

Khulna University of Engineering & Technology

Department of Architecture

B. Arch 1<sup>st</sup> Year Backlog Examination, 2022

Course No: Phy 1125 Course Title: Physics

Full Marks: 210

Time: 03 Hours

- N.B i) Answer any three questions from each section in separate script  
ii) Figures in the right margin indicate full marks

Section-A



1. a) Establish the differential equation of simple harmonic motion and solve it to obtain an expression for the displacement. 12  
b) Show that the energy of a plane progressive wave is given by  $E = 2\pi^2 pr^2 \alpha^2$ ; where the symbols have their usual meaning. 13  
c) A particle executes S.H.M given by the equation  $y=10\sin (10t+\phi)$ . If the time period is 25 seconds and the particle has a displacement of 10 cm at  $t=0$ . find i) Epoch, ii) The phase angle at  $t=5$  sec and iii) The phase difference between two positions of the particle 10 seconds apart. 10
2. a) Obtain the following differential equation of wave motion,  $\frac{d^2y}{dt^2} = v \frac{d^2y}{dx^2}$ ; where the symbols have their usual meanings. 10  
b) What is Doppler's effect? Obtain an expression of the apparent frequency of a note when the source and listener are, i) Moving toward each other, ii) Moving away from each other 15  
c) A motor car sounding a horn at a frequency of 100 Hz, moving away from a stationary observer towards a rigid flat wall with a velocity of 25 km/hr. How many beats per second will be heard by the observer? The velocity of sound in air is 332 m/sec. 10
3. a) Explain what is meant by bel and phon. Discuss the factors influencing loudness. 10  
b) What are the acoustic requirement for a good auditorium? Obtain an expression for the intensity of a plane wave in terms of acoustic pressure. 15  
c) An Air Conditioning Unit operates at a sound intensity level of 75 dB. If it is operated in a room with an existing sound intensity level of 70 dB, what will be the resultant intensity level? 10
4. a) What is ultrasonic wave? Mention the different techniques for production of ultrasonic waves. 10  
b) Give the theory of growth and decay of sound inside a room. Hence obtain an expression for reverberation time of a living room. 15  
c) The room dimension are  $12 \times 8 \times 10 \text{ m}^3$ . Calculate i) The mean free path of the sound wave in the room and ii) The number of reflections per second by the sound wave with the walls of the room. Velocity of sound in air is 332 m/s. 10

Section-B

5. a) What are the common defects in the images produced by a single lens? Which aberration does not occur in monochromatic light? 12
- b) What is achromatism? Derive and discuss the conditions of achromatism for two thin lenses placed in contact. 13
- c) Two thin lenses of focal lengths  $f_1$  and  $f_2$  separated by a distance  $d$  have an equivalent focal length of 50 cm. The combination satisfies the condition for no chromatic aberration and minimum spherical aberration. Find the values of  $f_1$ ,  $f_2$  and  $d$ . Assume that both the lenses are of the same materials. 10
6. a) What is meant by term polarization of light? Distinguish between ordinary light and polarized light. 10
- b) State and explain Brewster's Law. Discuss how can you understand light wave is a transverse wave? 15
- c) A 22 cm long tube containing sugar solution rotates in the plane of polarization by  $11^\circ$ . If the specific rotation of sugar solution is  $66^\circ$ , calculate the strength of the solution. 10
7. a) What is photometry? Discuss luminous intensity and illuminance of a light source and hence deduce the inverse square law. 15
- b) State and prove the Lambert Cosine Law. 10
- c) Using the Beer – Lambert law, find the molar extinction co-efficient for a species that absorbs 0.561 a.u. at  $\lambda_{max}$  of 534.0 nm. The path length of the cuvette is 1.00 cm, and the concentration of the solution is  $1.5 \times 10^{-5}$  M. 10
8. a) Explain additive and subtractive color mixture. 08
- b) Define primary and secondary color. What is meant by complementary color? 07
- c) Discuss axioms of color matching. 12
- d) Draw a color triangle to explain that how the white color is formed. 08



