L-3/T-1/ARCH **Date : 10/05/2014**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-3/T-1 B. Arch. Examinations 2012-2013

Sub : **PLAN 319** (Theory and Practice of Planning)

Full Marks : 140 Time : 3 Hours

The figures in the margin indicate full marks.

USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION – A

There are **FOUR** questions in this section. Answer any **THREE**.

1. (a) What is planning? Why is planning needed? What constraints does a planner face while planning? (6+4 1/3)

   (b) In case of planning water and sanitation facilities of a slum, which one would you prefer between Rational Comprehensive approach and Disjointed Incrementalist approach of planning? Explain. (13)

2. (a) Between Blue print planning and process planning, which one do you think is more appropriate while preparing a slum improvement plan and why? (10)

   (b) Differentiate between strategy level and local level plan of structure planning process. (6)

   (c) Write down some elements which can be covered under structure plan. (3 1/3)

   (d) State the major types of systems with one example for each. (4)

3. (a) Discuss different types of local level plans under strategic/structure planning process, with examples. (9)

   (b) What are the essential characteristics of a system? Explain with an example. (8)

   (c) How does an activity system vary from a mechanical system? (6 1/3)

4. (a) Do you think participatory approach should be incorporated while planning for a community? Why do you think participatory approach is needed? (10)

   (b) How does the advocacy planning serve the distressed group of the population? (8 1/3)

   (c) What do you understand by "Spatial Planning"? What is the purpose of Spatial Planning? (5)

SECTION – B

There are **FOUR** questions in this section. Answer any **THREE**.

5. (a) What is zoning? Why is it important? (6)

   (b) What are the objectives and advantages of zoning in a city plan? (8)

   (c) Describe the basic types of zoning? (9 1/3)

Contd P/2

25

PLAN 319

6. (a) What is a master plan? Define a master plan. (7)

   (b) What are the limitations of a master plan? How does it differ from a structure plan? (7)

   (c) Describe the salient features of Dhaka master plan, 1959. (9 1/3)

7. (a) What is DMDP? When was it approved? What are the objectives of this plan? (8)

   (b) What are the purpose of the Detailed Area Plan? How will it suppose to make Dhaka a liveable city? (8)

   (c) What is the importance of the structure plan in the DMDP? (7 1/3)

8. Write short notes on any four: (23 1/3)

   (a) RAJUK

   (b) Patrick Geddes and 1917 Survey Plan

   (c) DMAIUDP

   (d) Strategic Planning Zones (SPZ)

   (e) Urban Area Plan (UAP)

L-3/T-1/ARCH **Date : 24/05/2014**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-3/T-1 B. Arch. Examinations 2012-2013

Sub : **HUM 315** (Logic and Philosophy)

Full Marks : 140 Time : 3 Hours

The figures in the margin indicate full marks.

USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION – A

There are **FOUR** questions in this section. Answer any **THREE.**

1. (a) What is logic? **(5)**

   (b) What is premise and conclusion in argument? **(6)**

   (c) "Any argument can never be true or false, but valid or invalid" – Explain with example. **(12 1/3)**

2. (a) What is meant by sound argument? **(5)**

   (b) Discuss the characteristics of inductive argument. **(5)**

   (c) How is inductive argument different from deductive argument? **(13 1/3)**

3. (a) What is definition? **(5)**

   (b) Write the purpose of definition. **(8)**

   (c) Discuss any four rules of definition. **(10 1/3)**

4. (a) What are the differences between 'term' and 'word'? **(6)**

   (b) What do you mean by fallacy? **(4)**

   (c) Discuss any five types of fallacy of relevance as informal fallacy. **(13 1/3)**

SECTION – B

There are **FOUR** questions in this section. Answer any **THREE.**

5. (a) In what sense are we all philosopher? Discuss and offer your comments. **(10)**

   (b) What are the important branches of philosophy? Discuss any five branches of philosophy. **(13 1/3)**

Contd P/2

HUM 315

6. (a) What do we mean by religion? **(4)**

   (b) Discuss the relationship between philosophy and religion. **(13 1/3)**

   (c) What is the application of aesthetics in architecture? **(6)**

7. (a) What are intuitionism and authoritarianism? **(6)**

   (b) Discuss Rene Descartes' theory of idea. **(5)**

   (c) How does John Locke Criticize the innate idea of Rene Descartes. **(12 1/3)**

8. (a) Discuss the water philosophy of Thabs. **(6)**

   (b) What is meant by Sophist? **(4)**

   (c) Explain and evaluate Plato's theory of knowledge. **(13 1/3)**

Arc 31/05/14

L-3/T-1/ARCH **Date : 31/05/2014**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-3/T-1 B. Arch Examinations 2012-2013

Sub : **ME 363** (Building Services II: Mechanical Equipment)

Full Marks : 140 Time : 3 Hours

The figures in the margin indicate full marks.

USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION – A

There are **FOUR** questions in this section. Answer any **THREE**.

Necessary tables and charts are attached.

1. (a) Differentiate between drenchers and automatic sprinklers. With a diagram show the main features of a typical sprinkler system. **(10)**

   (b) Draw a typical bulb type sprinkler head. How this type of sprinkler head is said to operate at any desired temperature? **(8 ⅓)**

   (c) What is the special advantage of using a CTC type fire extinguisher? What happens when the fluid of this type is sprayed on to red hot metal? **(5)**

2. (a) What are the 5 environmental considerations of elevatoring? With neat sketches show different arrangements for 6 elevator car groupings. **(10)**

   (b) How "critical traffic period" vary with different building types and what are the factors by which it is determined? **(8 ⅓)**

   (c) Distinguish between 2 : 1 and 1 : 1 roping systems. **(5)**

3. (a) With an example, explain how the total time for an elevator trip is calculated by breaking its components into 2 stops, 10 ft apart. **(10)**

   (b) Mention the 3 requirements necessary for the escalators to be advantageously applied to any building. **(5)**

   (c) Draw and label the following: **(8 ⅓)**

   (i) An escalator showing its space requirements for all components.

   (ii) The plan view of a 4 ft wide escalator showing standard dimensions.

4. Estimate the cooling load of an office room of 10 persons in Chittagong (24° N Lattitude) with the following data: **(23 ⅓)**

   Dimension: East-West 12 m, North-South 8 m, height 3.5 m,
   Highest time and Month: 1800 hrs/June
   Roof: Type 5, without suspended, 25 mm wood, 50 mm insulation
   Walls: 254 mm brick with 12.7 mm plaster both sides
   1 Door: 1.25 m × 2.2 m (height) × 25 mm thick plywood
   2 Windows: 2.0 m × 1.25 m (height) × 3 mm cellular glass
   Lights: 250 Watts/CLF = 0.07
   Ventilation 7.5 l/s per person

   Assume no heat transfer through floor, North and East walls, door and windows in South only. (Use the tables provided)

Contd P/2

ME 363

SECTION – B

There are **FOUR** questions in this section. Answer any **THREE**.

Psychrometric chart, P-h chart for R-134a provided.

Assume standard data if necessary.

