
1	Set and functions	5
2	Algebra	5
3	Trigonometry	10
4	Coordinate geometry	5
5	Calculus	5
6	Vectors	5

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, in-center, 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.

Unit wise weightage

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

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, center of mass, center 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, Modulus 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.

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 phenomena
- ◆ 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.

6. 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.
- ◆ Radioactivity, Decay law, Half-life period.
- ◆ Nuclear fission and fusion.
- ◆ Semiconductors, junction diode.

Unit wise weightage

Units	Course content	Full marks
1	States of matter	2
2	Atomic structure	3
3	Oxidation and reduction	2
4	Periodic table	2
5	Hydrogen, oxygen, ozone and water	3
6	Introduction to organic chemistry and hydrocarbon	2
7	Volumetric analysis and ionic equilibrium	2
8	Aldehydes and ketones	2
9	Iron	2

1. STATES OF MATTER

- ◆ The gas laws (Boyles law Charle'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.

3. OXIDATION AND REDUCTION

- ◆ Classical concept of oxidation.
- ◆ Electronic concept of oxidation and Reduction.
- ◆ Oxidizing 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.
- ◆ Preparation of alkynes and its properties with H_2, X_2, HX, H_2O, O_3 Acidic nature, Action with ammoniacal $AgNO_3$ with alkaline kinetic and polymerization reaction.

7. VOLUMETRIC ANALYSIS AND IONIC EQUILIBRIUM

- ◆ Acidimetry and alkalimetry
- ◆ 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
- ◆ Ionization 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 Tollens 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, Mohns saclt.

Chemistry Entrance Model Questions

CHEMISTRY : SET-1

- The Latin name of mercury is
a) Stannum b) Plumbum c) Hydragyrum d) Cuprum
- The reaction $3\text{H}_2(\text{g}) + \text{N}_2(\text{g}) \rightleftharpoons 2\text{NH}_3(\text{g})$ is an example of
a) Reversible reaction b) Irreversible reaction
c) Redox reaction d) Polymerization
- Active mass of reactant is equivalent to
a) Normal concentration b) Molar concentration
c) g/L d) None of these
- Decinormal solution means
a) N/10 b) N/20 c) N/2 d) None of these
- Electronic configuration of Na is
a) $1s^2 2s^2 2p^6 3s^2$ b) $1s^2 2s^2 2p^6 3s^1$ c) $1s^2 2s^2 2p^6$ d) $1s^2 2s^2 2p^5$
- Carbon is placed in group
a) IA b) IIB c) IIIA d) IVA
- Water is liquid due to
a) Hydrogen bonding b) Ionic bond
c) Covalent bond d) Vander Waal's force
- The oxidation number of N in NH_3 is
a) +3 b) -3 c) +2 d) -2
- Which of the following is the best oxidizing agent
a) H_2 b) Na c) Cl_2 d) Ca
- Who gave the laws of electrolysis?
a) Newton b) Faraday c) Avogadro d) Thomson
- Half life period of first order reaction is
a) Proportional to concentration b) Independent of concentration
c) Proportional to (concentration)² d) None of these
- Alkali metals lies in
a) s-block b) p-block c) d-block d) f-block
- Froth floatation process is generally used for the concentration of
a) Oxide ore b) Carbonate ore
c) Sulphide ore d) Nitrate ore
- Calamine is the ore of
a) Zinc b) Copper c) Iron d) Mercury
- The molecular formula of Rinmann's green is
a) Na_2ZnO_2 b) CoZnO_2 c) CaZnO_2 d) None of these
- Which of the following is oil of vitriol
a) HNO_3 b) H_2SO_4 c) HCl d) H_2CO_3
- Which of the following is laughing gas
a) NO b) NO_2 c) N_2O d) N_2O_5