Khulna University of Engineering & Technology

Department of Architecture

B. Arch 1<sup>st</sup> Year Backlog Examination, 2022

Course No: Arch 1131 Course Title: Architecture of Ancient Civilization

Full Marks: 210

Time: 03 Hours

- N.B i) Answer any three questions from each section in separate script  
ii) Figures in the right margin indicate full marks

Section-A



1. a) Mention the geographical features of Ancient Nile Valley. 10  
b) Evaluate the historical and architectural significance of Theban Necropolis. 10  
c) Illustrate the architectural characteristics of the temple of Abu Simbel. 15
2. a) Draw a section of the pyramid of Khufu and annotate its different elements with proper references. 20+5 =25  
b) Discuss in brief the construction process of the pyramid. 10
3. a) Evaluate the different ordering principles of Greek Architecture with necessary details. 23  
b) Differentiate the ordering principles of Greek vs Roman architecture. 12
4. a) Demonstrate the architectural features and characteristics of Ziggurat of Urnammu with neat sketches. 20  
b) Write short notes on: 5 x 3 =15
  - i. Assyrian Architecture
  - ii. Apadana
  - iii. Throne Hall

Section-B

5. a) How you will define ancient civilization according to heritage cycle perspective? 15  
b) "The architectural style of roman civilization influenced by the geography of Rome"- illustrate the statement with an example. 20
6. a) Interpret your own understanding about the exterior and interior features of Pantheon with necessary drawings. 15  
b) "The Forum was considered the heart of Rome"- elaborate <sup>this</sup> the statement according to the functionality of roman forum. 20
7. a) Draw the influences of Gothic Architecture style. 15  
b) "Florence Cathedral is one of the revolutionary example of Italian gothic architecture"- elaborate ~~the~~ <sup>this</sup> statement with an example. 20

8. a) How you will compare between Gothic architecture and Romanesque architecture? Illustrate with necessary drawings. 20
- c) Write short notes on: (any three) 3 x 5 =15
- i. Rid Vault
  - ii. Pointed arch
  - iii. Rose window
  - iv. Flying Buttress



Khulna University of Engineering & Technology

Department of Architecture

B. Arch 1<sup>st</sup> Year Backlog Examination, 2022

Course No: Math 1125 Course Title: Mathematics

Full Marks: 210

Time: 03 Hours

- N.B i) Answer any three questions from each section in separate script  
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Section-A



1. a) Find the rectangular and spherical polar coordinates for a point whose cylindrical coordinates are  $(3, 2\pi/3, 4)$  10  
b) Find the ratio in which the line joining the points  $(3, -5, 4)$  and  $(2, 3, -1)$  is divided by the XY plane and also find the coordinates of intersection point. 11  
c) Show that the straight line whose d.c.'s are given by the relations  $al+bm+cn=0$  and  $fmn+gnl+hlm=0$  are perpendicular if  $\frac{f}{a} + \frac{g}{b} + \frac{h}{c} = 0$  and parallel if  $\sqrt{af} \pm \sqrt{bg} \pm \sqrt{ch} = 0$  14
2. a) Write the different forms of the equation of a plane. Determine the equation of the plane through the points  $(2, 3, 1)$ ,  $(4, -5, 3)$  and parallel to the Z-axis. 13  
b) Find the equation of the plane which is parallel to the plane  $x+5y-4z+22=0$  and the sum of whose intercepts on the coordinate axes is 12 12  
c) Find the distance of the point  $(1, -2, 3)$  from the plane  $x-y+z=5$  measured parallel to the line  $\frac{x}{2} = \frac{y}{3} = \frac{z}{-6}$  10
3. a) Determine the angle between the line  $\frac{x+1}{3} = \frac{y-1}{-6} = \frac{z-1}{6}$  and the plane  $2x-2y+z-3=0$  09  
b) Test whether the lines  $\frac{x-3}{1} = \frac{y-1}{2} = \frac{z+1}{3}$  and  $\frac{x-2}{1} = \frac{y-5}{-1} = \frac{z}{1}$  are coplanar or not. If they are coplanar, then find the equation of the plane containing them. 12  
c) Find the length and equation of shortest distance between the straight lines  $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-4}{4}$  and  $\frac{x-2}{2} = \frac{y-4}{4} = \frac{z-5}{5}$  14
4. a) Find the equation of perpendicular from the point  $(1, 6, 3)$  to the line  $\frac{x}{1} = \frac{y-1}{2} = \frac{z-2}{3}$ . 11  
b) Find the equation of the tangent planes to the sphere  $x^2 + y^2 + z^2 - 4x + 2y = 4$  which is parallel to the plane  $2x - y + 2z = 1$  11  
c) Find the center and radius of the circle  $x^2 + y^2 + z^2 - 2y - 4z - 11 = 0$ ;  $x + 2y + 2z = 15$ . 13

