



Kathmandu University  
School of Science  
Undergraduate Program Admission 2022/2023

**Information on**  
**Entrance exam, Syllabus and Sample questions 2022**

**August 2022**

**KATHMANDU UNIVERSITY**  
School of Science

Undergraduate Admission 2022  
Entrance exam, Syllabus and Sample questions 2022

Kathmandu University calls for application for admission in Undergraduate Programs in School of Science for the academic year 2022/2023. The rules and regulations for the entrance exam, syllabus and sample questions are highlighted below. However, Candidates are strongly suggested to read the ‘**Application call 2022**’ and ‘**Procedure for Application, Admission and Payment 2022**’ carefully to make sure that the candidate is qualified for the application/admission to the specific program.

All candidates seeking admission in the undergraduate programs for intake 2022/2023 of School of Science shall appear in the entrance exam 2022 and obtain the score above the minimum threshold required. Candidates are tested for their abilities in either PCM (Physics, Chemistry, and Mathematics) or PCB (Physics, Chemistry, and Biology) depending on the program in which the candidate is seeking admission. Admission is offered in merit basis.

The entrance exam is conducted only after the call for admission and candidates can choose one of the test centers as listed in the application portal. **The test is paper based and not available ONLINE.**

This document describes the syllabus for various subjects. Candidates are strongly recommended to go through this document carefully to get better prepared for the test. For updated information, one should always check KU website <http://www.ku.edu.np> and <https://apply.ku.edu.np/sos>

Based on the program the candidate is seeking admission, he/she can choose either PCM or PCB test groups. One should be clear about the choice of the program before selecting the test group. Biology group in +2 (equivalent) can choose for PCM test only when they have extra Mathematics.

Program	Test Group
B.Tech. in Environmental Engineering	<b>PCM</b> (Physics, Chemistry and Mathematics)
B.Sc. in Computer Science	
B.Sc. in Computational Mathematics	
B.Sc. in Environmental Science	<b>PCM or PCB</b>
B.Tech. in Biotechnology	
B. Sc. in Bioinformatics	
B.Sc. in Agriculture	<b>PCB</b> (Physics, Chemistry and Biology)

## 1. Overview of entrance exam

- 1.1 Total duration of each test is **two hours** and has **120 multiple choice questions** in total.
- 1.2 The test contains three parts one for each in PCM or PCB. There are **40 multiple choice questions in each part**. The questions are distributed uniformly across the topics of the syllabi provided at the end of this document.
- 1.3 Each questions carry equal marks
- 1.4 A candidate shall at least obtain minimum score (university will set the score) for being eligible to be offered admission in respective programs.
- 1.5 The score list of the candidates will be published in university website.

## 2. Registering for the Test

- 2.1 Opening of the registration is announced with the admission call notice. The registration for entrance exam starts on **21 August 2022**. The registration closes on **10 September 2022**. The application for the admission is ONLINE.
- 2.2 Fill the online application form available at <https://apply.ku.edu.np/sos>. A **valid email id** is required for online application. **Confirmation link** and **confirmation code** will be sent by email. Be sure to click on the confirmation link and enter the confirmation code for online application. Use the login credentials provided to log into the online application system and complete online admission form. *(If confirmation link is not found in inbox check it in junk/spam/promotions folder as well.)*
- 2.3 Pay the required application processing fee. Fees can be paid using any method specified in the admission call notice. Refer **Procedure of Application, Admission and Payment 2022** document for details. Upload/Provide the evidence of fee payment through application portal.

2.4 Download and **color print** the **admission card** after it becomes available in your registered account. Exam center, date and time for the entrance test are mentioned in admission card. Appear at test center accordingly.

2.5 **Any additional information or instruction if needed will be published in university website at appropriate time.**

### **3 Appearing in the Entrance Test**

3.1 Appear in the entrance test on the exact center, date and time as notified. Note that the exam is NOT AVAILABLE ONLINE. Note the following for appearing in the test:

