Khulna University of Engineering and Technology

Department of Architecture

B.Arch 1st Year Back Log Examination, 2018

Arch 1133- 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.	What is the primary identifying character of a volume	05
	b.	Discuss Wall Plane in the definition of form and space with necessary examples.	15
	c.	How linear elements have been used in architecture according to their visual Expression and functionality? Discuss with examples.	15
2.	a.	State seven visual properties of form with examples.	15
	b.	Define Regular and Irregular form.	05
	c.	What is articulation of form? Discuss various ways in which a corner can be articulated.	15
3.	a.	What is additive transformation? Give example of an architect's work	15
	b.	Discuss clustered form in brief.	05
	c.	What are the reasons behind formal collisions of geometry? Give examples.	15
4.	a.	How L-shaped plane define a field of space? State with examples.	15
	b.	Outline the various types of openings at corner	05
	c.	Discuss the role of overhead plane in defining a volume of space	15

Section B

1.	a.	Write short notes on: i. Interlocking Spaces ii. Spaces linked by common spaces	20
	b.	Discuss Radial Organization in brief	15
2.	a.	Outline the various types of path configuration.	05
	b.	How an entrance can be visually reinforced? Discuss with examples.	15
	c.	Discuss various forms of circulation space in brief.	15
3.	a.	Briefly discuss the following proportioning systems with examples- i. Modulor ii. Ken	20
	b.	What is Anthropometry? Discuss Visual scale and Human scale with examples.	15
4.	a.	Outline the various ordering principles.	05
	b.	Write short notes on: I. Axis II. Hierarchy	30

Khulna University of Engineering and Technology

Department of Architecture

B.Arch 2nd Year Back Log Examination, 2018

Arch 2131 Buddhist and Hindu Architecture

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.

1	a.	Illustrate the spatial pattern and house form of Indus Civilization with necessary sketches	20
	b.	Explain the construction technique of Corbel Arch that developed during Indus period.	15
2.	a.	Explain Sunchi stupa with necessary details.	20
	b.	Interpret the important parts of Rajprashada with neat sketches.	15
3.	a.	Buddhist philosophy imparted both social and physical life in ancient period in India' explain the statement in your own word.	25
	b.	Sketch Ashok pillar with example.	10
4.	a.	Depict the features of house form of Vedic Civilization with necessary sketches.	15
	b.	Write short notes (any two)	
	i.	Rani Gumpha	10x2
	ii.	Chaityagrih at Karle	=20
	Iii	Ajanta Cave	

Section B

5	a.	Compare pallava, Chola and Pandya, three dynasties of Southern Style Temple Architecture, to find the similarities and dissimilarities among them. Use necessary illustrations.	25
	b.	Write short note on Orissan Temple.	10
6.	a.	How Vastupurusha Mandala is related with human body and physical environment? Use proper diagram to illustrate.	20
	b.	Describe the principle elements of Hindu Temples with neat sketches.	15
7.	a.	Briefly describe about the common Architectural characteristics of temple developed by Orissan group	15
	b.	Write short notes (any two)	20
		i.Rekha Deul ii.Pida Deul iii Sikhara	
8.	a.	What are the meaning of symbolic offerings of five elements of nature made to the idol?	20
	c.	Write down about the process of worship in a temple.	15

Khulna University of Engineering and Technology
Department of Architecture
B.Arch 1st Year Backlog Examination, 2018
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) Calculate the average kinetic energy and the total energy of a body executing S.H.M. 15

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

c) A SHM is presented by $J = 12\sin(6t - \frac{\pi}{3})$, where y is measure in meters, t in seconds and the phase angles in radians. Calculate the frequency, epoch, maximum displacement, velocity and acceleration at t=0. 10

Question-02

a) Explain analytically the formation of stationary waves. How can you indicate the position of nodes and antinodes from the above equation? 12

b) What is Doppler's effect in sound? Obtain an expression for the apparent frequency of a note when the source and listener are, (i) Moving towards each other. (ii) Moving away from each other. 13

c) A motor car sounding a horn at a frequency of 100Hz, moves away from a stationary observer towards a rigid flat wall with a velocity of 35km/hr. How many beats per second will be heard by the observer? The velocity of sound in air is 332m/sec. 10

Question-03

a) What do you mean 'bel' and 'phon'? Discuss the factors influencing loudness. 12

b) Define the intensity and energy density at a point in a plane ware 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 70db, what will be the resultant intensity level? 10