18. Bromine is manufacture from
a) Sea weds b) Common salt c) Carnallite d) Wood
19. The IUPAC name of $\text{CH}_3-\text{CH}=\text{CH}_2$
a) Ethene b) Propene c) Propyne d) Ethyne
20. The general formula of Alkene is
a) $\text{C}_n\text{H}_{2n+2}$ b) C_nH_{2n} c) $\text{C}_n\text{H}_{2n-2}$ d) $\text{C}_n\text{H}_{2n+1}$
21. Electrophiles are
a) Lewis acid b) Lewis base
c) Reducing agent d) Both a & b
22. Nitration of benzene is
a) Electrophilic addition b) Electrophilic substitution
c) Elimination d) Both a & b
23. Calcium carbide reacts with water to give
a) Acetylene b) Ethylene c) Ethane d) Methane
24. PVC is an example of
a) Addition polymer b) Condensation polymer
c) Mixed polymer d) Both a & b
25. Which of the following thermosetting polymer?
a) PVC b) Teflon c) Nylon 6,6 d) Bakelite

ENGLISH : SET 1

1. Have you seen _____ one eyed man?
a) a b) an c) the d) nothing
2. My father lives in Biratnagar _____ my brother.
a) to b) by c) with d) of
3. I'm tired and hungry, _____?
a) Am I? b) aren't I? c) is it? d) amn't I?
4. Prakash! Clean the room _____.
a) himself b) yourself c) ourselves d) ownself
5. Hari drives a car, but he _____ a bus.
a) doesn't drives b) doesn't drive
c) don't drives d) didn't drives
6. If you want to pass, _____ study hard.
a) you would b) you might
c) you should have d) you must
7. The negative of "He likes it too." Is _____
a) He doesn't like it either. b) He doesn't like it too.
c) He likes it either. d) Nor does he like it.
8. _____ his old age he is living a very active life.
a) because b) because of c) despite d) although
9. Did you _____ your brother yesterday?
a) met b) meets c) meeting d) meet
10. The teacher asked the new student, " _____?" He replied that his

name was Samir.

- a) What is his name b) What is your name
c) What was your name d) What his name is
11. Tourists are attracted by the architecture of Krishna Mandir. That is to say the architecture of Krishna mandir _____ tourists.
a) attracts b) attract c) attracted d) has attracted
12. I have _____ my chest x-rayed.
a) been b) made c) had d) already
13. He spoke "slowly" slowly is here used as _____.
a) noun b) pronoun c) adverb d) adjective
14. The feminine gender of deer is _____.
a) bitch b) mare c) ewe d) doe
15. A dog barks whereas a lion _____.
a) cackles b) giggles c) roars d) hisses
16. The meaning of "to laugh at" is _____.
a) to make fun of b) to break out
c) to take up with d) to wait up for
17. He looks _____ he is from another world.
a) like b) as though c) as d) nothing
18. The young one of cat is called _____.
a) baby b) fawn c) boy d) kitten
19. The past participle of arise is _____.
a) arose b) aroded c) arised d) arisen
20. The person, _____ is standing at the corner, is my uncle.
a) that b) who c) he d) whom
21. Specialist in female ailments: _____
a) obstetrician b) gynecologist
c) dermatologist d) physician
22. Anthropology is related to mankind, whereas ecology is related to _____.
a) heavenly bodies b) insects c) environment d) colour
23. A camera _____.
a) rustles b) creaks c) clicks d) stirs
24. The antonym of fruitful is _____.
a) hostile b) state c) futile d) reserve
25. The synonym of abandon is _____.
a) leave b) subside c) confound d) mean

