Khulna University of Engineering and Technology

Department of Architecture

B.Arch 1st Year 1st Term Regular Examination, 2017

Course no: Arch 1131 Course title: Architecture of Ancient Civilization

Full Marks: 210 Time: 3 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. What are the building materials of ancient Egyptian architecture? 10
   b. Analyse and discuss Mastaba with necessary illustration. 10
   c. Discuss with drawings-The Step Pyramid of Zoser, at Sakkara. 15

2. a. Illustrate your understanding with drawings about The Great Pyramid of Gizeh. 10
   b. Identify the significance of the Theban Necropolis. 10
   c. Draw typical temple of ancient Egyptian architecture. 15

3. a. Explain the Ziggurat of Urnammu at Ur with necessary drawings. 20
   b. Discuss the Ziggurat at Tchoga-Zanibil, Elam with necessary drawings. 15

4. a. Describe with drawings, The Ziggurat of White Temple at Warka. 20
   b. Interpret and discuss the city of Khorshabad with necessary illustrations. 15

Section-B

1. Write short notes on : 7x5 = 35
   i. Hellenic Period
   ii. Doric Order
   iii. Insula
   iv. Roman Urban Design
   v. Propylaea

2. a. Discuss with drawings- The Pantheon, Rome. 20
   b. Draw diverse and different plans of Greek Temple. 15

3. a. Evaluate and discuss Agora with drawings. 15
   b. Discuss and analyse Acropolis with necessary drawings. 20

Khulna University of Engineering and Technology

Department of Architecture

B.Arch 1st Year 1st Term Regular Examination, 2017

Course no: Phy 1125 Course title: Physics

Full Marks: 210 Time: 3 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

Question-01

a) Show that the total energy of a particle executing simple harmonic motion is constant. 13

b) Distinguish between particle velocity and wave velocity and obtain the following relation connecting them: $u=-v\frac{dy}{dx}$, where u is the particle velocity and v is the wave velocity. 12

c) The force and displacement of simple dynamic system undergoing sinusoidal excitation are given by the equation $F = 8\sin(\frac{\pi t}{10})$ Newtons and $Y = 0.08\sin(\frac{\pi t}{10} - \frac{\pi}{4})$ meters. Calculate the work done by the excitation force in (i) 20 seconds, (ii) 2.5 minutes 10

Question-02

a) Discuss mathematically the formation of stationary waves and explain how the characteristics change (i) with time and (ii) with distance 15

b) Explain Doppler's effect. Write down the application of Doppler's effect. 10

c) A car sounding a horn producing a node of 550HZ approaches and then passes a stationary observer at a steady speed of 24m/s. What will be the frequencies apparent to the observer when the car is (i) approaching and (ii) receding? What is the interval of two nodes? (Velocity of the sound=340 m/s) 10

Question-03

a) What is intensity level? How an auditorium can be used for speech, music and opera? 12

b) Obtain an expression for the intensify of a plane wave in terms of acoustic pressure. 13

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 70db, what will be the resultant intensity level? 10

Question-04

a) What is architectural acoustics? What factors need be addressed for designing of a hall? 10

b) Give the theory of growth and decay of sound in "Live room". Find the reverberation time. 10

c) A room dimensions 12X8X10 meters. Calculate (i) the mean free path of the sound wave in the room (ii) the number of reflections made per second by the sound wave with the walls of the room. (Velocity of sound in air 350 m/s) 15

Section-B

Question-05

a) Explain what is meant by chromatic aberration in lenses. Explain how chromatic aberration may be removed in the case of a combination of two lenses in contact. 13

b) Describe astigmatism and distortion. How they may be reduced to a minimum? 12

c) Two glasses have dispersive power in the ratio 2:3. These glasses are to be used in the manufacture of an achromatic objective of focal length20 cm. What are the focal lengths of the lenses? 10

Question-06

a) Distinguish between polarized light and un-polarized light. Can sound waves be polarized, explain. 10

b) State and explain Brewester's law. Show that at the polarizing angle of incidence, the reflected and refracted rays are mutually perpendicular to each other. 15

c) Calculate the thickness of a half wave plate of quartz for a wavelength of $5000A°$, Here $\mu E = 1.553$and $_{\circ} = 1.544$. 10