5. (a) Briefly explain the difference between a refrigerator and a heat pump. **(7 ⅓)**

   (b) Draw a schematic diagram identifying the components of the typical air conditioning plant of a central air conditioning system. **(10)**

   (c) What do you understand by 'Relative humidity' and 'Absolute humidity' of atmospheric air? **(6)**

6. (a) Briefly explain the advantages of superheating and subcooling in a vapor compression refrigeration cycle. **(8 ⅓)**

   (b) A refrigerator using R-134a as working fluid operates on an ideal vapor compression refrigeration cycle between condenser pressure of 0.8 MPa and evaporator pressure 0.15 MPa. Find the following if the system cools at the rate of 5 tons. **(15)**

   (i) COP of the system

   (ii) Mass flow requirement of refrigerant (kg/s)

   (iii) Work input required by the compressor (kW)

   Attach the cycle on the P-h chart with the script.

7. (a) Briefly explain the difference between a split-type and a window type Air-conditioner. **(8)**

   (b) Briefly explain the working principle of an 'Induced Draft' cooling tower. Where is it used in an air conditioning system? **(10)**

   (c) What do you understand by a 'Water Chiller'? **(5 ⅓)**

8. (a) Briefly explain "Dew-point" temperature using psychrometric chart parameters. **(7 ⅓)**

   (b) 142 m^3/min moist air at 5°C with absolute humidity of 0.002 kg/kg of dry air, is mixed with 425 m^3/min of moist air at 24°C and 50% relative humidity. Mixing can be considered adiabatic and at atmospheric pressure. Find the absolute humidity and the dry bulb temperature of the mixed stream. **(16)**

Cooling Load Calculation Tables

for problem #4.

TABLE A2 Climatic conditions for different countries

Col. 1	Col. 2				Col. 3	Winter, °C			Summer, °C							Prevailing winds		
						Col. 4			Col. 5 Design dry-bulb			Col. 6	Col. 7 Design wet-bulb			Winter		Summer
Country and station	Lat. °	′	Long °	′	Elevation, (m)	Mean of annual extremes	99%	97.5%	1%	2.5%	5%	Mean daily range, °C	1%	2.5%	5%	m/s		
AFGHANISTAN																		
Kabul	34	35N	69	12E	1816	−17	−14	−13	37	36	34	18	19	18	18	N	2	N
ALGERIA																		
Algiers	36	46N	3	03E	59	3	6	7	35	33	32	8	25	24	24			
ARGENTINA																		
Buenos Aires	34	35S	58	29W	27	−3	0	1	33	32	30	12	25	24	24	SW	5	NNE
Cordoba	31	22S	64	15W	423	−6	−2	0	38	36	34	15	24	24	23			
Tucuman	26	50S	65	10W	427	−4	0	2	39	37	36	13	24	24	23			
AUSTRALIA																		
Adelaide	34	56S	138	35E	43	2	3	4	37	34	33	14	22	21	20	NE	3	NW
Alice Springs	23	48S	133	53E	547	−2	1	3	40	39	38	15	24	23	22	N	3	SE
Brisbane	27	28S	153	02E	42	4	7	8	33	31	30	10	25	24	24	N	4	NNE
Darwin	12	28S	130	51E	27	16	18	19	34	34	33	9	28	27	27	E	5	WNW
Melbourne	37	49S	144	58E	35	−1	2	3	35	33	30	12	22	21	20			
Perth	31	57S	115	51E	64	3	4	6	38	36	34	12	24	23	23	N	3	E
Sydney	33	52S	151	12E	42	3	4	6	32	29	27	7	23	23	22	N	4	NE
AUSTRIA																		
Vienna	48	15N	16	22E	196	−19	−14	−12	31	30	28	9	22	21	19	W	7	SSE
AZORES																		
Lajes (Terceira)	38	45N	27	05W	52	6	8	9	27	26	25	6	23	22	22	W	5	NW
BAHAMAS																		
Nassau	25	05N	77	21W	3	13	16	17	32	32	31	7	27	27	26			
BANGLADESH																		
Chittagong	22	21N	91	50E	27	9	11	12	34	33	32	11	28	27	27			
BELGIUM																		
Brussels	50	48N	4	21E	100	−11	−9	−7	28	26	25	11	21	20	19	NE	4	ENE
BERMUDA																		
Kindley AFB	33	22N	64	41W	9	8	12	13	31	30	29	7	26	26	26	NW	8	S
BOLIVIA																		
La Paz	16	20S	68	09W	2659	−2	−1	1	22	21	20	13	14	14	13			
BRAZIL																		
Belem	1	27S	48	29W	13	19	21	22	32	32	31	11	27	26	26	SE	3	E
Belo Horizonte	19	56S	43	57W	915	6	8	10	30	29	28	10	24	24	24			
Brasilia	5	52S	47	55W	1049	8	9	11	32	31	30	9	24	24	24	N	3	E
Curitiba	25	25S	49	17W	949	−2	1	3	30	29	28	12	24	23	23			
Fonaleza	3	46S	38	33W	27	19	21	21	33	32	9	26	26	26				
Porto Alegre	30	02S	51	13W	10	0	3	4	35	33	32	11	24	24	24			
Recife	8	04S	34	53W	30	19	21	21	31	31	30	6	26	25	25	5	4	ESE
Rio De Janeiro	22	55S	43	12W	61	13	14	16	34	33	32	6	27	26	26	N	3	S
Salvador	13	00S	38	30W	47	18	19	20	31	31	30	7	26	26	26			
Sao Paulo	23	33S	46	38W	795	2	6	8	30	29	28	10	24	23	23	N	3	W

(Contd.)

Adapted by permission from *ASHRAE Fundamentals*, 1989, Table 3.

TABLE A3 Recommended indoor temperature and relative humidity for summer cooling

Type of premise	Dry bulb temperature (°C)	Minimum relative humidity
Offices	25.5	55%
Cafetarias	24.0	55%
Auditoriums	25.5	50%
Computer rooms	24.0	As needed
Department stores	26.5	55%
Supermarkets	25.5	55%
Factory	22	50%
Residence	25.5	55%

TABLE A4(a) Maximum solar heat gain factor (W/m^2) for sunlit glass, north latitudes

0°N Lat

	N	NNE/ NNW	NE/ NW	ENE/ WNW	E/ W	ESE/ WSW	SE/ SW	SSE/ SWW	S	HOR
Jan.	107	107	278	558	738	801	741	574	372	934
Feb.	114	123	416	647	773	779	663	445	211	965
Mar.	120	274	536	704	746	704	536	274	120	956
Apr.	224	423	609	707	697	581	372	120	117	896
May	357	517	640	688	634	486	252	117	117	836
June	407	546	650	669	603	441	208	117	117	805
July	363	517	634	672	615	470	243	120	120	820
Aug.	237	423	590	681	669	552	353	123	120	871
Sep.	126	265	514	672	729	672	514	265	126	924
Oct.	117	126	407	628	745	751	637	426	208	943
Nov.	110	110	278	552	726	789	726	565	369	924
Dec.	107	107	224	517	713	798	757	618	435	909

4°N Lat

	N	NNE/ NNW	NE/ NW	ENE/ WNW	E/ W	ESE/ WSW	SE/ SW	SSE/ SWW	S	HOR
Jan.	104	104	249	536	722	795	514	609	445	902
Feb.	110	110	388	628	764	782	678	480	278	550
Mar.	120	243	514	691	764	716	558	303	136	953
Apr.	174	394	596	704	704	599	398	136	120	905
May	293	486	631	694	650	508	281	120	120	858
June	347	517	637	678	618	464	230	120	120	830
July	303	486	622	678	631	492	268	123	120	842
Aug.	186	391	581	678	675	571	379	133	126	880
Sep.	123	237	492	659	729	681	536	293	139	924
Oct.	114	114	379	609	738	754	653	467	271	928
Nov.	107	107	249	530	713	782	732	599	439	896
Dec.	104	104	196	495	697	789	764	650	505	874

Adapted by permission from *ASHRAE Fundamentals*, 1989, Table 34.