Section-B

5. a) Find the values of a and b such that the function, 13

$$f(x) = \begin{cases} x + \sqrt{2} a \sin x ; 0 \leq x \leq \frac{\pi}{4} \\ 2x \cot x + b ; \frac{\pi}{4} \leq x \leq \frac{\pi}{2} \\ a \cos 2x - b \sin x ; \frac{\pi}{4} \leq x \leq \pi \end{cases}$$

Is continuous for all values of x in the interval  $0 \leq x \leq \pi$

- b) Find the n-th derivatives of  $y = \frac{1}{x^2+a^2}$  10

- c) If  $y = \tan^{-1}x$  then show that  $(1+x^2)y_{n+1} + 2nxy_n + n(n-1)y_{n-1} = 0$ , also find the value of  $(y_n)_0$ . 12

6. a) Define maxima and minima of a function. 12

Discuss the maxima and minima of  $x^3 - 9x^2 + 24x - 12$ .

- b) If  $u = e^{xyz}$  then find  $\frac{\delta^3 u}{\delta x \delta y \delta z}$  10

- c) If u be a function of r alone, where  $r^2 = x^2 + y^2 + z^2$  then find  $\frac{\delta^2 v}{\delta x^2} +$  13

$$\frac{\delta^2 v}{\delta y^2} + \frac{\delta^2 v}{\delta z^2} .$$

7. a) Calculate  $\int \frac{dx}{x\sqrt{x^2+2x-1}}$  11

- b) Calculate  $\int \frac{dx}{(x^2+1)\sqrt{x^2+4}}$  13

- c) Calculate  $\int \frac{e^x}{x} (1 + x \log x) dx$  11

8. a) Evaluate  $\int_0^{\frac{\pi}{2}} \frac{dx}{(a^2 \cos^2 x + b^2 \sin^2 x)^2}$  12

- b) Evaluate  $\int_0^{\frac{\pi}{2}} \ln \sin x dx$  12

- c) Find the area bounded by the curve  $x^{\frac{2}{3}} + y^{\frac{2}{3}} = a^{\frac{2}{3}}$  11

Khulna University of Engineering & Technology

B. Arch. 1<sup>st</sup> Year Backlog Examination, 2022

Department of Architecture

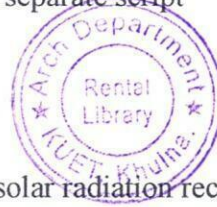
Course no: Arch 1255 Course title: Climate and Built Environment

Full Marks: 210

Time: 3 hrs.

- N.B. i) Answer any three questions from each section in separate script  
ii) Figures in the right margin indicate full marks

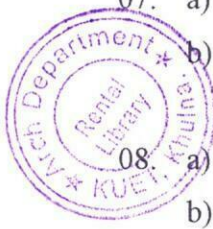
**Section A**



01. a) Explain the factors that influence the amount of solar radiation received on the earth's surface. 15
- b) Discuss the following attributes of warm-humid climate:(any 04) 5X4=20
- i. Air temperature
  - ii. Humidity
  - iii. Precipitation
  - iv. Wind velocities
  - v. Vegetation
02. a) Elaborate the general characteristics of climate of Bangladesh? 15
- b) What is 'temperature inversion'? Discuss with examples. 20
03. a) How does the human body produce and release heat to the environment? Discuss in brief. 15
- b) Write short note on:(any 02) 2X10=20
- i. Effective Temperature (ET)
  - ii. The Bioclimatic chart
  - iii. Urban Climate
04. a) What is sol-air temperature? State some application of sol-air temperature concept in different heat exchange situations? 15
- b) Write short note on: 2X10=20
- i. Density of heat flow rate
  - ii. Solar gain factor