- 3.1.1 Be sure to arrive well ahead of time at exam centers. Arrive at least 30 minutes before the commencement of the examination.
- 3.1.2 Any candidate arriving more than 15 minutes late of his/her test time may not be allowed to sit for the test. Scheduled time will not be extended for delayed candidate.
- 3.1.3 Do not forget to bring your color **printed admission card** and **original personal identification** (the one that was uploaded at the time of filling the application form). Scanned copy and photo (printed copy or non-printed copy) are not accepted as original ID.
- 3.1.4 Only pens and pencils are allowed in the test room.
- 3.1.5 Calculator is allowed. Other electronic items and writing materials are not permitted inside the examination hall. Mobile phone, wireless devices, or any other portable electronic devices are **strictly prohibited**.
- 3.1.6 Attempting to cheat in the entrance exam, by any means, or failing to comply with invigilators' instructions may **disqualify the candidates** from the admission process.
- 3.1.7 The rules mentioned in admission card comply besides general exam rules.
- 3.1.8 Failing to comply with the examination rules and attempt of use of any unfair means in the examination will result in disqualification from the admission process.

## **Syllabus for the entrance exam (Physics, Chemistry, Mathematics, Biology)**

### **Syllabus for Physics**

#### **A. Mechanics:**

1. Physical Quantity
2. Kinematics
3. Dynamics
4. Energy
5. Rotational motion
6. Gravitation
7. Structure and Properties of Matter
8. Elasticity
9. Viscosity
10. Surface tension

#### **B. Heat & Thermodynamics:**

11. Heat and temperature
12. Transmission of heat
13. Basic assumption of kinetic theory of gasses
14. Thermodynamics

#### **C. Optics:**

15. Reflection
16. Refraction
17. Speed of light
18. Dispersion of light
19. Optical Instrument
20. Photometry

#### **D. Waves:**

21. Wave motion
22. Sound
23. Electromagnetic waves

#### **E. Electrostatics and D. C. Circuits:**

24. Simple Electrostatic Phenomenon
25. Charge flow
26. Resistance
27. Effect of Current
28. Capacitors

#### **F. Magnetic field and Current:**

29. Magnetic field
30. Force on conductor
31. Magnetic materials
32. Electromagnetic induction
33. Alternating current

#### **G. Modern Physics:**

34. Electron
35. Photons
36. Electronic
37. Atoms
38. Nucleus
39. Radioactivity
40. Elementary particles

## Syllabus for Chemistry

### A. General & Physical Chemistry:

1. Language of Chemistry
2. Gaseous state of matter
3. Liquid state of matter
4. Solid state of matter
5. Laws of Stoichiometry
6. Avogadro's Hypothesis and its important applications
7. Atomic structure
8. Quantum numbers
9. Chemical bonding
10. Oxidation and Reduction
11. Acids, Bases and Salts
12. Acidimetry and Alkalimetry
13. Periodic Table
14. Electrochemistry
15. Electrode potential
16. Chemical Kinetics
17. Chemical Equilibrium
18. LeChatelier's Principle
19. Chemical Thermodynamics
20. Entropy and spontaneity

### B. Inorganic Chemistry:

21. Hydrogen, Oxygen and Nitrogen
22. Carbon
23. Sulphur and its compound
24. Halogen and halogen acids
25. Introduction to Metals
26. Alkali and alkaline earth metals
27. Coinage metals
28. Heavy metals

### C. Organic Chemistry:

29. Introduction to Organic Chemistry
30. Hydrocarbons
31. Organic halogen compounds
32. Alcohols
33. Ethers
34. Carbonyl Compounds
35. Carboxylic Acids
36. Amines
37. Aromatic Hydrocarbons
38. Aniline and Nitrobenzene
39. Carbohydrates, Proteins, Nucleic Acids, Lipids
40. Polymers, Pesticides, Dyes and Drugs

## **Syllabus for Mathematics**

- 1 Representation of Data
- 2 Measures of Location and Spread
- 3 Probability
- 4 Permutation and Combination
- 5 Probability Distributions
- 6 Binomial Distributions
- 7 Expectation and Variance of a random variable
- 8 Normal Distribution
- 9 Surds and indices
- 10 Functions and Graphs
- 11 Quadratics and Inequalities
- 12 Differentiation
- 13 Application of Differentiation
- 14 Sequences
- 15 Binomial Theorem
- 16 Trigonometry
- 17 Extending Differentiation
- 18 Vectors
- 19 Geometric Sequences
- 20 Second Derivative
- 21 Integration
- 22 Volume of revolution
- 23 Polynomial
- 24 The Modulus function
- 25 Exponential and Logarithmic function
- 26 Differentiating Exponential and Logarithmic Functions
- 27 Differentiating Trigonometric Function
- 28 Determinants
- 29 Matrices
- 30 Equation of Straight Lines
- 31 A pair of lines
- 32 System of linear equations
- 33 System of Linear Inequalities and Graphs
- 34 Complex Numbers
- 35 Limits and Continuity
- 36 Coordinate Space
- 37 Plane
- 38 Concept of Sets
- 39 Relation
- 40 Functions