Question-04

a) What is meant by architectural acoustics? What factors need to be addressed for designing of a hall? 12

b) What are the different techniques for production of ultrasonic waves? Discuss the properties of ultrasonic waves. 13

c) A room has dimension 6X4X5m3, calculate 10

i) The mean free path of sound wave in room.

ii) The number of reflections made per second by the sound wave with the walls of the room, Assume, the velocity of sound in air 345m/s

Section-B

Question-05

a) What is distortion? Discuss Barrel-shaped distortion and Pin Cushion distortion with proper diagram. 10

b) What is achromatism? Deduce the condition of achromatism of two thin lenses in contact with each other. 15

c) The two thin lenses of focal length f_1 and f_2 separated by a distance 'd' have an equivalent focal length 60 cm. The combination satisfies the conditions per no chromatic aberration and minimum spherical aberration. Find the values of f_1, f_2 and d. 10

Question-06

a) State and explain Brewster's law. Show that at the polarization angle of incidence the reflected and refracted rays are mutually perpendicular to each other. 13

b) What is polarization of light? Discuss that how the plane polarized light can be found due to reflection. 12

c) Determine the specific rotation of the given sample of sugar solution if the plane of polarization is turned through 13.2^0 . The length of the tube containing 10% sugar solution in 20cm. 10

Question-07

a) What is photometry? Define the following term: i) Luminous flux ii) Illuminance and iii) Solid angle. 12

b) What is luminous intensity? State and explain the Lamberts low of light. 13

c) A 240 volts lamp has a total flux of 3600 lumens and takes a current of 1 ampere. Calculate i) lumens per watt ii) spherical candle power per watt. 10

Question-08

a) Define additive colour mixture. How can be determined three colour mixture data for matching spectrum colours? 15

b) Draw a colour triangle to explain that how the white colour is formed. 12

c) Write down the different types of defect of image. 08

Khulna University of Engineering and Technology

Department of Architecture

B.Arch 2nd Year Back Log Examination, 2018

URP2125 Fundamentals of Planning Process

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.	Briefly narrate the necessity of Urban Planning for a country like Bangladesh.	15
	b.	'Planning has three dimensions in terms of Space, Sector and Time'. Briefly explain the statement drawing example from Bangladesh.	15
	c.	What are the conditions to be an urban area especially municipality (Pouroshova) In Bangladesh.	05
2.	a.	Write down the structure of Planning Commission.	10
	b.	Briefly describe the major functions of Planning Commission.	10
	c.	'There are different types of Institutional linkages of Planning Commission with other Ministries/Divisions/Organizations'-write down the linkages.	10
	d.	What is the development strategy of Bangladesh Government	05
3.	a.	Briefly narrate the stages of Planning Process conventionally practiced in Bangladesh.	20
	b.	'Citizen Participation in the planning process is necessary to make the plan sustainable.' Explain the statement.	15
4.	Annotate any five of the followings:		5x7
	i.	Land –Use Plan	35
	ii.	Detail Area Plan	
	iii.	Strategic Plan	
	iv.	Structure Plan	
	v.	Advocacy Planning	
	vi.	Project	
	vii.	Programme	

Section B

5.	a.	Plan (in context of urban and regional planning) should be Specific, Measurable Achievable, Realistic , Time bound- Why?	10
	b.	How will you define 'Paradigm Shift' in Planning. Provide an example with the help planning theories.	10
	c.	Compare between the Positivism and Post Positivism paradigms of planning Theories.	15
6.	a.	Why comprehensive plan is known as Land-Use Plan. Explain with an example	15
	b.	List the five basic requirement of a Comprehensive Plan as mentioned by Goodman.	05

c. 'Rational Planning follows a systematic process of decision making'- Explain the procedure with proper example. 15

7. a. What is your understanding about Advocacy Planning? How a Planner can play the role of an advocate in this planning? Provide an example. 15

b. Radical Planning Theory is based on some distinct thoughts or ideas'-Explain 10

c. 'Transactive Planning is a process of mutual learning'-how? Explain both the role of planner and community people here. 10

8. a. Explain the concept of 'SITAR' in Planning theory. Provide a short overview of each planning approaches used in SITAR model. 15

b. Write short notes (any four) 20

I. Radical Planning
II. Negotiator
III. Topdown and Bottom up approach
IV. Factory Towns
V. Components of Transactive Planning
VI. Limitations and strength of Advocacy Planning