Question-07

a) State and explain the inverse square law of light. 10

b) Write a short note on: 3X5=15

(i) Lambert's law
(ii) Quantum theory of light
(iii) Radiant and luminous intensity

c) The intensity of a radio signal is $0.120W/m^2$ at a distance of $16m$ from a small transmitter. What is the intensity of the signal $4m$ from the transmitter? 10

Question-08

a) What is colorimetry? How has this technique enhanced the study of science? What is light observance? 10

b) Define axioms of color matching. How can be determined three color mixture data for matching spectrum colors? 15

c) Describe why sun looks yellow but sunset looks red. 10

Khulna University of Engineering and Technology

Department of Architecture

B.Arch 1st Year 1st Term Regular Examination, 2017

Course no: Arch 1133 Course title: Design Theory

Full Marks: 210 Time: 3 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.Outline the Primary Elements of Architecture. 05

   b. How orientation of a line affects its role in a visual construction? How Linear Elements have been used in architecture according to their visual expression and functionality, state with example. 15

   c. What is the primary identifying character of a Plane? Discuss Wall Plane in the definition of form and space with necessary example. 15

2. a. State and illustrate seven Visual Properties of Form with examples. 15

   b. Define Regular and Irregular forms. 05

   c. What do you mean by Articulation of Form? Discuss various ways in which a corner can be articulated. 15

3. a. What is subtractive transformation? Give example of an architect's work. 10

   b. Mention the types of additive forms in architecture. Discuss clustered form in brief. 10

   c. Identify the reasons behind Formal Collisions of Geometry? Give examples. 15

4. a. Explain the role of Overhead Plane in defining a volume of space. 15

   b. How L- shaped plane define a field of space? State with examples. 10

   c. Discuss the provision of Vertical and Horizontal openings between planes in defining space. 10

Section-B

1. a. What is Anthropometry? Discuss Visual Scale and Human Scale with examples. 15

   b. Briefly discuss the following proportioning system with examples, 15

      i. Golden Section

      ii. Ken

   c. Define Proportion and Scale. 05

2. a. Define Order. Outline the Principles that can be utilized to create order in an architectural composition. 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 Datum? In how many ways a Datum can organize elements? State with examples. 15

3. a.What is Centralized Organization? Give an example from Bangladesh. 05

   b. Discuss various types of Spatial Relationship in brief. 15

   c. What is linear organization? Discuss with examples. 15

4. a. How forms of Circulation Space affect our perception, movement and activities through a space? Give an example of Enclosed Circulation Space. 10

   b. Discuss various forms of Entrances to a building. State the locational impact of Entrances on space. How Entrances can be visually reinforced? 15

   c. Outline the elements of circulation. In how many ways a building can be approached? Discuss with examples. 10

Khulna University of Engineering and Technology

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B.Arch 1st Year 1st Term Regular Examination, 2017

Course no: Hum1125 Course title: Communicative English

Full Marks: 210 Time: 3 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

Question-01

a) Make sentence with following structures using the words given in brackets. 14

I) Subj. + Intransitive Verb+ Adv. of manner. (Walk as verb)

II) Subj. + Transitive verb+ Obj. (indirect) + Obj. (direct). (Offer as verb)

III) That+ Subj. + Verb+ Adv. of manner + Verb + Adj. complement. (Work and is as verb)

IV) Subj. + Verb + Object +What + Subj. + Verb. (Entitle and reflect as verb)

V) When + Subj. + Verb + Adv. of place, Subj. + Verb+ Object. (Read and recite as verb)

VI) Since + Subj. + Verb + Adv. of manner, Subj. + Verb + Adv. of place. (Work and succeed as verb)

VII) Subj. + Verb +not only + Obj. + but also obj. (Buy as verb)

b) Change the following words as asked in brackets and make sentence with the changed forr 12

Bath (into verb), Drop (into verb), Agony (into verb), Choose (into noun), Ignore (into noun) Jealousy (into adjective)

c) Write two synonyms for the words given below and make sentence with the new words. 09

Help, Isolation, Large

Question-02

a) Make W-H question with the underlined words/phrases from each of the follow 14 sentences.