**Section B**

05. a) What is the difference between climate and weather? 05
- b) How does climate affect the built environment of different regions? Refer to a few examples to justify your answer. 30
06. a) Differentiate between active and passive climate control. 10
- b) What are the objectives of thermal control both in a rural and an urban setting? 25



- 07. a) What is a climatic shading device? 08
  - b) Refer to a few buildings to illustrate the impact of shading devices in architecture. 27
  - 08. a) What is stack effect? 05
  - b) What are the key passive design strategies in our tropical climate? 30
- Illustrate in favour of your answer.



Khulna University of Engineering & Technology

Department of Architecture

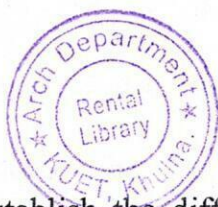
B. Arch 1<sup>st</sup> Year Backlog Examination, 2022

Course No: Phy 1125 Course Title: Physics

Full Marks: 210

Time: 03 Hours

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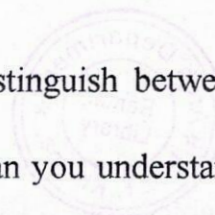


Section-A

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Department of Architecture

B. Arch 1<sup>st</sup> Year Backlog Examination, 2022

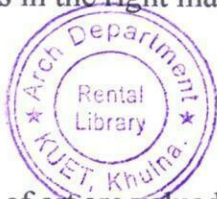
Course No: Arch 1233

Course Title: Art History

Full Marks: 210

Time: 03 Hours

- N.B i) Answer any three questions from each section in separate script  
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Section-A

1. a) “Works of art are valued not only by artists and patrons but also by the entire culture. “ Justify the statement mentioning different values of art. 25
- b) Critically evaluate Greek coins as important artworks of this style 10
2. a) Critically evaluate Michelangelo’s work in your own words 25
- b) Discuss about High Renaissance in brief 10
3. a) Elaborate the main features of Byzantine apse mosaic work ‘Court of Theodora’ in your own words. 20
- b) Analyze different aspects of Greek sculptures. 15
4. a) Write short notes on: 5X7  
i) The Bayeux Tapestry =35  
ii) Madonna of the Meadow  
iii) Gattamelata  
iv) The Holy Trinity  
v) The Last Supper

Section-B

5. a) What details are portrayed by the Baroque style? 05
- b) What was the social, political, religious and scientific context behind the origin of Baroque art? 30
6. a) What is Post-Impressionism? 05
- b) What role did color play in the impressionist paintings? Refer to a painting in favor of your answer. 30
7. a) Define Cubism. 05
- b) How did Picasso and Matisse contribute to early modern art? Refer to paintings in favor of your answer. 30

8. a) What role did nationalism play in our art of early 1950s? 05

b) Do you think that some of the first artworks of our nation have 30

originated from some of the most challenging periods of war? Justify  
your answer.



Khulna University of Engineering & Technology

Department of Architecture

B. Arch 1<sup>st</sup> Year Backlog Examination, 2022

Course No: HUM 1125 Course Title: Communicative English

Full Marks: 210

Time: 03 Hours

- N.B i) Answer any three questions from each section in separate script  
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Section-A