Khulna University of Engineering and Technology

Department of Architecture

B.Arch 1st Year Back Log Examination, 2018

Math 1125 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 limit of a function. Using $(\delta - \varepsilon)$ definition of limit show that $\lim_{x\to 1}\frac{x^3-1}{x-1} = 3$. 10

1(b) What is meant by continuity of a function? A function $f(x)$ is given by 15

$$f(x) = \begin{cases} 2x-2, & x \geq 2 \\ 2, & 0 \leq x < 2 \\ 2-2x, & x < 0 \end{cases}$$

Discuss the continuity and differentiability of $f(x)$ in the given interval.

1(c) If $y = \frac{x}{x^2-5x+6}$, then find y_n. 10

2(a) State Leibnitz's theorem. If $y = e^{2sin^{-1}x}$, then find a relation connecting y_n, y_{n+1} and y_{n+2}. 12

2(b) If $u = \log r$ and $r = \sqrt{x^2+y^2+z^2}$, then show that 12

$(x^2+y^2+z^2)\left(\frac{\partial^2 u}{\partial x^2}+\frac{\partial^2 u}{\partial y^2}+\frac{\partial^2 u}{\partial z^2}\right) = 1$

2(c) Determine the maximum and minimum values of $x + sin2x$ for $0 \leq x \leq 2\pi$. 11

3 Evaluate the followings: 12

(a) $\int\left(\sqrt{tanx} + \sqrt{cotx}\right) dx$

(b) $\int \frac{dx}{(x^2+1)\sqrt{x^2+4}}$ 11

(c) $\int e^x \frac{x^2+1}{(x+1)^2} dx$ 12

4 Evaluate the followings: 12

(a) $\int_1^3 (2x+1)\sqrt{x^2+2x+2}\, dx$

(b) $\int_0^{\pi/2} \frac{sin^3 x}{sin^3 x+cos^3 x} dx$ 10

(c) Find the area bounded by the parabolas $y^2 = ax$ and $x^2 = ay$. 13

SECTION – B

5(a) Find the cylindrical and spherical polar coordinates of a point whose rectangular coordinates are $(-2,\ 2\sqrt{3},\ 4)$. 10

5(b) Find the distance of $(-1,\ 2,\ 5)$ from the line through $(3,\ 4,\ 5)$ whose direction cosines are proportional to $2, -3, 6$. 12

5(c) If direction cosines of two lines are connected by the relations $l - 5m + 3n = 0$ and $7l^2 + 5m^2 - 3n^2 = 0$ then find the angle between the lines. 13

6(a) Find the equation of the plane which is perpendicular to the plane $5x + 3y + 6z + 8 = 0$ and containing the line of intersection of the planes $x + 2y + 3z - 4 = 0$and $2x + y - z + 5 = 0$. 12

6(b) Reduce in symmetrical form of the equation of the straight line $3x - 2y + 13 = 0 = y + 3z - 26$. Hence verify whether or not this line is perpendicular to $\frac{x+4}{5} = \frac{y-1}{-3} = \frac{z-3}{1}$. 11

6(c) Find the length of the shortest distance between two skew lines $x + y = 0$, $z = 4$and $\frac{x-1}{4} = \frac{y-2}{3} = \frac{z-36}{-6}$. 12

7(a) Examine whether or not the lines $\frac{x-5}{4} = \frac{y-7}{4} = \frac{z+3}{-5}$ and $\frac{x-8}{7} = \frac{y-4}{1} = \frac{z-5}{3}$ are coplanar. 10

7(b) Find the equation of the plane through the straight line $2x = 3y = 4z$ and perpendicular to the plane $7x - y - 5z = 9$. 13

7(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 $x + 2y + 2z = 8$. 12

8(a) Find the equation of the sphere whose centre is $(2,\ 1, -3)$ and tangent to the plane $2x - 4y + 5z = 0$. 11

8(b) Find the angle between the plane $5x - 4y + 3z - 5 = 0$ and the straight line $2x + 4y - 2z + 3 = 0 = 4x - 2y + 6z + 5$. 12

8(c) Find the condition that the plane $lx + my + nz = p$ may touch the ellipsoid$x^2 + 2y^2 + 3z^2 = 1$. 12