I) Kamal met me yesterday.

II) Mamun reads the novel sincerely.

III) Hamim works in this office.

IV) Sabuj is 5ft and 8 inches tall.

V) He consoles the peoples socially.

VI) He has been writing the article for an hour.

VII) Nizam is a man of principle.

b) Make use of the following words as asked in brackets in sentence. 12

Light (as verb), Baby (as verb), Bad (as noun), Bait (as verb), Captain (as verb), Da (as verb)

c) Make new word with the following prefixes and suffixes and use the new words in sentenc 09

By—, Em—, Im—, —once, —cy, —ee.

Question-03

a) Transform the following sentences on directed: 14

I) The man went away to avoid punishment. (Complex)

II) The man came here when there was storm. (Simple)

III) He made the man do the work. (Passive)

IV) Lily was not so white as her forehead. (Comparative)

V) He was never late. (Affirmative)

VI) The boy failed to notice the teacher. (Negative)
VII) No other food is as nutritious as milk. (Compound)

b) Express the following notions/emotions in sentence. 12
I) Depression, II) Dislike, III) Co-operation, IV) Honesty, V) Boredom, VI) Foresight.

c) Fill in the gaps of the following sentences with suitable words. 09
I) We hope _____ youths as _____ courageous.
II) It is you _____ _____ said this.
III) They need ____ people ____ will support them.

Question-04

a) Correct the following sentences 14
I) I have received your letter yesterday.
II) I am preparing my lesson everyday.
III) His pen is inferior and less costly than yours.
IV) Ten men were wounded and one killed.
V) Wait here until I do not come.
VI) It is raining since morning.
VII) Quote the poem from heart.

b) Make one sentence with each of the following modals as directed: 12
I) Could (to express polite request)
II) Must (to express internal obligation)
III) Should (to express duty)
IV) Used to (to express the regular habit in the past)
V) Be going to (to express future intension)
VI) Would rather (to express preference)

c) Define present participle, Gerund and Transitive verb with example. 09

Section-B

Question-05

a) Read the following passage carefully and answers the questions that follow. 20

The work of has making mainly depends upon fair weather. As sunny weather in a cold country or in a wet country is a very uncertain factor, the farmers, so, have to make use of their opportunities. They are to take time by the forelock. They have to make use of the bright sunshine in drying their hay. If they are indolent, let the opportunity of drying their hay in summer season slip uselessly away, their grass is likely to be ruined. In a broader sense, the difficulties that the farmer has to face are difficulties of tall man kind. Just as the weather is uncertain so is the care with our life. Life too is uncertain. Bright sunshine is the youth of our life. Youth comes but once in a whole life time, as in this time life can use the full of opportunities with energy and willingness in face of difficulties and it never possible in the time out of youth, chances never repeat themselves, or if they do, either the circumstances are not favourable or our need is too great. Sometimes we do not feel so strong as to avail ourselves of the opportunity. Hence we must learn to make the most of the opportunities that present themselves is our life. We must, like the farmer, be even on the look out for sunshine to serve our needs. If we do not avail ourselves of the opportunities today, we shall be left wringing our hands in despair when the opportunities have slipped away. A man, who is always putting off till tomorrow what he should do today, suffers an irreparable loss. Opportunities therefore, must not be passed unnoticed, particularly when they are within our grasp.

Questions:

I) What does a farmer do in a cold country and why?
II) What is life and what should a life do in its youth?
III) What should we do in case of chance? And why?
IV) What should we do today for our opportunities? And why?

b) Make a précis of the above written passage (Q.5.a) with a suitable title. 15

Question-06

a) Write a paragraph on "Home and School" following the technique of contrast. 20

b) Amplify the idea-'A rolling stone gathers no moss' (Around 1000 words) 15

Question-07

a) Suppose you are a reporter of the Bangladesh observer. In Khulna, twenty people died of a mysterlans disease. You are given the duty to investigate the matter. Now, write a report about it. 20

b) Write a dialogue between two friends about an interesting movie. 15

Question-08

Write a composition on 35

Technology and Entertainment

or

The role of press to create social awareness

Khulna University of Engineering and Technology

Department of Architecture

B.Arch 1st Year 1st Term Regular Examination, 2017

Course no: Math 1125 Course title: Mathematics

Full Marks: 210 Time: 3 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) Define continuous function. 13

If $f(x) = x - a \quad for\ x > a$

$= a - x \quad for\ x < a$

$= 0 \quad for\ x = a$

Show that $f(x)$ is continuous at $x = a$ but has no differentiable co-efficient at $x = a$.

