

Khulna University of Engineering and Technology

Department of Architecture

B.Arch 1st Year Backlog 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. What are the purpose of Egyption temple? 10
b. Illustrate your understanding with drawings about the temple of Amun at Karnak. 25
3. a. Describe with drawings, The Ziggurat of White Temple at Warka. 20
b. Discuss the Ziggurat at Tchoga-Zanibil, Elam with necessary drawings. 15
4. a. Describe Persian architecture. 10
b. Interpret and discuss the city of Khorshabad with necessary illustrations. 25

Section-B

5. a) Describe Geographical, Geological, Climatic, Religious and Social aspects of Greece, 20
that shaped its architecture.
b) What is Hellenic and Hellenistic period? 15
6. a) Discuss with drawings- The Pantheon, Rome. 20
b) Draw diverse and different plans of Greek Temple. 15
7. a) evaluate and discuss Parthenon with drawings. 20
b) Discuss the Bouleuterian-Council Hall. 15
8. Write short notes on : 7x5 = 35
 - i. The Prytaneion
 - ii. The Odeion
 - iii. The forum of Trajan
 - iv. The Stadium
 - v. The Hippodrome

Khulna University of Engineering and Technology
 Department of Architecture
 B.Arch 1st Year Backlog 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.

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Section-A

Question-01

a) Solve the differential equation $\frac{d^2y}{dt^2} + w^2 y = 0$ to obtain the expression $y = a \sin(wt + \phi)$ for the displacement of a particle executing simple harmonic motion. 12

b) Show the energy of a plane progressive wave is given by $E = 2\pi^2 \rho \gamma^2 a^2$, where the symbols have their usual meanings. 13

c) Two SHM's acting simultaneously on a particle are given by the equations 10

$$Y_1 = 4 \sin\left(wt + \frac{\pi}{3}\right)$$

$$Y_2 = 6 \sin\left(wt + \frac{\pi}{6}\right)$$

Calculate (i) amplitude (ii) phase constant and (iii) the time period of resultant vibration.

Question-02

a) Show that there is no transfer of energy and across any section of the medium in case of a stationary wave. 12

b) Obtain an expression for the apparent frequency of a note when the source and the listener are (i) Source is in motion and observer at rest (ii) Moving toward each other and (iii) Moving away from each other. 13

c) A source of sound has a frequency of 512Hz and amplitude of 0.25cm. What is the flow of energy across a square cm per second if the velocity of sound in air is 332m/s and the density of air is 0.000129 gm/m^3 10

Question-03

a) Explain what is meant by 'bel' and 'phon'. Discuss the factors influencing Loudness. 12

b) Define the intensity and energy density at a point in a plane wave of sound. How are they related? 13

c) Calculate the acoustic intensity level in each case at a distance of 12m from a source, which radiated energy in the rate of 3.12 watts using reference intensities of (i) 100 watts/m^2 (ii) 1 watt/m^2 (iii) $10^{-12} \text{ watt/m}^2$. 10

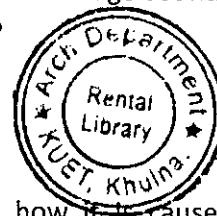
Question-04

a) What are the acoustic requirements of a good auditorium? How an auditorium can be used for speech, music and opera? 10

b) Define the terms (i) Threshold of feeling (ii) Band power level (iii) Peak level (iv) Dead hall and (v) Reverberation time 15

c) The interior surfaces of an auditorium 200X50X30 ft, have an average sound absorption coefficient of 0.25. What is reverberation time of the auditorium? 10

Section-B



Question-05

a) What is meant by spherical aberration of lens? Explain how it is caused. Explain how spherical aberration may be removed. 13

b) Describe coma and astigmatism and distortion. How can those defects be removed? 12

c) The dispersive power for crown and flint glass are 0.015 and 0.030 respectively. Calculate the focal lengths of the lenses (made of crown and flint glass) which form an achromatic doublet of focal length 60 cm when placed in contact. 10

Question-06

a) What is meant by the term polarization of light? Explain the terms "Plane of Polarization" and "Plane of Vibration". 12

b) Show that the light waves are transverse waves and not longitudinal waves. 13

c) A 20 cm long tube containing sugar solution rotates the plane of polarization by 11° . If the specific rotation of sugar is 66. Calculate the strength of solution. 10

Question-07

a) Define lumen, luminous intensity of source and illumination of a source. Describe a photometer and explain how it may be used to compare the illuminating power of two lamps. 12

b) Explain inverse square law of light. How would you verify the inverse square law with a photo-voltic photometer? 13

c) A cobalt 60 source gives a gamma dose rate of $160 \mu Sv h^{-1}$ at 1.0m away. At what distance will the dose rate will be $40 \mu Sv h^{-1}$. 10