Khulna University of Engineering and Technology

Department of Architecture

B.Arch 2nd Year Backlog Examination, 2018

Course no: CE-2125 Course title: Structure I-Mechanics

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) Define force and write down the characteristics of force. 05

b) Differentiate between collinear force systems and concurrent force systems. What is meant by transmissibility of forces? 10

c) Draw the free body diagrams of different members in the following figures. 20

[see figure 1(c)]

Question-02

a) Define the following terms: (i) Modulus of Resilience, (ii) Modulus of toughness, (iii) Elastic Limit, (iv) Proportional limit, (v) Strain, (vi) Stress. 12

b) Draw the stress-strain diagram of mild steel and explain its different features. 08

c) Following observations were made during the tensile test of a mild steel specimen. 15

Diameter of the specimen= 50mm

Length of the specimen = 200mm

Extension under a load of 40kN = 333×10^{-4}mm (within proportional limit)

Load at yield point = 155.8kN

Maximum load = 264kN

Length of the specimen after fracture = 251.9mm

Calculate the values of- (i) Modulus of Elasticity, (ii) Yield point stress, (iii) Ultimate Strength, and (iv) % elongation.

Question-03

a) In following figure, neglecting all friction so that the reactions are normal to the surfaces, find the force F on the top of the wedge. Assume that each body is subjected to concurrent force. 20

[see figure 3(a)]

b) Determine the magnitude and sense of the following force system. [see figure 3(b)] 15

Question-04

a) Describe Varignon's Theorem. 12

b) Define the following terms: (i) Two force member, (ii) Moment arm, (iii) Torque, (iv) couple 12

c) What is elasticity and plasticity? A tensile force of 25kN is applied on a cylindrical body having a diameter of 25mm and height of 75mm. After force application the height of the body is increased to 1.7mm. Calculate stress and strain of the body due to load application. 11

Section-B

Question-05

a) What is 'centroid' and centre of 'gravity'? 05

b) Locate the centroid for a sector of a circle. 12

c) Locate the centroid of the area included between the parabola $y^2 = 8x$, the y axis and the line $y = 8$ inch. 18

Question-06

a) A wire, considered as a weighted line, is to be bent to form a 10-inch semicircle joined to the straight part OA shown in figure below. It is designed that this bent wire balance about the x and y axis at 0. Where should be the centroid if the section OA and what should be the length of OA? 15

[see figure 6(a)]

b) Find the centroid of the shaded area shown in figure below. 20

[see figure 6(b)]

Question-07

a) What do you mean by 'polar moment of inertia' and 'Rectangular moment of inertia'? Derive a relationship between them. 10

b) Find the moment of inertia of a triangular area as shown in figure below. 15

c) A semi-circular area is removed from a triangular area as shown in figure below. Find the moment of inertia of the net composite area about the x axis. 10

[see figure 7(c)]

Question-08

a) If the co-ordinates of P, in the following figure are (3in, 27in), find the moment of inertia with respect to the Y axis of (i) A1 and (ii) A2. 20

[see figure 8(a)]

b) In the channel section of the following figure. Let a=1½", b=4¾" and c=9½". Find $\bar{I}x$ and $\bar{I}y$. 15

[see figure 8(b)]