(*Contd.*)

TABLE A4(a) Maximum solar heat gain factor (W/m^2) for sunlit glass, north latitudes (Contd.)

24°N Lat

	N	NNE/ NNW	NE/ NW	ENE/ WNW	E/ W	ESE/ WSW	SE/ SW	SSE/ SWW	S	HOR
Jan.	85	85	129	404	599	757	798	760	716	675
Feb.	95	95	252	521	694	770	767	672	606	786
Mar.	107	142	391	615	738	748	675	530	432	868
Apr.	117	278	502	659	719	669	533	338	237	893
May	136	369	562	675	688	599	416	211	145	890
June	174	401	581	675	669	565	369	174	136	880
July	142	366	555	663	672	584	407	205	145	877
Aug.	120	274	492	640	694	644	511	325	227	874
Sep.	110	133	375	584	700	710	650	514	423	839
Oct.	98	98	249	502	666	748	741	653	590	770
Nov.	85	85	133	398	590	745	786	748	707	672
Dec.	82	82	91	353	568	738	779	779	748	628

28°N Lat

	N (Shade)	NNE/ NNW	NE/ NW	ENE/ WNW	E/ W	ESE/ WSW	SE/ SW	SSE/ SWW	S	HOR
Jan.	79	79	110	369	577	741	792	779	751	618
Feb.	91	91	227	495	672	770	776	707	653	738
Mar.	104	129	366	596	729	748	697	574	495	836
Apr.	114	265	476	647	719	681	562	391	297	877
May	126	363	543	666	691	615	454	262	183	883
June	161	394	562	666	672	581	404	707	155	877
July	129	360	536	656	678	599	442	252	180	870
Aug.	120	262	470	628	694	653	543	379	287	858
Sep.	107	120	350	565	691	713	672	558	486	808
Oct.	95	95	224	476	644	745	751	685	637	722
Nov.	82	82	110	363	571	732	779	767	741	615
Dec.	75	76	76	312	543	716	782	792	776	565

(Contd.)

TABLE A6 Surface conductance (W/(m^2·°C)) and resistance (m^2·°C/W) for air

Position of surface	Direction of heat flow	Surface emittance, ε^e					
		Non-reflective $\varepsilon = 0.90$		$\varepsilon = 0.20$	Reflective	$\varepsilon = 0.05$	
		h_1	R	h_1	R	h_1	R
STILL AIR							
Horizontal	Upward	9.26	0.11	5.17	0.19	4.32	0.23
Sloping-45°	Upward	9.09	0.11	5.00	0.20	4.15	0.24
Vertical	Horizontal	8.29	0.12	4.20	0.24	3.35	0.30
Sloping-45°	Downward	7.50	0.13	3.41	0.29	2.56	0.39
Horizontal	Downward	6.13	0.16	2.10	0.48	1.25	0.80
MOVING AIR (Any Position)		h_o	R	h_o	R	h_o	R
Wind (for winter) 6.7 m/s (24 km/h)	Any	34.0	0.030	–	–	–	–
Wind (for summer) 3.4 m/s (12 km/h)	Any	22.7	0.044	–	–	–	–

[a]No surface has both an airspace resistance value and a surface resistance value. No airspace value exists for any surface facing an airspace of less than 13 mm.
[b]For ventilated attics or spaces above ceiling under summer conditions (heat flow down), see Table 5.
[c]Conductances are for surfaces of the stated emittance facing virtual black body surrounding at the same temperature as the ambient air. Values are based on a surface-air temperature difference of 5.5°C and for surface temperature of 21°C.
[d]see Chapter 3 for more detailed information, especially Tables 5 and 6, and see Figure 1 for additional data.
[e]Condensate can have a significant impact on the surface emittance (see Table 3).

Adapted by permission from *ASHRAE Fundamentals*, 1989, Table 1.

TABLE A7 Typical thermal properties of common building and insulating materials—design values (Contd.)

Description	Density kg/m³	Conductivity (k) W/(m·K)	Conductance (C) W(m²·K)	Resistance (R) (1/k) m·K/W	Resistance (R) For thickness listed (1/Ω) (m²·K)/W	Specific heat, kJ/(kg·K)
Loose Fill						
Cellulosic insulation (milled paper or wood pulp)	37–51	0.039–0.046	–	25.6–21.7	–	1.38
Perlite expanded	32–66	0.039–0.045	–	25.6–22.9	–	1.09
	66–120	0.045–0.052	–	22.9–1.4	–	
	120–180	0.052–0.060	–	19.4–16.6	–	
Mineral fiber (rock, slag, or glass) approx. 95–130 mm	9.6–32	–	–	–	1.94	0.71
approx. 170–220 mm	9.6–32	–	–	–	3.35	
approx. 190–250 mm	9.6–32	–	–	–	3.87	
approx 260–350 mm	9.6–32	–	–	–	5.28	
Mineral fiber (rock, slag, or glass) approx. 90 mm (closed sidewall application)	32–56	–	–	–	2.1–2.5	
Vermiculite expliated	110–130	0.068	–	14.8	–	1.34
	64–96	0.063	–	15.7	–	
Spray Applied						
Polyurethane foam	24–40	0.023–0.026	–	43.3–38.5	–	
Urea formaldehyde foam	11–26	0.032–0.040	–	31.5–24.7	–	
Cellulosic fiber	56–96	0.042–0.049	–	23.9–20.4	–	
Glass fiber	56–72	0.038–0.039	–	26.7–25.6	–	
PLASTERING MATERIALS						
Cement plaster, sand aggregate	1860	0.72	–	1.39	–	0.84
Sand aggregate 95 mm	–	–	75.5	–	0.08	0.84
Sand aggregate 19 mm	–	–	37.8	–	0.15	0.84
Gypsum plaster:						
Light weight aggregate 127 mm	720	–	17.7	–	0.32	–
Light weight aggregate 16 mm	720	–	15.2	–	0.39	–
Light weight agg. on metal lath 19 mm	–	–	12.1	–	0.47	–
Perlite aggregate	720	0.22	–	4.64	–	1.34
Sand aggregate	1680	0.81	–	1.25	–	0.84
Sand aggregate 127 mm	1680	–	63.0	–	0.09	–
Sand aggregate 16 mm	1680	–	51.7	–	0.11	–
Sand aggregate on metal lath 19 mm	–	–	43.7	–	0.13	–
Vermiculite aggregate	720	0.24	–	4.09	–	–

(Contd.)