PHYSICS : SET 1

- The dimensional formula for pressure is:
a) $[ML^{-2}T^{-2}]$ b) $[ML^{-1}T^{-1}]$
c) $[MLT^{-2}]$ d) $[ML^{-1}T^{-2}]$
- When a bus starts suddenly, the upper part of sitting passenger experiences a jerk in backward direction due to:
a) Inertia of rest b) Inertia of motion
c) Change in momentum d) Centripetal force
- The value of 'g' depends on:
a) Mass of earth only b) Radius of earth only
c) Mass of radius of earth d) Is constant and independent of mass and radius of earth
- In hydrogen atom, the electron is moving the nucleus with a velocity $2.2 \times 10^6 \text{ ms}^{-1}$ in an orbit of radius $0.53 \text{ \AA}$. the acceleration of the electron is:
a) $9 \times 10^{18} \text{ ms}^{-2}$ b) $9 \times 10^{22} \text{ ms}^{-2}$ c) $9 \times 10^{-22} \text{ ms}^{-2}$ d) $9 \times 10^{12} \text{ ms}^{-2}$
- The product of moment of inertia & angular acceleration is :
a) Angular momentum b) Torque c) Work d) Force
- Steel is preferred for making springs over copper because:
a) Steel is cheaper b) Young's modulus of copper is less than steel
c) Young's modulus of steel is more than copper
d) Steel is less likely to be oxidized
- Bernoulli's principle is based on the conservation of:
a) Mass b) Momentum c) Velocity d) Energy
- Heat required to convert 1gm of ice into steam at 100°C is :
a) 100cal b) 0.01kcal c) 716cal d) 1kcal
- The correct relation for emissive power & temperature is
a) $E \propto T^4$ b) $E \propto T$ c) $E \propto T^2$ d) $E \propto T^4$
- If the gas is allowed to expand adiabatically against external pressure:
a) Its temperature remains constant
b) There is increase in internal energy
c) There is decrease in internal energy
d) Pressure remains constant
- A Carnot engine takes 300 calories of heat from a source at 500k & rejects 150 calories of heat to the sink. The temperature of sink is:
a) 400k b) 250k c) 150k d) 100k
- The focal length of plane mirror is:
a) Zero b) 1m c) Infinity d) Depends on size of mirror
- A person can see nearer objects but cannot see far object, the eye of person is
a) Myopic eye b) Hypermetropic eye
c) Presbyopic eye d) Cylindrical eye

14. Young's double slit experiment is performed inside water, the fringe width will:
 - a) Increase b) Decrease c) Remains same d. Cannot be explained
15. An unpolarised beam of intensity I_0 falls on a Polaroid. The intensity of emergent light is:
 - a) I_0 b) $I_{0/4}$ c) $I_{0/2}$ d) Zero
16. The fundamental unit of charge is :
 - a) 1coulomb b) 1.6×10^{-19} coulomb
 - c) 3.2×10^{-19} coulomb d) 9.1×10^{-31} coulomb
17. Persistence of hearing is:
 - a) 1ses b) 1/5 sec c) 1/10 sec d) 1/15 sec
18. If the power of heater is 1watt & 1ampere of current is passed through it, the resistance is:
 - a) 4200 k ohm b) 4200 ohm c) 1 ohm d) 0.1 ohm
19. A fuse wire must have:
 - a) High resistivity & high melting point
 - b) High resistivity & low melting point
 - c) low resistivity & high melting point
 - d) low resistivity & low melting point
20. soft iron is a suitable material for the core of transformer because it has:
 - a) high hysteresis, high permeability
 - b) high hysteresis, low permeability
 - c) low hysteresis, high permeability
 - d) hysteresis, high permeability
21. A transformer is employed to reduce 220v to 11v. The primary coil draws a current of 5A & secondary draws 90A. The efficiency of the transformer is:
 - a) 20% b) 40% c) 70% d) 90%
22. The phenomenon of photoelectric effect was explained by:
 - a) Einstein b) Maxwell c) Bohr d) Faraday
23. In p-type semiconductor, the conduction is mainly due to the flow of:
 - a) Electrons b) Holes
 - c) Negative ions d) Electrons & holes both
24. The synthesis of two lighter nuclei into a heavier one is called:
 - a) Nuclear fission b) Nuclear fusion
 - c) Pair annihilation d) Anti-break process
25. Maximum ionization energy is exhibited by:
 - a) X-rays b) Gamma rays c) Alpha rays d) Beta rays

