Khulna University of Engineering & Technology

Department of Architecture

B. Arch 1st Year 1st Term Regular Examination, 2023

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) How did the geography of ancient Nile valley help to develop civilization in ancient Egypt? Discuss briefly.   10
    b) Evaluate the distinctive features of Egyptian Architecture with necessary illustrations and drawings.   25

2. a) What is monumental scale? Draw a Roman Arch with detail illustrations.   10
    b) Illustrate the historical and architectural significance of the Pantheon with detail graphical drawings.   25

3. a) Analyze the three classical order of Greek Architecture with necessary drawings and illustrations.   15
    b) Demonstrate the Greek influence in Roman Architecture and differentiate the design pattern of Greek and Roman temples with necessary illustrations.   20

4. a) Evaluate the optical illusion of the Greek Parthenon. How does the correction of optical illusion make this temple unique? - Discuss with your own justification.   20
    b) Write short notes on (any three):   3x5
       i.   Natural levees   =15
       ii.   Acropolis
       iii. Greek Agora
       iv.   Roman Bath

Section-B

5. a) Interpret your understanding about the context of Gothic Architecture highlighting Geological, Climatic and Social influences.   15
    b) Discuss the basic Architectural elements of Gothic Cathedral with necessary drawings.   20

6. a) What are the features for sacredness in Gothic Architecture?   10
    b) Briefly discuss "Amiens Cathedral" of French Gothic Architecture with necessary drawings.   15
    c) Write short note on Flying Buttress with necessary drawings.   10

7. a) Critically interpret your understanding about traditional Chinese Houses with necessary illustrations.   20

    b) Discuss and evaluate the "Temple of Heaven" of Chinese Architecture with necessary drawings.   15

8. a) Interpret your understanding about traditional Japanese houses with necessary illustrations.   20

    b) Write short notes on: 3x5 =15
        i.   Pointed Arch
        ii. Rosetta window
        iii. Great wall of China

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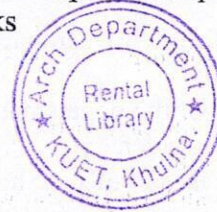Course No: HUM 1125   Course Title: Communicative English

Full Marks: 210   Time: 03 Hours

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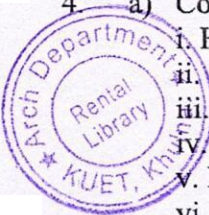
Section-A

1. a) Make sentence with the following structures using the words given in brackets.   14
   - i.   Subj. + Intransitive Verb + Adv. of Place. (Study as verb)
   - ii.   Subj. + Transitive Verb + Object. (Feed as Verb)
   - iii.   Subj. + Transitive Verb + Object (Noun/pronoun) + Adj. Complement. (Observe as Verb)
   - iv.   That + Subj. + Verb + Adv. of Manner + Verb + Adj. Complement (Study and is as Verb)
   - v.   Not only + Subj. + but also + Subj. + Verb + Adv. of Place (Work as Verb)
   - vi.   Since + Subj. + Verb + Adverb, Subj. + Verb + Adj. Complement. (Exercise and is as Verb)
   - vii.   Subj. + Relative pronoun + Verb + Adj. Complement + Verb + Adverb. (is and study as Verb)

   b) Change the following words as asked in brackets and use the changed words in sentence. Solubility (into adj.), Youth (into adj.), Immediacy (into adj.), Submit (into noun), Corrosion (into verb), Little (into verb).   12

   c) Make a new word with each of the following prefixes and suffixes and use them in sentences. Counter......., Over........, Mal............,............ance, ...ize, ...ship.   09

2. a) Transform the following sentences as asked in brackets.   14
   i. Habib, a doctor, practices in Canada. (Complex)
   ii. It is fine that you study sincerely. (Simple)
   iii. As you follow a good life style, you are healthy. (Simple)
   iv. Though he walks fast, he can't catch the train. (Compound)
   v. Liza is as talented as Soma. (Comparative)
   vi. Until you listens to our advice, we willn't help you. (Simple)
   vii. Shimu works hard, so succeeds in life. (Complex).

   b) Make use of the following words in sentence as asked in brackets. Call (as adj.), Even (as verb), Express (as adj.), Iron (as verb), Light (as verb), Long (as verb).   12

   c) Write two antonyms for each of the following words and use the antonyms in sentence.
   Valuable, Feverish, Harmony   09