TABLE A7 Typical thermal properties of common building and insulating materials—design values (Contd.)

Description	Density kg/m³	Conductivity (k) W/(m·K)	Conductance (C) W/(m²·K)	Resistance (R) ($1/k$) m·K/W	Resistance (R) For thickness listed ($1/\Omega$) (m²·K)/W	Specific heat, kJ/(kg·K)
WOODS (12% moisture content)						1.63
Hardwoods						
Oak	659–749	0.16–0.18	–	6.2–5.5	–	
Birch	682–726	0.167–0.176	–	6.0–5.7	–	
Maple	637–704	0.157–0.171	–	6.4–5.8	–	
Ash	614–670	0.153–0.164	–	6.5–6.1	–	1.63
Softwoods						
Southern Pine	570–659	0.144–0.161	–	6.9–6.2	–	
Douglas Fir-larch	536–581	0.137–0.145	–	7.3–6.9	–	
Southern Cypress	502–514	0.130–0.132	–	7.7–7.6	–	
Hem-Fir, Spruce-Pine-Fir	392–502	0.107–0.130	–	9.3–7.7	–	
West Coast Woods, Cedars	347–502	0.098–0.130	–	10.3–7.7	–	
California Redwood	392–448	0.107–0.118	–	9.4–8.5	–	
BUILDING BOARD						
Asbestos-cement board	1900	0.58	–	1.73	–	1.00
Asbestos-cement board 3.2 mm	1900	–	182.4	–	0.005	–
Asbestos-cement board 6.4 mm	1900	–	93.3	–	0.011	–
Gypsum or plaster board 9.5 mm	800	–	17.6	–	0.056	1.09
Gypsum or plaster board 12.7 mm	800	–	12.6	–	0.079	–
Gypsum or plaster board 15.9 mm	800	–	10.1	–	0.099	–
Plywood (Douglas Fir)	540	0.12	–	8.66	–	1.21
Plywood (Douglas Fir) 6.4 mm	540	–	18.2	–	0.055	–
Plywood (Douglas Fir) 9.5 mm	540	–	12.1	–	0.083	–
Plywood (Douglas Fir) 12.7 mm	540	–	9.1	–	0.11	–
Plywood (Douglas Fir) 15.9	540	–	7.3	–	0.14	–
Plywood or wood panels 19.0 mm	540	–	6.1	–	0.16	1.21

(Contd.)

TABLE A7 Typical thermal properties of common building and insulating materials—design values (Contd.)

Description		Density kg/m³	Conductivity (k) W/(m·K)	Conductance (C) W/(m²·K)	Resistance (R) ($1/k$) m·K/W	Resistance (R) For thickness listed ($1/\Omega$) (m²·K)/W	Specific heat, kJ/(kg·K)
BUILDING MEMBRANE							
Vapor—permeable felt		–	–	94.9	–	0.011	
Vapor—seal, 2 layers of mopped 0.73 kg/m² felt		–	–	47.4	–	0.21	
Vapor—seal, plastic film		–	–	–	–	Negl.	
FINISH FLOORING MATERIALS							
Carpet and fibrous pad		–	–	2.73	–	0.37	1.42
Carpet and rubber pad		–	–	4.60	–	0.22	1.38
Cork tile	3.2 mm	–	–	20.4	–	0.049	2.01
Terrazzo	25 mm	–	–	71.0	–	0.014	0.80
Tile—asphalt, linoleum, vinyl, rubber		–	–	113.6	–	0.009	1.26
vinyl asbestos							1.01
ceramic							0.80
Wood, hardwood finish	19 mm			8.35	–	0.12	
INSULATING MATERIALS							
Blanker and Batt							
Mineral Fiber, fibrous form processed from rock, slag, or glass							
approx. 75–100 mm		5–32	–	0.52	–	1.94	
approx. 90 mm		5–32	–	0.44	–	2.29	
approx. 140–165 mm		5–32	–	0.30	–	3.34	
approx. 150–190 mm		5–32	–	0.26	–	3.87	
approx. 230–250 mm		5–32	–	0.19	–	5.28	
approx. 300–330 mm		5–32	–	0.15	–	6.69	
Board and Slabs							
Cellular glass		136	0.050	–	19.8	–	0.75
Glass fiber, organic bonded		64–140	0.036	–	27.7	–	0.96
Expanded perlite organic bonded		16	0.052	–	19.3	–	1.26
Expanded rubber (rigid)		72	0.032	–	31.6	–	1.68
Expanded polystyrene extruded (smooth skin surface) (CFC-12 exp.)		29–56	0.029	–	34.7	–	1.22

(Concluded)

Notes:

(1) Corrections in Table A10(a) are in °C. The correction is applied directly to the CLTD for a wall or roof as given in Tables A8 and A9.
(2) The CLTD correction given in Table 10(a) is not applicable to Table A10(b) (Cooling load temperature differences for conduction through glass).
(3) For South latitudes, replace Jan. through Dec. by July through June.

For sunlit double-strength sheet glass (Table A10(b)). Related data were calculated for externally shaded similar glass (Table A4(b)). These SHFGs were used as the heat gain input for calculating Cooling Load Factors (CLF), employing appropriate Room Transfer Functions (RTFs). This process, however, introduces several new variables into the calculations: (1) the presence or absence of an interior shading device, which is pivotal, and (2) the construction, furnishings, floor coverings, and relative amounts of fenestration, which is important when interior shading is absent.

To simplify the data, the total SHGF for a particular month are divided by the maximum SHFG in that month to obtain a normalized profile. A comparison of these profiles for different months indicates great similarity among SHGFs in the warmest months

TABLE A10(b) Cooling load temperture differences (CLTD) for conduction through glass

Solar time, h	CLTD, °C	Solar time, h	CLTD, °C
0100	1	1300	7
0200	0	1400	7
0300	−1	1500	8
0400	−1	1600	8
0500	−1	1700	7
0600	−1	1800	7
0700	−1	1900	6
0800	0	2000	4
0900	1	2100	3
1000	2	2200	2
1100	4	2300	2
1200	5	2400	1

Corrections. The values in the table were calculated for an inside temperature of 25.5°C and an outdoor maximum temperature of 35°C with an outdoor daily range of 12°C. The table remains approximately correct for other outdoor maximums 34 to 39°C and other outdoor daily ranges of 9 to +19°C, provided the outdoor daily average temperature remains approximately 29.4°C. If the room air temperature is different from 25.5°C and/or the outdoor daily average temperature different from 29.4°C, the following rules apply: (a) For room air temperature less than 25.5°C, and the difference between 25.5°C and room air temperature; if greater than 25.5°C, subtract the difference. (b) For outdoor daily average temperature less than 29.4°C, subtract the difference between 29.4°C and the daily average temperature; if greater than 29.4°C, add the difference.