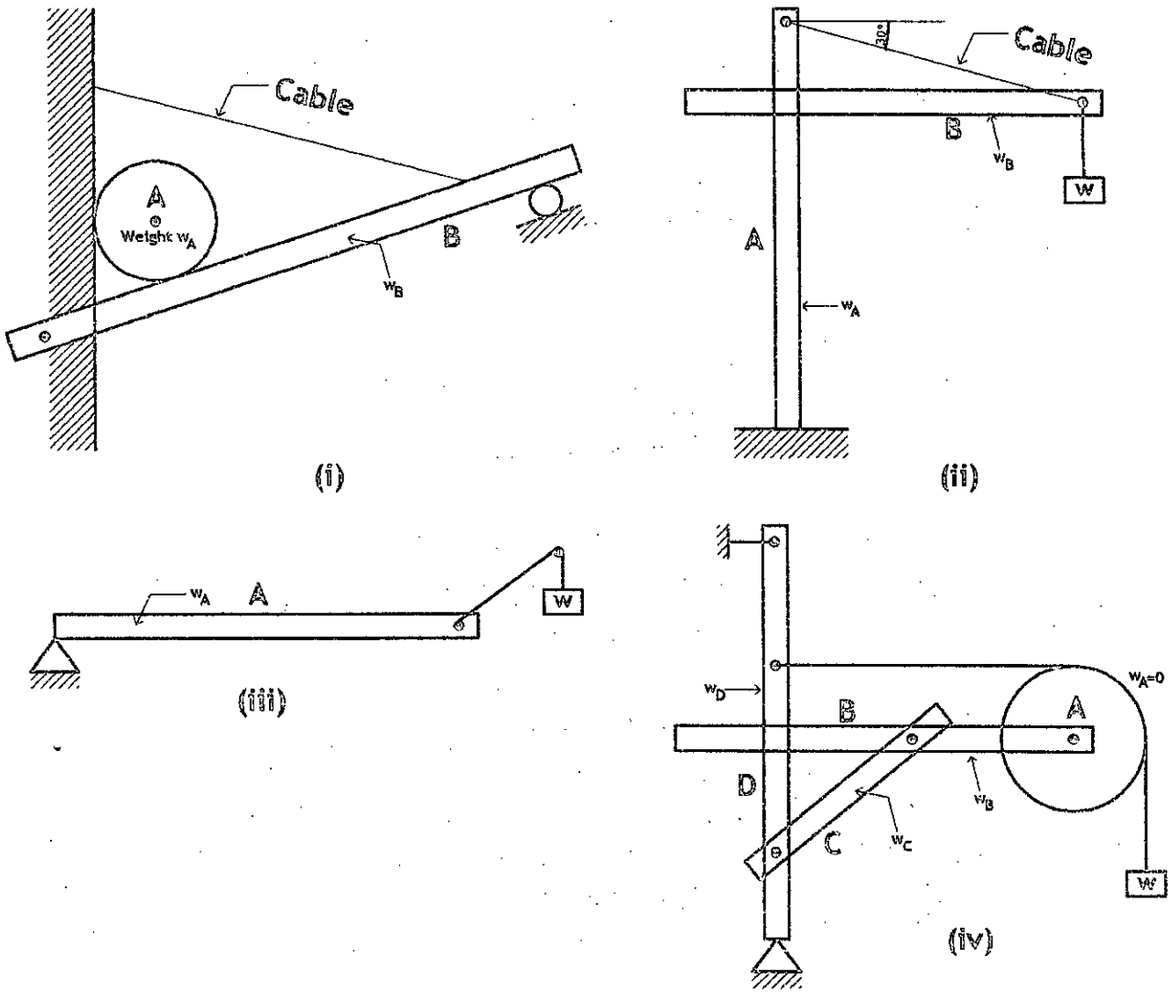

Figure 1(c)

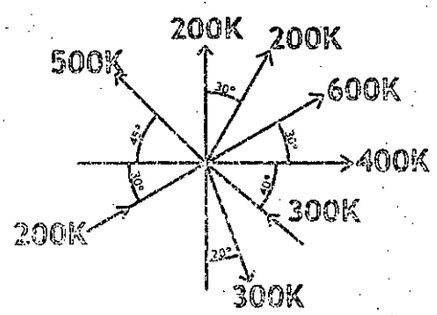

Figure 3(b)

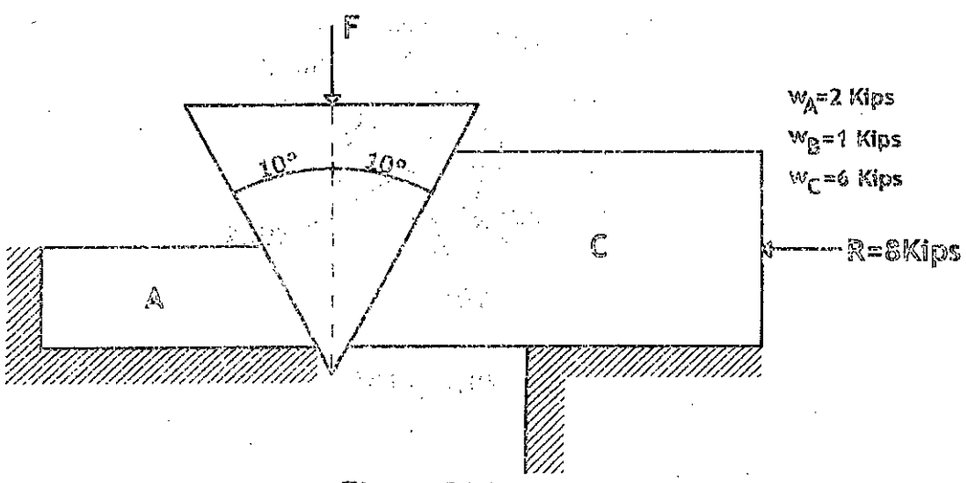

Figure 3(a)