MATH : SET 1

- If S be a set with n elements, then power of set has:
 - n elements
 - $\frac{n(n+1)}{2}$
 - 2^n elements
 - 2^{n+1} elements
- The domain of the function $f(x) = \frac{1}{\sqrt{4-x^2}}$
 - {2, -2}
 - [-2, 2]
 - (-2, 2)
 - None
- The function $f:N \rightarrow N$, where N is the set of natural numbers by $f(x) = 2x + 3$ is
 - Surjection
 - Many – to one
 - One to one
 - None
- The general solution of $\tan x = 1$
 - $n\pi + \frac{\pi}{4}$
 - $\frac{n\pi}{3} + \frac{\pi}{12}$
 - $n\pi$
 - $n\pi \pm \frac{\pi}{4}$
- If $\sin^{-1} x = \frac{\pi}{5}$ then $\cos^{-1} x$ is equals
 - $\frac{\pi}{10}$
 - $\frac{3\pi}{10}$
 - $\frac{5\pi}{4}$
 - None
- The vectors $2\vec{i} + 3\vec{j} + \vec{k}$ and $-4\vec{i} - 6\vec{j} - 2\vec{k}$ are:
 - Equal
 - same magnitude
 - parallel
 - Perpendicular
- If $|\vec{a} + \vec{b}| = |\vec{a} - \vec{b}|$ then $\vec{a}$ and $\vec{b}$ are
 - Perpendicular
 - Equal
 - Parallel
 - None
- The sum of $2 + 4 + 6 + 8 + \dots, \dots, + n$ is given by:
 - $n(n+1)$
 - $\frac{n(n+1)}{2}$
 - n^2
 - $\frac{n(n+1)2}{4}$
- The sum of the series $3 + \sqrt{3} + 1 + \dots, \dots$, is:
 - $\frac{\sqrt{3}}{\sqrt{3}-1}$
 - $3\sqrt{3}$
 - $\frac{3\sqrt{3}}{\sqrt{3}-1}$
 - $\frac{3\sqrt{3}}{\sqrt{3}+1}$
- If $A = \begin{pmatrix} 1 & 3 \\ 2 & 4 \end{pmatrix}$, then $|A|$
 - 11
 - 10
 - 2
 - 4
- The value of i^2 in complex number will be:
 - 1
 - 1
 - 0
 - ± 2
- When $f(x) = x^5 - 3x^2 + 2x - 1$ is divided by $g(x) = x - 1$ the remainder will be:
 - 0
 - 1
 - 1
 - 2
- The centroid of the triangle whose vertices are (2, 0), (4, 4) and (6, 2) is:
 - (4, 2)
 - (2, 4)
 - (-4, -2)
 - (2, -4)
- The distance between the parallel lines $3x + 5y = 11$ and $3x + 5y = -23$ is:
 - $\sqrt{34}$
 - 34
 - $\frac{1}{\sqrt{34}}$
 - $\frac{1}{34}$