Adapted by permission from *ASHRAE Fundamentals*, 1989, Table 33.

TABLE A11 Shading coefficients for single glass and insulating glass[a]

Type of glass	Nominal thickness[b]	Solar trans.[b]	Shading coefficient	
			h_0 = 22.7	h_0 = 7.0
A. Single Glass				
Clear	3 mm	0.86	1.00	1.00
	6 mm	0.78	0.94	0.95
	10 mm	0.72	0.90	0.92
	13 mm	0.67	0.87	0.88
Heat absorbing	3 mm	0.64	0.83	0.85
	6 mm	0.46	0.69	0.73
	10 mm	0.33	0.60	0.64
	13 mm	0.24	0.53	0.58
B. Insulating Glass				
Clear out, Clear in	3 mm[c]	0.71[e]	0.88	0.88
Clear out, Clear in	6 mm	0.61	0.81	0.82
Heat absorbing[d]				
Out, Clear in	6 mm	0.36	0.55	0.58

[a]Refers to factory-fabricated units with 5-, 6-, or 13 mm airspace or to prime windows plus storm sash.
[b]Refer to manufacturer's literature for values.
[c]Thickness of each pane of glass, not thickness of assembled unit.
[d]Refers to gray, bronze, and green tinted heat-absorbing float glass.
[e]Combined transmittance for assembled unit.

Adapted by permission from *ASHRAE Fundamentals*, 1989, Table 20.

TABLE A12 Design values of *a*

a	Furnishings and return	Air supply light fixture	Type of
0.45	Heavyweight, simple furnishings, no carpet	Low rate; supply and return below ceiling ($V \leq 2.5$)[a]	Recessed, not vented
0.55	Ordinary furniture, no carpet	Medium to high ventilation rate; supply and return below ceiling or through ceiling grill and space ($V \geq 2.5$)[a]	Recessed, not vented
0.65	Ordinary furniture, with or without carpet	Medium to high ventilation rate or fan coil or induction type air-conditioning terminal unit; supply through ceiling or wall diffuser; return around light fixtures and through ceiling space. ($V \geq 2.5$)[a]	Vented
0.75 or greater	Any type of furniture	Ducted returns through light fixtures	Vented or freehanging in air stream with ducted returns

-9-

[a]V is room air supply rate in litres/s per square metre of floor area.

Adapted by permission from *ASHRAE Fundamentals*, 1989, Table 41.