1(b) If $y = \tan^{-1}\left\{\sqrt{\frac{a-b}{a+b}}\ tan\frac{x}{2}\right\}$. Find $\frac{dy}{dx}$. 10

1(c) State Leibnitz's theorem. If $y = e^{a\sin^{-1}x}$, then find the value of 12

$(1-x^2)y_{n+2} - (2n+1)xy_{n+1} - (n^2+a^2)y_n$.

2(a) If $u = (x^2+y^2+z^2)^{\frac{1}{2}}$, then find the value of $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} + \frac{\partial^2 u}{\partial z^2}$. 08

2(b) State and prove Euler's theorem. 12

2(c) Discuss the maxima and minima of the function $f(x,y) = x^3 + y^3 - 3x - 12y + 20$. 15

3(a) Calculate $\int \sqrt{\frac{x-3}{x-4}}\, dx$ 12

3(b) Calculate $\int \frac{dx}{cosx + 3sinx + 4}$ 10

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

4(a) Evaluate $\int_0^{\frac{\pi}{2}} logcosx\, dx$ 13

4(b) Evaluate $\lim_{n\to\infty}\left[\frac{n+2}{n^2+1} + \frac{n+4}{n^2+4} + \frac{n+6}{n^2+9} + \cdots\ldots\ldots + \frac{n+2n}{n^2+n^2}\right]$ 10

4(c) Find the area bounded by the curve $x^{2/3} + y^{2/3} = a^{2/3}$ 12

Section - B

5(a) A, B, C are the points on the axes x, y and z respectively at distance a, b, c from the origin "O". Find the Co-ordinates of the point which is equidistance from A, B, C and O. 17

5(b) If $l_1, m_1, n_1;\ l_2, m_2, n_2;\ l_3, m_3, n_3$ are direction cosines of 3-mutually perpendicular lines. The line whose direction cosines are proportional to $l_1 + l_2 + l_3,\ m_1 + m_2 + m_3,\ n_1 + n_2 + n_3$. Prove that this line makes equal angels with them. 18

6(a) If the line makes angles $\alpha,\ \beta,\ \gamma$ with the axes. Show that $sin^2\alpha + sin^2\beta + sin^2\gamma = 1$ 10

6(b) Find the equation of the plane through the points $(2,\ 2,\ 1)$ and $(9,\ 3,\ 6)$ and perpendicular to the plane $2x + 6y + 6z = 9$ 10

6(c) Find the shortest distance between the lines $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ and $\frac{x-2}{3} = \frac{y-4}{4} = \frac{z-5}{5}$. 15

7(a) If any tangent plane to the sphere $x^2 + y^2 + z^2 = r^2$ makes intercepts a, b and c on the co-ordinate axes. Prove that $\frac{1}{r^2} = \frac{1}{a^2} + \frac{1}{b^2} + \frac{1}{c^2}$. 10

7(b) A sphere of radius k passes through the origin and meets the axes in A, B, C. Prove that the centroid of the triangle ABC lies on the sphere $(x^2 + y^2 + z^2) = \frac{4}{9}k^2$ 10

7(c) Find the co-ordinates of the point where the line $\frac{x+3}{4} = \frac{y+4}{3} = \frac{z-8}{-5}$ intersects the sphere $x^2 + y^2 + z^2 + 2x - 10y = 23$. 15

8(a) Show that the lines $3x - 2y + 13 = 0 = y + 3z - 26$ and $\frac{x+4}{5} = \frac{y-1}{-3} = \frac{z-3}{1}$ are perpendicular. 15

8(b) Deduce the equation of the line $x + 3y + 4z = 0 = 3x - y + z + 6$ in symmetric form. 12

8(c) Find the angle between the planes $x - y + 2z = 9$ and $2x + y + z = 7$. 08