## **Syllabus for Biology**

1. Introduction to Biology
2. Cell, cell-division and life components
3. Origin of Life
4. Theory of Evolution by Natural Selection
5. Human Evolution
6. Heredity and variation
7. Regulation of replication, transcription, translation and expression of genetic material
8. Concept of Taxonomy
9. Monera
10. Viruses
11. Protista
12. Mycota
13. Plantae
14. Morphology, Reproduction, Growth and Development of Flowering Plant
15. Photosynthesis
16. Transpiration
17. Animalia
18. Study of Earthworm
19. Study of Frog
20. Animal Tissues
21. Animal Nutrition and Digestive system
22. Respiratory system
23. Circulation of body fluids
24. Excretion and osmoregulation
25. Nervous system
26. Endocrine system
27. Animal reproduction and embryonic development
28. Aminocentesis
29. Growth, Repair, Regeneration, Ageing and Death
30. Animal Behaviour
31. Concept of ecosystem
32. Environmental pollution
33. Green-house effect and global warming
34. Conservation of Natural resources
35. Pesticides
36. Bio-fertilizers and biological pest control
37. Biotechnology
38. Domestication of plants and crop improvements
39. Bioenergy
40. Mental health, addiction and community health



## Sample Questions for the entrance exam

### Section A

1. An object 20 cm high is placed 50 cm in front of a lens whose focal length is 5 cm. Where will the image be located (in cm)?  
[A] 5.13                      [B] 5.56                      [C] 5.72                      [D] 5.93
2. In an adiabatic free expansion  
[A] no heat is transferred between a system and its surroundings.  
[B] the pressure remains constant.  
[C] the temperature remains constant.  
[D] the volume remains constant.

### Section B

1. In benzene, carbon – carbon sigma bond is formed by the overlap of .....orbitals.  
[A]  $sp^3-sp^3$                       [B]  $sp^2-sp^2$   
[C]  $sp^3-s$                       [D]  $sp^2-s$
2. What is the mass of aluminum in 204 g of the aluminum oxide?  
[A] 26 g                      [B] 27 g  
[C] 54 g                      [D] 108 g

### Section C

1. The tendency of an offspring to resemble its parent is known as  
[A] Variation                      [B] Resemblance                      [C] Heredity                      [D] Inheritance
2. The cranial nerve that regulates the heartbeat  
[A] X                      [B] IX                      [C] VIII                      [D] VII

### Section D

1. If  $A = \begin{pmatrix} 3 & 1 \\ -2 & 0 \end{pmatrix}$  and  $B = \begin{pmatrix} 1 & 2 & 1 \\ 0 & 3 & 1 \end{pmatrix}$  then the product  $AB =$   
[A]  $\begin{pmatrix} 3 & 9 & 4 \\ -4 & -2 & -2 \end{pmatrix}$                       [B]  $\begin{pmatrix} 3 & 9 & 4 \\ -2 & -4 & -2 \end{pmatrix}$   
[C]  $\begin{pmatrix} 3 & 9 & 4 \\ -2 & -2 & -4 \end{pmatrix}$                       [D]  $\begin{pmatrix} 3 & 9 & 4 \\ -4 & -4 & -2 \end{pmatrix}$
2. If  $(x + 3), 3x, (4x + 1)$  are in A.P., then the value of x is:  
[A] 3                      [B] 1                      [C] 4                      [D] 5

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### Sample Answer sheet

Name:

Roll no.

Section A	Section B	Section C	Section D
1. [ ]A [√]B [ ]C [ ]D	1. [ ]A [√]B [ ]C [ ]D	1. [ ]A [ ]B [√]C [ ]D	1. [ ]A [√]B [ ]C [ ]D
2. [√]A [ ]B [ ]C [ ]D	2. [ ]A [ ]B [ ]C [√]D	2. [√]A [ ]B [ ]C [ ]D	2. [ ]A [ ]B [√]C [ ]D
3.	3.	3.	3.
4.	4.	4.	4.
40.	40.	40.	40.