Carrier

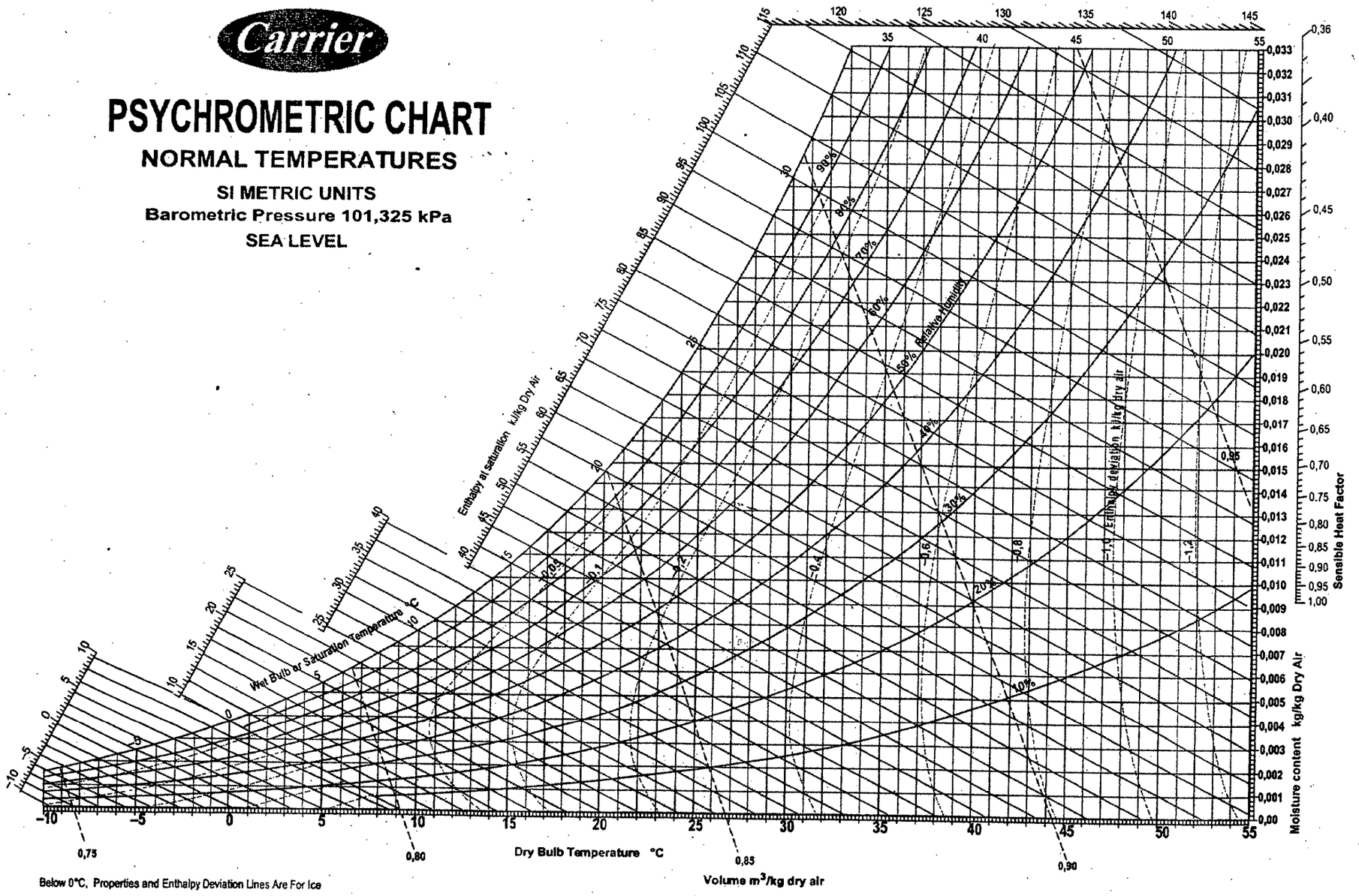
PSYCHROMETRIC CHART

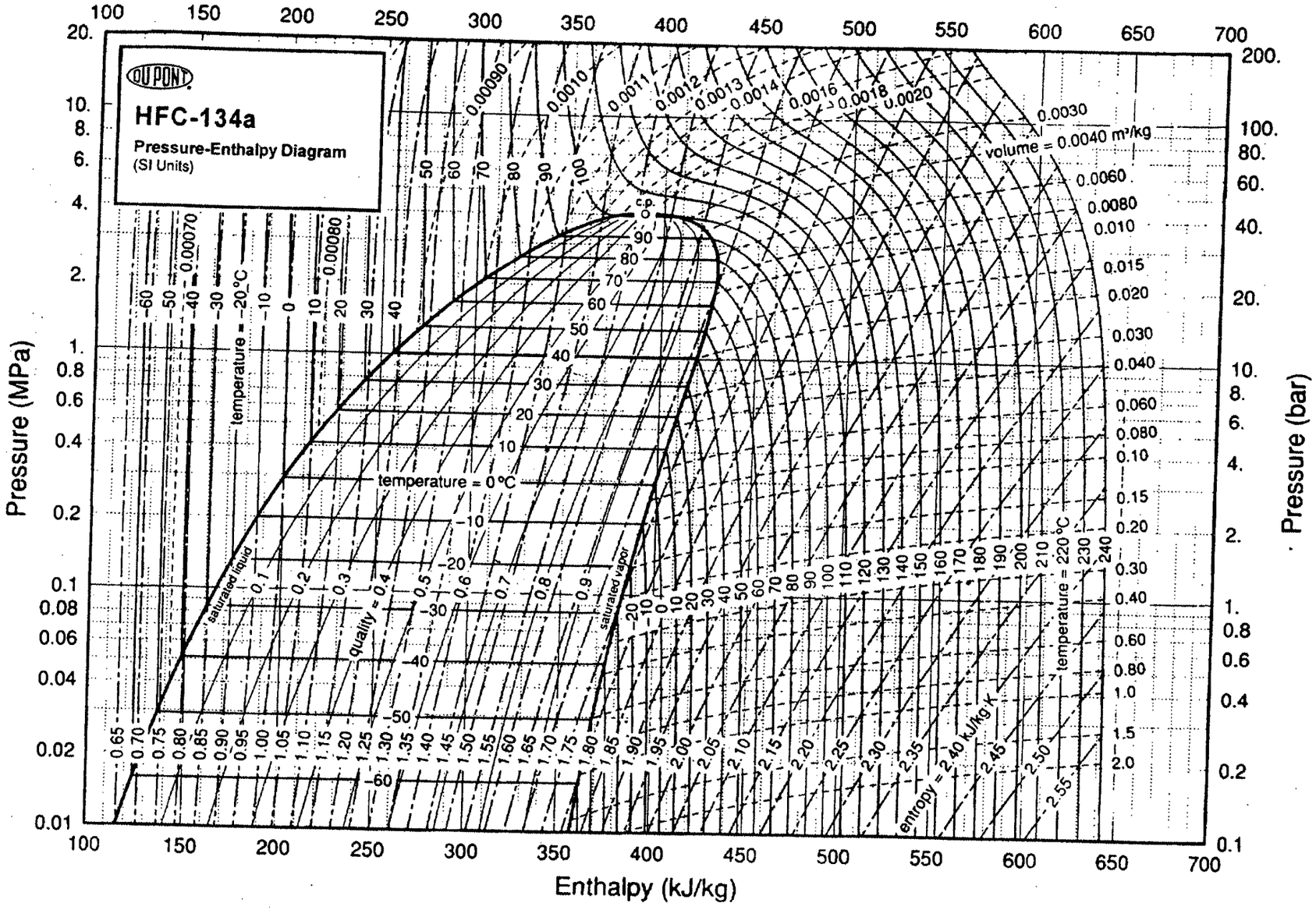
NORMAL TEMPERATURES

SI METRIC UNITS

Barometric Pressure 101,325 kPa

SEA LEVEL




DUPONT
HFC-134a
Pressure-Enthalpy Diagram
(SI Units)
Pressure (MPa)
Pressure (bar)
Enthalpy (kJ/kg)
saturated liquid
saturated vapor
quality = 0.4
temperature = 0 °C
temperature = -20 °C
temperature = 220 °C
volume = 0.0040 m³/kg
entropy = 2.40 kJ/kg K

L-3/T-1/ARCH **Date : 17/05/2014**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-3/T-1 B. Arch. Examinations 2012-2013

Sub : **ARCH 341** (Art and Architecture IV)

Full Marks : 140 Time : 3 Hours

The figures in the margin indicate full marks.

USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION – A

There are **FOUR** questions in this section. Answer **Q. No. 1** and any **TWO** from the rest.

1. Define "Basic Module" of Islamic architecture that originated during Khilji or Khalji dynasty. Use tomb of Iltutmish and Alai darwaza as reference. Draw necessary sketches. **(30)**

2. (a) What is the first attempt of slave dynasty's important building scheme? Graphically represent its stages. **(14)**

   (b) Draw plan and section of Militant Palace of Firoz Shah Kotla. **(6)**

3. (a) Explain with sketches the architectural characteristics of Hauz-Khas. **(12)**

   (b) Explain the uniqueness of "Khirki Mosque". **(8)**

4. Write short notes on the following: **(2×10=20)**

   (i) Qutb Minar

   (ii) Sultan Ghari's Tomb

SECTION – B

There are **FOUR** questions in this section. Answer **Q. No. 5** and any **TWO** from the rest.

5. Write short notes on the following topics: **(3×8=24)**

   (a) Akbar's all India architecture

   (b) Buland Darwaza

   (c) Delhi Jami Mosque

6. (a) Critically evaluate the architectural character and features applied in plans, elevations and sections of the 'Jahangiri Mahal'. **(13)**

   (b) "The Mughal garden attempted to capture natural beauty within a man-made frame work" – discuss with necessary illustrations. **(10)**

Contd P/2

ARCH 341

7. (a) Describe the 'Tomb of Humayun' as a fusion and logical synthesis of two great architectural traditions with necessary illustrations. **(13)**

   (b) 'Taj Mahal is a complete architectural experience'. – explain with reference to concept and zoning. Use necessary sketches. **(10)**

8. Critically describe the following aspects of 'Fatehpur Sikri' with illustrations – **(23)**

   (a) Concepts of planning

   (b) Visual unity and diversity

   (c) Material and landscape

L-3/T-1/ARCH **Date : 07/06/2014**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-3/T-1 B. Arch. Examinations 2012-2013

Sub : **CE 365 (CE 321)** (Structure III : Mechanics of Solids)

Full Marks : 140 Time : 3 Hours

The figures in the margin indicate full marks.

USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION – A

There are **SEVEN** questions in this section. Answer any **FIVE**.

1. For the beam loaded as shown in Figure 1, determine (a) the maximum deflection and (b) the deflection at the center of the span. EI = 1800 lb-in^2. **(14)**

2. Determine the equation of the elastic curve for the beam shown in Figure 2 due to the applied loading with proper boundary conditions. EI is constant. **(14)**

3. Determine the elastic moment capacity and the plastic moment capacity of the section shown in Figure 3. Also calculate the shape factor. F_y = 40 ksi. **(14)**

4. The beam shown in Figure 4 has to carry a uniformly distributed load of 2 k/ft. Draw the bending stress distribution diagram of the beam section at the section of maximum bending moment. **(14)**

5. Draw the shear stress distribution diagram of the beam of Figure 4 at the section of maximum shear. **(14)**

6. Determine the allowable bending moment around horizontal neutral axis for the composite beam of wood and steel plates having the cross sectional dimensions shown in Figure 5. Materials are fastened so that they act as a unit. $E_{st} = 30 \times 10^6$ psi and $E_w = 1.2 \times 10^6$ psi. The allowable bending stresses are σ_{st} = 20 ksi and σ_w = 1.25 ksi. **(14)**

7. Determine the deflections at points a, d and mid point of span bc of the beam shown in Figure 6. EI = 1800 lb-in^2. **(14)**

Contd P/2

CE 365 (CE 321)

SECTION – B

There are **SEVEN** questions in this section. Answer any **FIVE**.