3. a) Make wh question with the underlined word/words of the following sentences.   14
   i. Babla is a man of letters.
   ii. They are five feet and two inches tall.
   iii. Shila weighs 65 kgs.
   iv. I saw Mamun at the morning.
   v. Johir explained the matter with an acut skill.
   vi. Mim's team is much better.
   vii. Liza has been studying in this varsity for five years.

b) Complete the sentences with subordinate clauses as directed.   12
   i. ...., is unknown.   (Noun clause)
   ii. I hope ....   (Noun clause)
   iii. The man .... is ill.   (Adjective clause)
   iv. ...., she put out the light.   (Adv. clause of time)
   v. Bangladesh is a poor country mainly ....   (Adv. clause of reason)
   vi. ...., he would have passed.   (Adv. clause of condition)

c) Make sentences using the following phrases and idioms.   09
   Ad hoc; A lot of; Bread and butter; Hand in glove; Nip in the bud; Come of.

4. a) Correct the following sentences.   14
   i. He is a M.A.
   ii. Chairman of the department will preside over the meeting.
   iii. He met his elder.
   iv. When he is sick of you, he willn't meet you.
   v. Labu delivered me a quantity of books.
   vi. You that happy are a satisfaction is to your parents.
   vii. It is a true fact.

   b) Make use of the following modals in sentence as asked in brackets.   12
      i. Can. (To express an offer to somebody else)
      ii. Could. (To express a past ability)
      iii. Dare. (To express an indulgence)
      iv. Would. (To express a polite request)
      v. Bet to base form of verb. (To express a command)
      vi. Should. (To express propriety)

   c) Make sentences expressing the following emotions/notions.   09
      i. Approval, ii. Farewell, iii. Invitation, iv. Advice, v. Offer, vi. Warning.

Section-B

5. a) Read the passage and answer the questions that follow.   15
      The man who is always hesitating which of the two things he will do first
      will do neither. The man who resolves, but allows his resolution to be
      changed by the counter-suggestion of a friend- who changes from opinion to
      opinion, from plan to plan, and turns like a weather-cock to every point of
      compass with every breath- can never accomplish anything great or useful.
      It is only the man who first consult wisely, then resolves firmly, and then
      executes the purpose with perseverance in the face of whatever difficulties
      may come in the way, - that can advance to any line. Take your course
      wisely, but firmly; and having taken it, hold to it with resolution, and the
      Alps and the Himalayas will sink before it.
      Questions:
      i. How does a man always hesitating behave and fare in life?
      ii. What kind of people succeed in life?
      iii. What is the author's advice to the young?

   b) Make a precis of the above passage (Q. 5a.) with a title.   20

6. a) Write a cause and effect paragraph on Road Accident.   15
   b) Amplify the idea – 'One has a moral responsibility to disobey unjust laws.' 20

7. a) Write a report on the condition of your hall dining.   20
   b) Write an application for a job along with a C.V.   15

8. Write a free composition on any one of the following.   35
   i. Youths: The development of a country.
   ii. Bribery: A social problem in Bangladesh.

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B. Arch 1st Year 1st Term Regular Examination, 2023

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) Outline the primary elements of architecture. As a primary element, how can a point influence a visual field? Explain.   5+10 =15

    b) How have linear elements been used in architecture according to their visual expression and functionality? Discuss with examples.   20

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.   10+10 =20

3. a) What is additive transformation? Give example of an architect's work.   10+5 =15

    b) Write short notes on: (Any two)
       i.   Radial form
       ii.   Clustered form
       iii. Subtractive transformation   2 x10 =20

4. a) How do L-shaped planes define field of space? State with examples.   20

    b) Discuss various types of openings at corners.   15

Section-B

5. a) Discuss different types of spatial relationships in brief.   15

    b) What is 'Centralized organization'? Give an example from Bangladesh.   20

6. a) Evaluate and interpret various types of entry approach towards a building with examples.   15

    b) Discuss any four types of configurations of path with relevant examples and diagrams.   20

7. a) What is Axis? "An axial condition can exist without a symmetrical condition being simultaneously present, a symmetrical condition cannot exist without implying the existence of an axis"- justify.   5+20 =25

    b) Discuss the different aspects of "Path space relationship" with sketches.   10