15. The area of circle centred at (1, 2) and passing through (4, 6) is:
 a) 10π b) 6π c) 15π d) 25π
16. The eccentricity of ellipse is $3x^2 + 4y^2 = 36$
 a) $\frac{1}{3}$ b) $\frac{1}{4}$ c) $\frac{1}{5}$ d) $\frac{1}{2}$
17. The d.c.s (direction cosines) of y-axis is:
 a) (1, 0, 0) b) (0, 1, 0) c) (0, 0, 1) d) (1, 1, 0)
18. $\lim_{x \rightarrow 0} \frac{\sin x}{\sqrt{x}}$ is equal to
 a) 0 b) $\frac{1}{2}$ c) 1 d) doesn't exist
19. If $y = x^x$, $x > 0$ then $\frac{dy}{dx}$ is
 a) $\log x$ b) $1 + \log x$ c) $x^2 \log x$ d) $x^x (1 + \log x)$
20. The derivative of even function is always:
 a) An odd function b) an even function
 c) doesn't exist d) None of these
21. The sum of two non-zero numbers is 4. The minimum value of sum of their reciprocals:
 a) $\frac{1}{4}$ b) $\frac{1}{2}$ c) 0 d) 1
22. $\int \log x \, dx$ will be: $\rightarrow$
 a) $x \log x$ b) $x \log_e x$ c) $\frac{\log x}{x}$ d) $x \log_e \frac{e}{x}$
23. $\int \frac{dx}{a^2 + x^2} = ?$
 a) $\frac{1}{a} \tan^{-1} \frac{x}{a} + c$ b) $\sin^{-1} \frac{x}{a} + c$ c) $\frac{1}{2a} \log \frac{(a+x)}{(a-x)} + c$ d) None
24. The area of the region bounded by the curve $y = 3x^2 - 2$ between $x = 1$ to $x = 4$ is
 a) 75 b) 57 c) 65 d) 70
25. If $p(n, 4) = 20 p(n, 2)$. The value of n will be:
 a) 2 b) -2 c) 7 d) -7



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Use Gel Pen Only

Proper erasing is required in case of correction

Do not write anything except in this specified area

A Answering Area

Mark your answers by blackening the appropriate bubble against each question

B

Official Use

English					Math					Chemistry					Physics				
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Code

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ANSWER SHEET

CHEMISTRY		ENGLISH		MATHEMATICS		PHYSIC	
1	C	1	A	1	C	1	D
2	A	2	C	2	C	2	A
3	B	3	B	3	C	3	C
4	A	4	B	4	A	4	B
5	B	5	B	5	B	5	B
6	D	6	D	6	A	6	C
7	A	7	A	7	A	7	D
8	B	8	C	8	A	8	C
9	C	9	D	9	C	9	D
10	B	10	B	10	C	10	C
11	B	11	A	11	B	11	B
12	A	12	C	12	C	12	C
13	C	13	C	13	A	13	A
14	A	14	D	14	A	14	B
15	B	15	C	15	D	15	C
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17	C	17	B	17	B	17	C
18	C	18	D	18	A	18	C
19	B	19	D	19	D	19	B
20	B	20	B	20	A	20	C
21	A	21	B	21	D	21	D
22	B	22	C	22	B	22	B
23	A	23	C	23	A	23	B
24	A	24	C	24	B	24	B
25	D	25	A	25	C	25	C

Frequently used Integral formula

- $\int \frac{dx}{x^2+a^2} = \frac{1}{a} \tan^{-1} \frac{x}{a} + c$
- $\int \frac{dx}{x^2-a^2} = \frac{1}{2a} \log \frac{x-a}{x+a} + c$
- $\int \frac{dx}{a^2-x^2} = \frac{1}{2a} \log \frac{a+x}{a-x} + c$
- $\int \frac{dx}{\sqrt{x^2+a^2}} = \log (x + \sqrt{x^2+a^2}) + c$
- $\int \frac{dx}{\sqrt{x^2-a^2}} = \log (x + \sqrt{x^2-a^2}) + c$
- $\int \sqrt{a^2+x^2} dx = \frac{x\sqrt{a^2+x^2}}{2} + \frac{a^2}{2} \log(x + \sqrt{a^2+x^2}) + c$
- $\int \sqrt{x^2-a^2} dx = \frac{x\sqrt{x^2-a^2}}{2} - \frac{a^2}{2} \log(x + \sqrt{x^2-a^2}) + c$
- $\int \sqrt{a^2-x^2} dx = \frac{x\sqrt{a^2-x^2}}{2} + \frac{a^2}{2} \sinh^{-1} x/a + c$
- $\int uv dx = u \int v dx - \int \left(\frac{du}{dx} \int v dx \right) dx$
- $\int \frac{f'(x)}{f(x)} dx = \log f(x) + c$
- $\int \tan x dx = \log \sec x + c$
- $\int \cot x dx = \log \sin x + c$
- $\int \operatorname{cosec} x dx = \log \tan \frac{x}{2} = \log (\operatorname{cosec} x - \cot x) + c$
- $\int \sec x dx = \log \tan \left(\frac{x}{2} + \frac{\pi}{4} \right) = \log (\sec x + \tan x) + c$