8. State of stresses for an element is shown in Figure 7. Calculate the normal and shear stresses on plane AB. **(14)**

9. Using Mohr's circle of stresses, for the element shown in Figure 7, **(14)**
   (a) Find the principal stresses and show their direction on properly oriented element.
   (b) Find the maximum shear stress and associated normal stresses, if any. Show their proper orientation.

10. A round and a square column are made of steel. Determine the radius of the round column so that the round and the square column (shown in Figure 8) have the same slenderness ratio. Also compute the largest load each of them can support considering both buckling and yielding. Given, E = 29000 ksi, F_y = 36 ksi. **(14)**

11. Determine the capacity of the column of 24 ft height shown in Figure 9 which is braced about minor axis at mid height. Section of the column is 4″ × 6″ rectangular section and its material is A36 steel. **(14)**

12. Determine the displacement at point C for the steel overhanging beam shown in Figure 10. Use E = 29000 ksi, I = 125 in^4. **(14)**

13. Find the deflection of the beam at the point of the applied load shown in Figure 11. Given I_1 = 400 in^4, I_2 = 300 in^4 and E = 29000 ksi. **(14)**

14. For the beam loaded as shown in Figure 12, determine the reactions and plot the shear force and bending moment diagrams. **(14)**

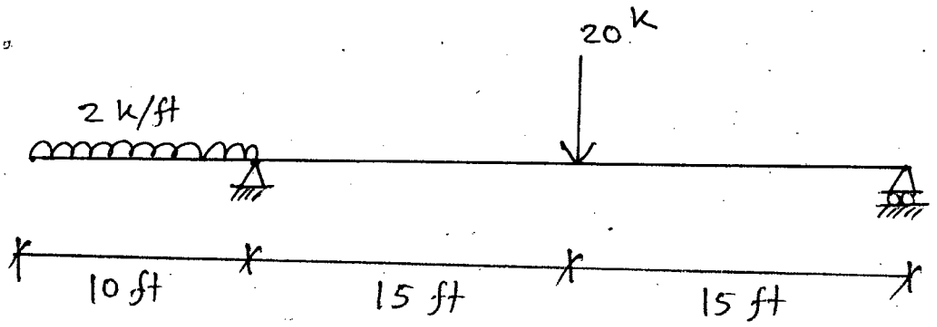


Figure-1

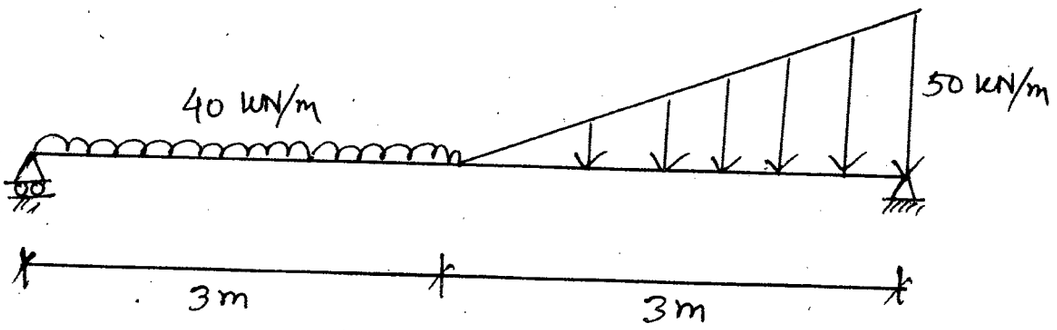


Figure-2

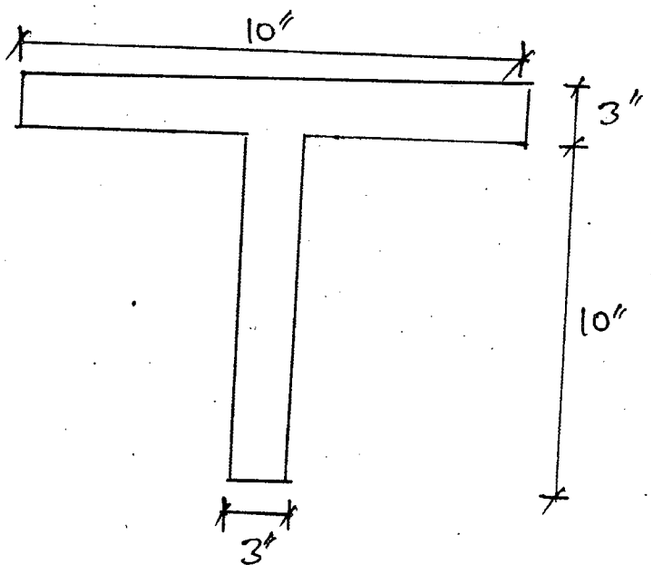
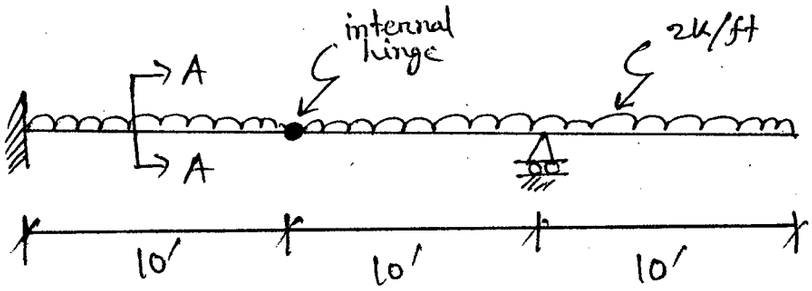
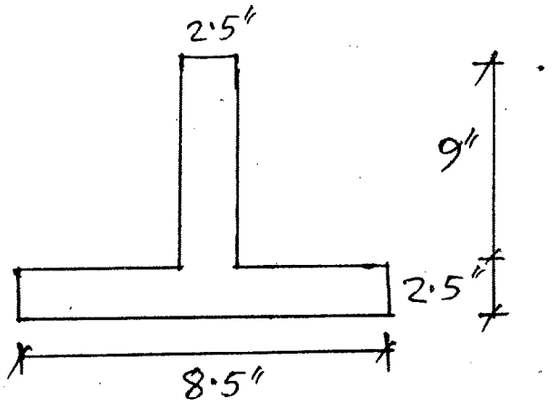