1. a) Make sentence with the following structures using the words given in brackets. 14
- Subj. + Transitive Verb + Object. (Write as verb)
  - Subj. + Intransitive Verb + Adv. Of Manner. (Walk as verb)
  - That + Subj. + Verb + Adv. of Manner + Verb + Adj. Complement. (Study and is as verb)
  - Subj. + Relative Pronoun + Verb + Adv. of Place, + Verb + Adj. Complement. (Work and is as verb)
  - As + Subj. + Verb + Adj. Complement, Subj. + Verb + Obj. (is and like as verb)
  - Neither + Subj. + nor + Subj. + Verb + Adv. of Manner. (Sleep as verb)
  - Though + Subj. + Verb + Adv. of Manner, Subj. + Verb + Adv. + Adv. of place. (Study and do as verb)
- b) Change the following words as asked in brackets and make sentence with the changed forms. 12
- Immensity (into adj.), Greenth (into adj.), Coherency (into adj.), Dedication (into verb), Toxify (into noun), Omission (into verb)
- c) Make sentences using the following phrases and idioms. 09
- Ad hoc; Hard and fast; Fresh blood; In fine; Hush money; Yellow dog.
2. a) Transform the following sentences as asked in brackets. 14
- Hasib walking every day at morning is healthy. (into Complex).
  - That Shimu works sincerely in office is really praise worthy. (Simple)
  - As Liza can't smoke a little, he is fine in lifestyle. (Simple)
  - Though an honest man is happy in psyche, he suffers in society. (Simple)
  - Labu is as talented as other students in class. (Superlative)
  - Salim struggles in life, so succeeds in life. (complex)
  - Mamun can't progress in life inspite of his hard working. (Compound)
- b) Make use of the following words in sentence as asked in brackets. 12
- Back (as verb), Best (as adv.), Good (as adv.), Fast (as verb), Mean (as adj.), Near (as verb).

c) Make a new word with each of the following prefixes and suffixes and use them in sentences. 09

Be....., De....., Out....., .....ance, .....hood, .....y.

3. a) Make wh question with the underlined word/ words of the following sentences. 14

i. Mim sent me a book yesterday.

ii. Sabuj was travelling at a speed of 90 mph.

iii. The pond is waist deep.

iv. Zeba has been reading in this varsity for five years.

v. He gave me two hundred taka.

vi. Nasir came here to see us.

vii. He completed the task with a great effort.

b) Make sentences expressing the following emotions/notions. 12

i) Apology ii) Disapproval iii) Disliking iv) Farewell v) Introduction

vi) Good wish

c) Write two antonyms for each of the following words and make sentence with the antonyms. 09

Hatred, Tolerance, Cheerfulness.

4. a) Correct the following sentences. 14

i. A man must be argumentative.

ii. Mamun is good at the mathematics.

iii. When Labib is healthy, he is fit for football.

iv. A little number of students attended at the class.

v. Let's give up our childlike behavior.

vi. Zerín is our mutual friend.

vii. Only graduates are illegible for the post.

b) Complete the sentences with subordinate clauses. 12

i. The man..... came to see me yesterday. (Adjective clause)

ii. Professor Ali is a scholar..... (Adjective clause)

iii. Mumu nursed her mother..... (Adv. clause of time)

iv. ...., the teacher refused to let him in. (Adv. clause of cause)

v. ...., you would have passed. (Adv. clause of condition)

vi. ...., is important. (Noun Clause)

c) Make sentences using the following modals as directed. 09

i. Could (To express polite request)

ii. Could (To express inference)

iii. Must (To express internal obligation)

iv. Need (To express unnecessary action in the present)

v. Had better (To express preference)

vi. Be to (To express command)



Section-B



5. a) Read the passage and answer the questions that follow. 20
- An emperor was told that some of his subjects in a distant province had risen in revolt against him. "Come then, my men," said he, "follow me and I shall destroy enemies." He marched against the rebels, but they submitted on his approach. All now expected that he would punish them severely. But instead of doing so, he treated them with mildness and humanity. "Sire", said his Chief Minister, "you promised to destroy your enemies; but we see that you have pardoned them all, and even bestowed favours upon some of them. Is this the way you keep your word?" "I promised" replied the emperor, to destroy my enemies; but these men are no longer my enemies, - I have made friends of them. So my promise has not been broken. Like this emperor, we also should overcome evil with good and turn our enemies into friends by kindness.
- Questions:
- i. What was the promise of the emperor?
  - ii. What did the chief minister say?
  - iii. How did the emperor justify himself?
  - iv. What lesson should we learn from this story?
- b) Make a precis of the above passage (Q5.a) with a title. 15
6. a) Amplify the idea- 'To be wealthy and honored in an unjust society is a disgrace.' 20
- b) Write a contrast paragraph between Democracy and autocracy. 15
7. a) A cold-wave is sweeping over the country for a few days. Now make a newspaper report of it. 20
- b) Prepare a C.V. along with a job application. 15
8. Write a free composition on any one of the following. 35
- a) Quality education: A corruption free society.
  - b) Global warming: Bangladesh is a victim.