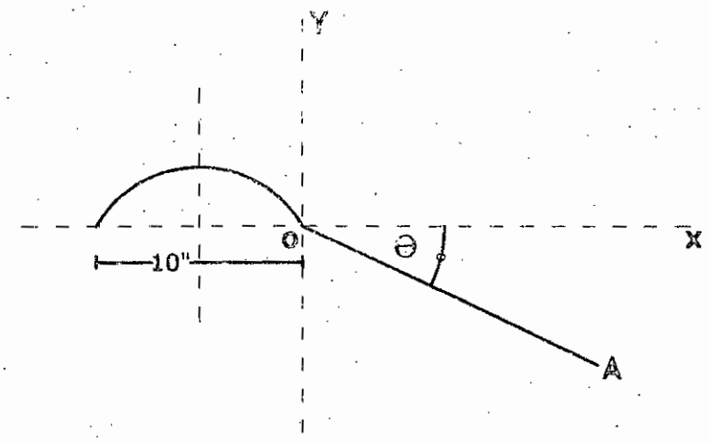

Figure 6(a)

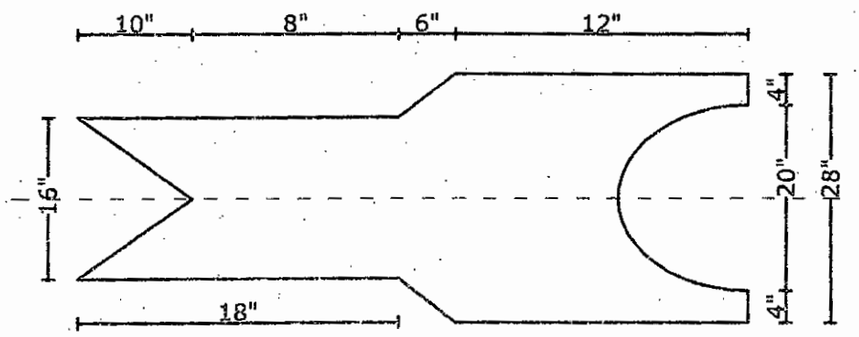

Figure 6(b)

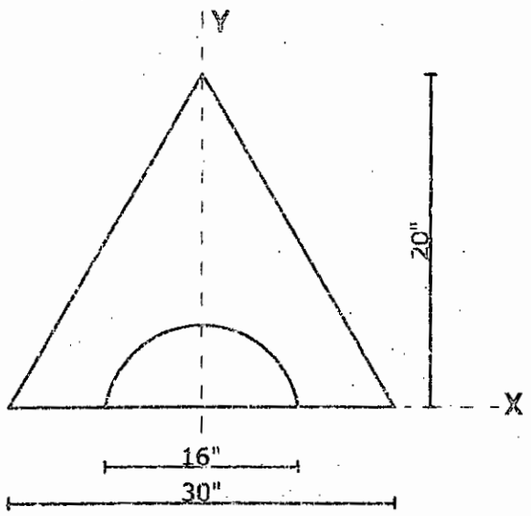

Figure 7(c)

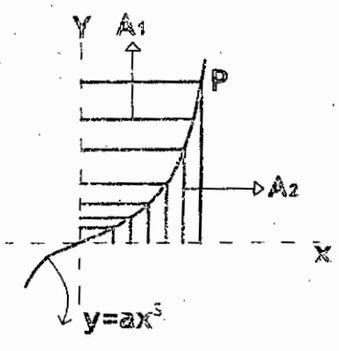

Figure 8(a)

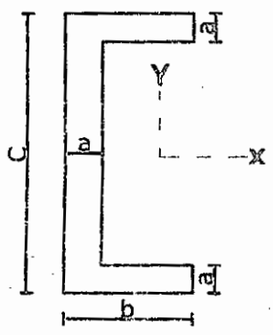

Figure 8(b)