Some important formula and equations in Physics

- Differential equation of free oscillation: $\frac{d^2x}{dt^2} + \omega^2 = 0$
- Differential equation of damped oscillation:
$$\frac{d^2x}{dt^2} + \frac{b}{m} \frac{dx}{dt} + \omega^2 x = 0$$
- Differential equation of forced oscillation:
$$\frac{d^2x}{dt^2} + \frac{b}{m} \frac{dx}{dt} + \omega^2 x = f_0 \cos \omega t$$
- Intensity of wave: $I = 2\pi^2 f^2 R^2 \rho v$
- Mean free path $\lambda = \frac{4V}{S}$
- Reverberation Time: $T = \frac{0.16V}{aS}$
- Intensity of light due to the superposition of two waves:
 $I = a_1^2 + a_2^2 + 2a_1 a_2 \cos \phi$
- For constructive interference, path difference
 $= n\lambda, n=0,1,2,3,\dots$
- For destructive, path difference $= (2n-1)\lambda/2, n=1,2,3,\dots$
- Condition for nth order maxima in diffraction due to grating:
 $(a+b)\sin \theta = n\lambda$
- For quarter-wave plate, $(\mu_o - \mu_e)t = \lambda/4$; -ve uniaxial crystal and $(\mu_e - \mu_o)t = \lambda/4$; +ve uniaxial crystal.
- For half-wave plate, $(\mu_o - \mu_e)t = \lambda/2$; -ve uniaxial crystal and $(\mu_e - \mu_o)t = \lambda/2$; +ve uniaxial crystal.
- Equivalent focal length due to the combination of two thin lenses: $f = \frac{f_1 f_2}{f_1 + f_2 - d}$
- Acceptance angle: $i = \sin^{-1} \left(\sqrt{\frac{\mu_1^2 - \mu_2^2}{\mu_o^2}} \right)$
- Numerical aperture, N.A. $= \mu_1 \sqrt{2\Delta}$
- Energy stored in electric field: $U_E = \frac{1}{2} CV^2$ and electric energy density $u_e = \frac{1}{2} \epsilon_0 E^2$
- Energy stored in magnetic field: $u_B = \frac{1}{2} LI^2$ and magnetic energy density $u_B = \frac{B^2}{2\mu_o}$
- R-L circuit: (a) rise of current $I = I_0 (1 - e^{-Rt/L})$
(b) fall of current $I = I_0 e^{-Rt/L}$
- R-C circuit: (a) charging current $I = I_0 (1 - e^{-t/RC})$
(b) discharging current $I = -I_0 e^{-t/RC}$
- Displacement current $i_d = \epsilon_0 A \frac{dE}{dt}$ and displacement current density $j_d = \epsilon_0 \frac{dE}{dt}$
- 11 conductivity $\sigma = \frac{1}{\rho} = \frac{ne^2 \tau}{m}$
- Schrodinger's Wave equations
a) $i\hbar \frac{d\Psi}{dt} = \frac{\hbar^2}{2m} \nabla^2 \Psi + V\Psi$ (Time - dependent)
b) $\nabla^2 \Psi + \frac{2m}{\hbar^2} (E - V)\Psi = 0$ (Time - dependent)
- Energy of a particle in an infinite potential well: $E_n = \frac{n^2 \pi^2 \hbar^2}{2ma^2}$
- Transmission co-efficient: $T = 16 \frac{E}{V_o} \left(1 - \frac{E}{V_o}\right) e^{-2\beta a}$
- Maxwell's equations in free space
a) Integral form
i) $\oint \mathbf{E} \cdot d\mathbf{a} = \frac{q}{\epsilon_0}$ iii) $\oint \mathbf{E} \cdot d\mathbf{a} = 0$
ii) $\oint \mathbf{E} \cdot d\mathbf{l} = -\frac{\partial \phi_E}{\partial t}$ iii) $\oint \mathbf{B} \cdot d\mathbf{l} = \mu_o \left(I + \epsilon_0 \frac{\partial \phi_E}{\partial t} \right)$