Question-08

a) What a short notes on (i) Additive method of colour mixing, (ii) Subtractive method of colour mixing. 12

b) Define axioms of colour matching. If you add three primary colours then what will happen. 13

c) The refractive index of the glass is 1.51. Calculate the angles of refraction for a ray of light incident at polarizing angle. 10

Khulna University of Engineering and Technology
 Department of Architecture
 B.Arch 1st Year Backlog 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

Marks

- 1(a) Define continuous function. 11
 If $f(x) = 1$ for $x < 0$
 $= 1 + \sin x$ for $0 \leq x < \frac{\pi}{2}$
 $= 2 + \left(x - \frac{\pi}{2}\right)^2$ for $x \geq \frac{\pi}{2}$
 Test the continuity and differentiability at $x = \frac{\pi}{2}$.
- 1(b) If $\sin y = x \sin(a + y)$. Prove that $\frac{dy}{dx} = \frac{\sin^2(a+y)}{\sin a}$. 10
- 1(c) State Leibnitz's theorem. If $y = \tan^{-1} x$, then find the value of y_{n+2} by using Leibnitz's theorem. 14
- 2(a) Differentiate $\tan^{-1}\left(\frac{2x}{1-x^2}\right)$ with respect to $\sin^{-1}\left(\frac{2x}{1+x^2}\right)$. 08
- 2(b) If u is a homogeneous function of x, y of degree n . Show that $x^2 \frac{\partial^2 u}{\partial x^2} + y^2 \frac{\partial^2 u}{\partial y^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} = n(n-1)u$. 12
- 2(c) Discuss the maxima and minima of the function $f(x, y) = x^3 + y^3 - 63(x + y) + 12xy$. 15
- 3(a) Calculate $\int \frac{dx}{(1+x)\sqrt{1+x+x^2}}$ 13
- 3(b) Calculate $\int \frac{e^x}{x} (1 + x \log x) dx$ 09
- 3(c) Calculate $\int \frac{1 - \sin x + \cos x}{1 + \sin x - \cos x} dx$ 13
- 4(a) Evaluate $\int_0^1 \frac{\log(1+x)}{1+x^2} dx$ 11
- 4(b) Evaluate $\int_0^{\frac{\pi}{2}} \frac{dx}{1 + \sqrt{\cot x}}$ 12
- 4(c) Find the area bounded by the curve $x^{2/3} + y^{2/3} = 3^{2/3}$. 12

Section - B

- 5(a) Deduce the equation of the line $x + 3y + 4z = 0 = 3x - y + z + 6$ in symmetric form. 10
- 5(b) The axes being rectangular, find the equation of the perp. From the origin to the line $x + 2y + 3z + 4 = 0 = 2x + 3y + 4z + 5$, find the Co-ordinates of the foot of the perpendicular. 10
- 5(c) Find the length and equation of the shortest distance between 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 points where it intersects the lines. 15
- Q. 6(a) Determine the equation of the parabola $x^2 - 2xy + y^2 + 2x - 4y + 3 = 0$ after rotating of axes through 45° . 10
- 6(b) Prove that the straight lines $x/\alpha = y/\beta = z/\gamma$, $\frac{x}{a\alpha} = \frac{y}{b\beta} = \frac{z}{c\gamma}$, $\frac{x}{l} = \frac{y}{m} = \frac{z}{n}$ will lie one plane if $\frac{l}{\alpha}(b - c) + \frac{m}{\beta}(c - a) + \frac{n}{\gamma}(a - b) = 0$ 10
- Q.6(c) A, B, C are three 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. 15
- 7(a) If $l_1, m_1, n_1; l_2, m_2, n_2$ are the direction cosines of the two lines inclined at angle θ to each other. Show that the line with direction cosines $\frac{l_1+l_2}{2\cos\theta/2}, \frac{m_1+m_2}{2\cos\theta/2}, \frac{n_1+n_2}{2\cos\theta/2}$ bisect the angle between these two lines. 17
- 7(b) If A, B, C, D are four points in space such that AB is perp. To CD and AC is perp. to BD. Prove that AD is perpendicular to BC. 18
- 8(a) Write the different forms of the equation of a plane. 10
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- A plane meets the coordinate axes in A, B, C such that the centroid of the triangle ABC is the point (p, q, r) . Prove that the equation of the plane is $\frac{x}{p} + \frac{y}{q} + \frac{z}{r} = 3$
- 8(b) Define orthogonal sphere. Find the condition that the two spheres $x^2 + y^2 + z^2 + 2u_1x + 2v_1y + 2w_1z + d_1 = 0$ and $x^2 + y^2 + z^2 + 2u_2x + 2v_2y + 2w_2z + d_2 = 0$ to be orthogonal. 10
- 8(c) Find the equation of the right circular cone whose vertex is (α, β, γ) semivertical angle α and axis has direction cosines l, m, n . 15