Figure-3

Contd.--- P/4





Section A-A

Figure - 4

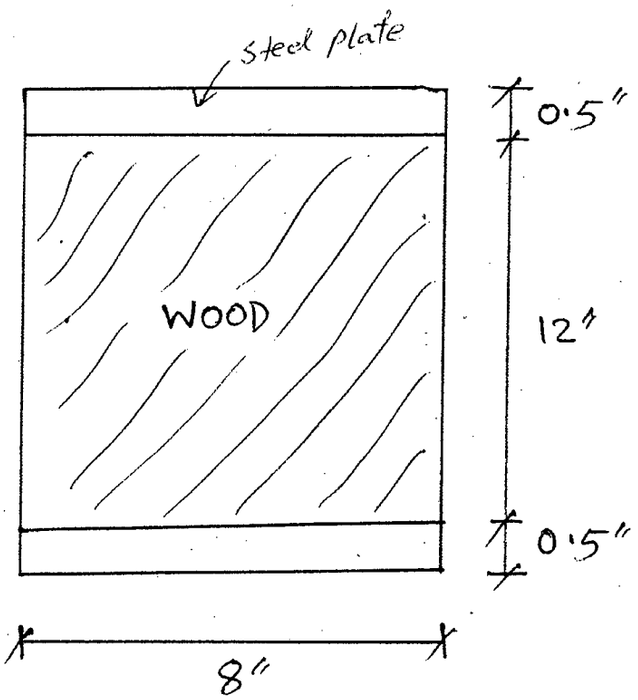


Figure - 5

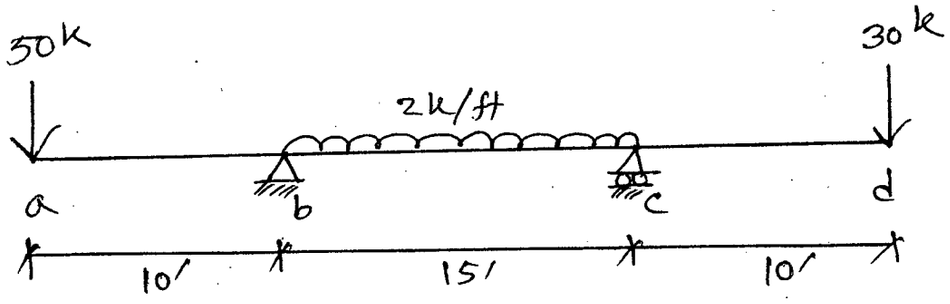


Figure - 6

Contd... P/5

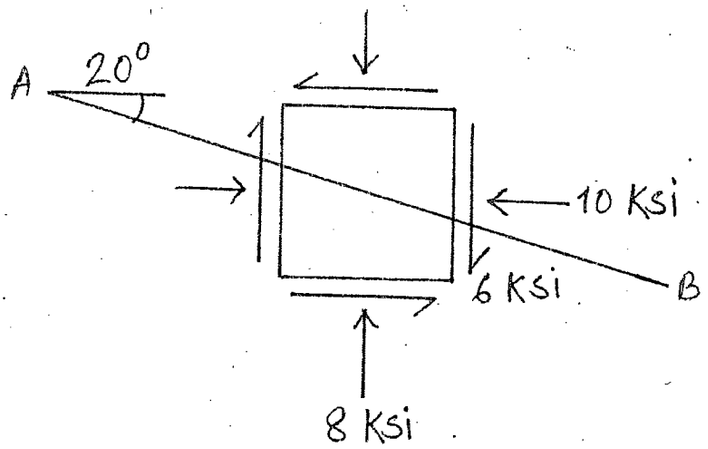
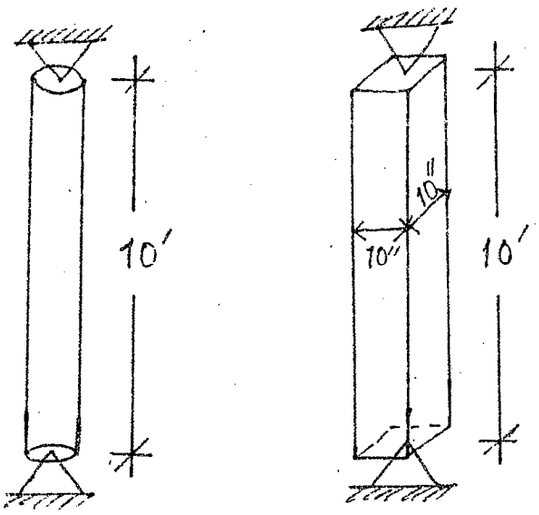


Figure 7



$I_{circular} = \frac{1}{4}\pi r^4$

$I_{square} = \frac{b^4}{12}$

Figure 8

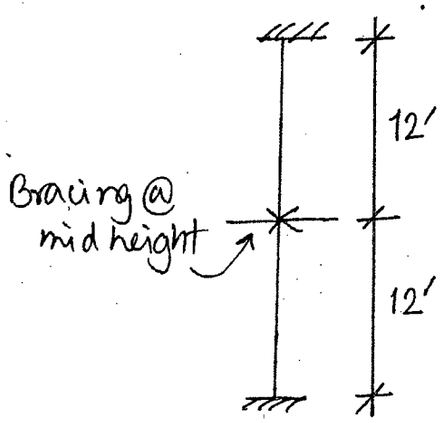


Figure 9

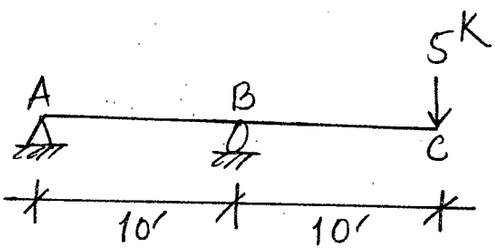


Figure 10

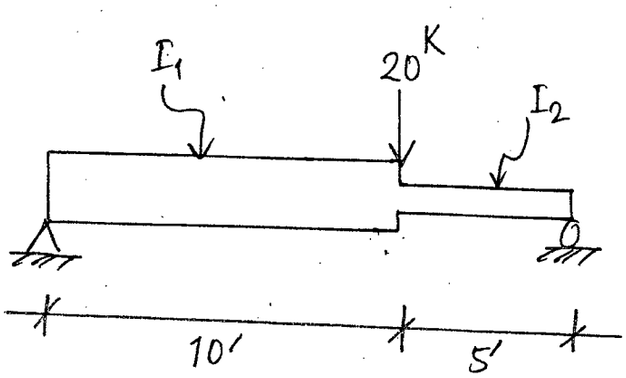


Figure 11

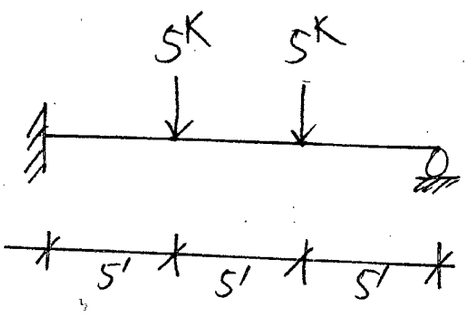


Figure 12