प्रवेश परीक्षाका परीक्षार्थीहरुलाई निर्देशन

१. परीक्षार्थीहरुले परीक्षा दिन आउँदा आफ्नो प्रवेशपत्र अनिवार्य रूपमा लिएर आउनुपर्नेछ ।
२. परीक्षार्थीहरुले केन्द्राध्यक्षद्वारा निर्देशित सीट-प्लानअनुसार तोकिएको स्थानमा बस्नु पर्नेछ ।
३. परीक्षा सञ्चालनका लागि केन्द्राध्यक्ष, निरीक्षकहरुद्वारा गरिएका निर्देशनहरु परीक्षार्थीको कर्तव्य हुनेछ । कर्तव्य पालन नगर्ने परीक्षार्थीलाई निष्काशन तथा निजको परीक्षा रद्द गर्न समेत सकिनेछ ।
४. प्रवेश परीक्षा प्रारम्भ भएको ३० मिनेट बढी ढिलो गरी परीक्षा दिन आउने परीक्षार्थीलाई परीक्षामा सम्मिलित गराइने छैन ।
५. परीक्षार्थीहरुले परीक्षाहलमा १) पुस्तक २) नोट ३) चिट ४) मोबाइलफोन ५) स्मार्ट घडि ६) प्रोग्रामेबल क्याल्कुलेटर ७) पर्स ८) पकेट कम्प्युटर आदि निषेधित वस्तुहरु साथमा राख्न पाउने छैन । परीक्षार्थीले सामान्य साइन्टीफिक क्याल्कुलेटर प्रयोग गर्न पाउने छन् ।
६. परीक्षार्थीहरुले परीक्षा कोठामा हल्ला गर्ने, एक आपसमा कुराकानी गर्ने, एक अर्काको प्रश्नपत्र, उत्तर पुस्तिका देखाउन र सांकेतिक रूपमा सम्पर्क राख्न पाउने छैन । यस्ता क्रियाकलापहरु गरिएको पाइएमा परीक्षाबाट निष्कासन गरिनेछ ।
७. परीक्षार्थीहरुले Answer Sheet मा विश्वविद्यालयले तोकेको Gel Pen ले मात्र लेख्नुपर्नेछ ।
८. परीक्षा दिँदा परीक्षार्थीहरुले आवश्यक च्यगनज गर्न परेमा Question Booklet मै गर्न सकिनेछ ।
९. Answer Sheet मा केही केरमेट गर्न पाउने छैन । Answer Sheet मा परीक्षार्थीले आफ्नो नाम, रोल नं. र दस्तखत गर्दा ध्यानपूर्वक सहि ठाउँमा सहि विवरण भर्नुपर्नेछ । कुनै कारण गल्ती भएमा नयाँ ब्लकधभच कजभभत दिइने छैन ।
१०. Question सम्बन्धित निरीक्षकसँग कुनै पनि सोधपुछ गर्न पाइने छैन ।
११. परीक्षार्थीहरुले परीक्षा प्रारम्भ भएको १ घण्टाभन्दा अगाडि आफ्नो सिट र परीक्षा भवन छाड्न पाइने छैन ।
१२. परीक्षार्थीहरुले Question Booklet र Answer Sheet अनिवार्य रूपमा बुझाउनु पर्नेछ ।