8. a) Write short notes on: (Any five)   5x7
    i. Ken   =35
    ii. Hierarchy
    iii. Classical order
    iv. Datum
    v. Clustered organization
    vi. Golden section

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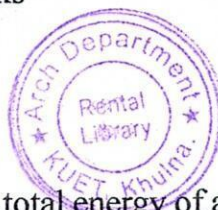
B. Arch 1st Year 1st Term Regular Examination, 2023

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) Calculate the average Kinetic energy and the total energy of a body executing SHM. **15**

    b) Deduce the following differential equation of wave motion, $\frac{d^2y}{dt^2} = \vartheta^2\frac{d^2y}{dx^2}$, where the symbols have their usual meanings. **10**

    c) A musical instrument of frequency 650 Hz is sending out waves of amplitude 2.5×10^{-3}cm. Find (i) energy of wave/m³ and (ii) intensity of sound in Joules/second/m³. Given the velocity of sound as 332 m/sec and density of air as 1.29 Kg/m³. **10**

2. a) What is Doppler's effect in sound? Write down the applications of Doppler's effect. **10**

    b) Discuss mathematically the formation of stationary waves and explain how the characteristics change (i) with time and (ii) with position. **15**

    c) Two trains travelling in opposite directions at 70Km/hr each, cross each other while one of them is whistling. If the frequency of the note is 500 Hz, find the apparent pitch as heard by an observer in the other train: (i) before the trains cross each other and (ii) after the trains have crossed each other. Velocity of sound in air = 332 m/s. **10**

3. a) Explain what are meant by architectural acoustics, acoustic intensity level and acoustic pressure level. **12**

    b) Define the intensity and energy density at a point in a plane wave of sound. Obtain an expression for the intensity 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 70 db, what will be the resultant intensity level? **10**

4. a) What are the acoustic requirements of a good auditorium? How an auditorium can be used for speech, music and opera. **12**

    b) What is Weber-Fetchner law? Define terms (i) Threshold of hearing (ii) Reverberation (iii) Noise reduction (iv) Dean hall (v) Loudness **13**

    c) If a concert hall of size 80x60x50 cu.ft has plastered surface of absorption co-efficient 0.13 and a capacity of an audience of 170 adults (each having an absorption of 4.6 ft² OWU). Find the reverberation time of the hall. **10**

5. a) Describe Coma, spherical aberration and distortion. How can those defects be removed? — 13

   b) Derive and discuss the conditions of achromatism for two thin lenses placed in contact. — 12

   c) Two glasses have dispersive powers in the ratio 2:3. These glasses are to be used in the manufacture of an achromatic object of focal length 20cm. What are the focal lengths of the lenses? — 10

6. a) What is photometry? Explain the basic difference between luminous intensity and intensity of illumination? — 13

   b) State and proof Lambert Cosine Law. — 12

   c) Using the beer-lambert law, find the molar extinction coefficient for a species that absorbs 0.561 a.u. at λ_{max} of 534.0 nm. The path length of cuvette is 100 cm, and the concentration of the solution is 1.5×10^{-5}M. — 10

7. a) Explain additive and subtractive colour mixture with appropriate diagram. — 10

   b) Define colour matching. Explain the axioms of colour matching. — 15

   c) Deduce inverse square law. — 10

8. a) Define the following terms: un-polarized light, polarized light, ordinary rays, extraordinary rays and optical activity. — 10

   b) Explain Brewster's law. Show from this law that when light is incident on a transparent substance at a polarizing angle, the reflected and refracted rays are at right angles. — 10

   c) Explain double refraction for polarization. — 05

   d) If the plane of vibration of the incident beam makes an angle of 30° with the optic axis, compare the intensities of extraordinary and ordinary light. — 10

Khulna University of Engineering & Technology

Department of Architecture

B. Arch 1st Year 1st Term Regular Examination, 2023

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
ii) Figures in the right margin indicate full marks

Section-A

1. a) Define limit of a function. Test the continuity of $f(x) = Sin\frac{\pi}{x}$, for $x \neq 0$ 10

    $=1$, for $x=0$ at the point x=0

    b) A function f(x) is defined as follows: 12

    $f(x) = 0$ for $x = 0$

    $= x$ for $x > 0$

    $= -x$ for $x < 0$

    Does f(x) is differentiable at x=0, why?