Khulna University of Engineering & Technology

Department of Architecture

B. Arch. 1<sup>st</sup> Year Backlog Examination, 2022

Course No: Arch 1133 Course Title: Design Theory

Full Marks: 210

Time: 03 Hours

- N.B i) Answer any three questions from each section in separate script  
ii) Figures in the right margin indicate full marks



**Section-A**

1. a) As a primary element, how can a point influence the visual field? Explain. 10  
b) How have linear elements been used in architecture according to their visual expression and functionality? Discuss with examples. 25
2. a) State seven visual properties of form with examples. 15  
b) What is articulation of form? Discuss various ways in which a corner can be articulated. 05+15=20
3. a) What is additive transformation? Give example of an architect's work. 10+05=15  
b) Write short notes on: 2x10 =20
  - i) Radial form
  - ii) Clustered form
4. a) How do L-shaped planes define a field of space? State with examples. 20  
b) Discuss various provisions of openings at corners. 15

**Section-B**

5. a) Discuss different types of spatial relationships in brief. 20  
b) What is 'Centralized organization'? Give an example from Bangladesh. 15
6. a) Mention various form of circulation space and discuss their effects on our Perception, Movement and Activities through a space. Give an example of enclosed circulation. 20  
b) Discuss the different aspects of "Path Space Relationship" with sketches. 15
7. a) What is Order? 05  
b) What is Hierarchy? Discuss the ways in which visual emphasis can be achieved in the arrangement of forms and spaces. 15  
c) What is linear organization? Discuss with examples. 15
8. a) Define human scale. 05  
b) Write short notes on: (any 03) 3x10 =30
  - i) Modular
  - ii) Golden Section
  - iii) Ken
  - iv) Proportioning System



Khulna University of Engineering & Technology

B. Arch. 1<sup>st</sup> Year Backlog Examination, 2022

Department of Architecture

Course no: Hum 1225 Course title: Basics of Sociology

Full Marks: 210

Time 3 hrs.

- N.B. i) Answer any three questions from each section in separate script  
ii) Figures in the right margin indicate full marks

**Section A**



1. a) What is resocialization? 10  
b) What are the practical uses of sociology? 10  
c) How do sociological insights differ from commonsense explanations of social behavior? 15
2. a) Discuss the features of hunting, fishing and food gathering society. 15  
b) Explain the characteristics of an agricultural feudal societies. 10  
c) Industrial society existed in the late 18<sup>th</sup> century-discuss. 10
3. a) Discuss the systems of socialization. 10  
b) Discuss the systems of stratification. 15  
c) What are the different elements of religion? 10
4. a) Differentiate between "Ethnocentrism" and "Xenocentrism". 10  
b) Where dose sub-culture differ from counter culture? 10  
c) What elements do all or most cultures share? 15

**Section B**

5. a) What is sociology and why do you study it? 15  
b) What is society? Explain different types of societies and their evolution. 20
6. a) Define community. What are the vital role of community and association for the nation? 15  
b) Why is the study of culture important? How and why do culture change? 20
7. a) What is house form? Describe determining factors of house form. 15  
b) Discuss the impact of culture on house form. 10  
c) What do you mean by cultural lag? Explain it in the light of your own society. 10
8. a) What is built-environment? Discuss the consequences of built –environment on neighborhood relationship. 15  
b) Critically explain the relation between architecture and built-environment. 10  
c) Explain elements of civilization with example. 10