    c) If $y = Sin\{a\ log(x+b)\};\ then\ find\ y_{n+2}$ 13

2. a) Define homogenous function. If $f_{(x,y)}$ is homogenous function of x & y of degree   15

    n, then show that $x\frac{\partial f}{\partial x} + \frac{\partial f}{\partial y} = n\ f(x,y)$

    b) If $u = f(\frac{1}{x} - \frac{1}{y}, \frac{1}{y} - \frac{1}{z})$, then find $x^2\frac{\partial u}{\partial x} + y^2\frac{\partial u}{\partial y} + z^2\frac{\partial u}{\partial z}$ 10

    c) Define Maxima and Minima. Find the maximum and minimum values of   10

    $12(logx + 1) + x^2 - 10x + 3 = 0$

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

    b) Calculate $\int \frac{(x+1)dx}{\sqrt{4+8x-5x^2}}$ 12

    c) Calculate $\int \frac{e^x}{x}(1 + x\ logx)dx$ 10

4. Evaluate the following: 12

    a) $\int_0^{\frac{\pi}{2}} \frac{dx}{a^2cos^2x+b^2sin^2x}$

    b) $\int_2^3 \frac{dx}{(x-1)\sqrt{x^2-2x}}$ 12

    c) $\underset{n \to a}{\alpha t}\ [\frac{\sqrt{n}}{\sqrt{n^3}} + \frac{\sqrt{n}}{\sqrt{(n+4)^3}} + \frac{\sqrt{n}}{\sqrt{(n+8)^3}} + \cdots\cdots\cdots + \frac{\sqrt{n}}{\sqrt{\{n+4(n-1)\}^3}}$ 11

5. a) Find the Cartesian and Spherical polar coordinates for a point where cylindrical polar coordinates are $(3, 120^0, -4)$

    b) Find the ratio in which the line joining the points $(-2, 3, 2)$ and $(4, 3, -1)$ is divided by the XY plane and also find the coordinates of the intersection point. 11

    c) Find the angle between two lines whose direction cosines are connected by the relation $2l + 2m = n$ and $mn + lm + ln = 0$ 13

6. a) Write the different forms of the equation of a plane. Determine the equation of the plane through the point $(-1, 3, 2)$ and perpendicular to the planes $x + 2y - 2z = 5$ and $3x + 3y + 27 = 8$. 12

    b) A variable plane is at a constant distance p from the origin and meets the axes in A,B,C. Prove that the locus of the centroid of the tetrahedron OABC is $x^{-2} + y^{-2} + z^{-2} = 16p^{-2}$ 12

    c) Find the equation of the plane that passes through origin and perpendicular to the line joining the points $(5, 3, -1)$ and $(-2, -3, 4)$. 11

7. a) Find the equation of the planes through $(0, 4, -3)$, $(6, -4, 1)$ and which cuts off from the axis intercepts whose sum is zero. 12

    b) Test whether the lines $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ and $\frac{x-2}{3} = \frac{y-3}{4} = \frac{z-4}{5}$ are coplanar or not. If they are coplanar, then find the equation of the plane containing them. 11

    c) Find the coordinates of the points where the shortest distance meets the lines $\frac{x-3}{3} = \frac{y-8}{-1} = \frac{z-3}{1}$ and $\frac{x+3}{-3} = \frac{y+7}{2} = \frac{z-6}{4}$. Also find the length and equation of the shortest distance. 12

8. a) Prove that the equation of the plane which passes through the line $\frac{y}{b} + \frac{z}{c} = 1$, x=0 and parallel to the line $\frac{x}{a} - \frac{z}{c} = 1$, y=0 is $\frac{x}{a} - \frac{y}{b} - \frac{z}{c} + 1 = 0$. Also if 2d is the shortest distance between the above lines, then prove that $\frac{1}{d^2} = \frac{1}{a^2} + \frac{1}{b^2} + \frac{1}{c^2}$ 12

    b) Find the center and radius of the circle $x^2 + y^2 + z^2 - 2x - 4y - 6z - 2 = 0$, $x + 2y + 2z - 20 = 0$ 12

    c) Find the equation of the tangent planes to the sphere $x^2 + y^2 + z^2 - 2x - 4y + 6z + 5 = 0$ which are parallel to the plane $x + 2y + 2z = 8$. 11