

**SECTION - A**

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

1. (a) What are the assumptions of a roof truss? (5)
- (b) Solve truss shown in Figure 1 and determine member forces in: (30)
- (i) CE
- (ii) CD
- (iii) DE

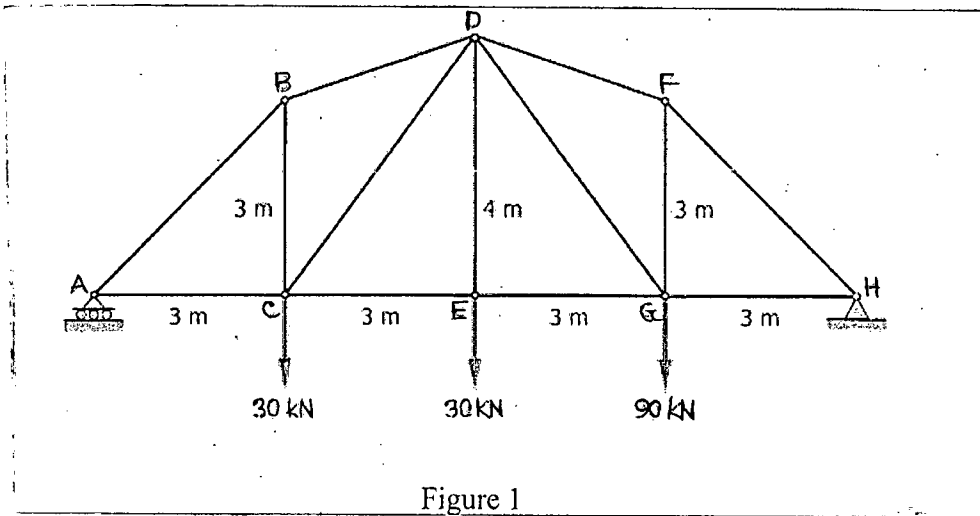


Figure 1

2. (a) What is the difference between non-coplanar concurrent force system and coplanar non-concurrent force system? Explain with figures. (7)
- (b) Two rectangular bodies; P in AB plane and Q in BC plane are shown in Figure 2. Weight of body P is 25 Kip and body Q is 20 Kip. The forces acting on these bodies are shown in the figure. Determine the cable tension and surface reactions of AB and BC plane. Also determine the angle ACB. (Assume the pulley is frictionless and ignore friction). (28)

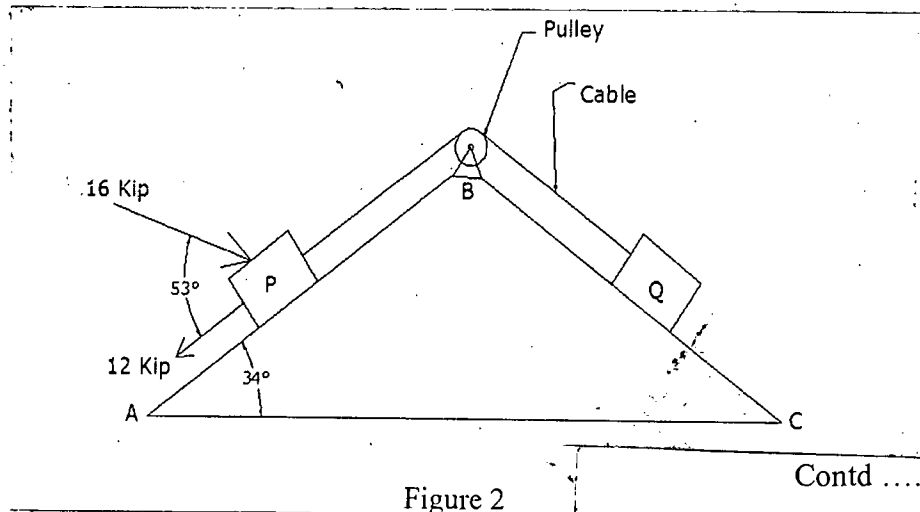
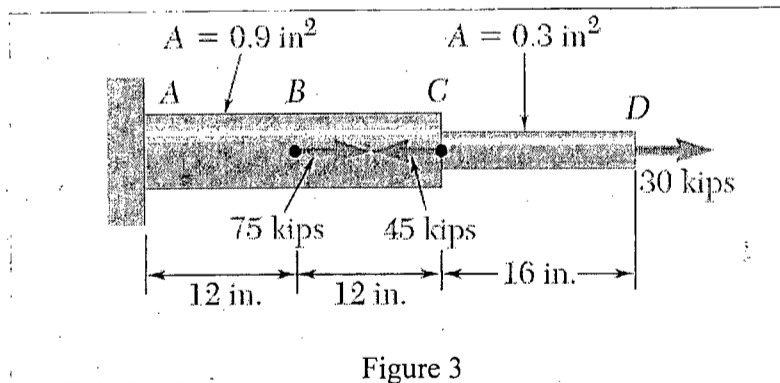


Figure 2

Contd ..... P/2

**CE 361 (URP)**

- 3. (a) Define ductility of a material. What are the advantages of utilizing ductile materials in structural design of a building? Explain with example. (7)
  - (b) Draw a qualitative stress strain diagram of an elastic material showing yield stress, ultimate stress and breaking stress. (7)
  - (c) What is toughness of a material? Among three materials A absorbs more energy than B and B absorbs more energy than C. Which material will you recommend as a shock absorbing material? Why? (7)
  - (d) If strain at proportional limit of a metal specimen is 0.00055; ultimate strain is 0.003 and yield strain is 0.00075. What is its ductility ratio? (7)
  - (e) What is the difference between engineering stress and true stress? Which one is mainly used in practical field? Explain the reason. (7)
- 
- 4. (a) What is slenderness ratio? Assume that you have given three circular column sections X, Y and Z. Diameter of the columns are p, q and r respectively ( $p < q < r$ ). All of these columns have equal length. X is fixed supported at both ends. Y and Z are hinge supported at both ends. Which of these three columns will you recommend for design as a compression member? Why? (7)
  - (b) A circular bar has a diameter of 15 mm. The length of the bar is 100 mm. Coefficient of thermal expansion is 0.00055 mm/°C. If temperature increases by 3°C, determine the percent elongation. (14)
  - (c) Determine the deformation of the steel rod shown in Figure 3 under the given loads. Given modulus of elasticity of steel =  $32 \times 10^6$  psi. (14)



**SECTION - B**

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

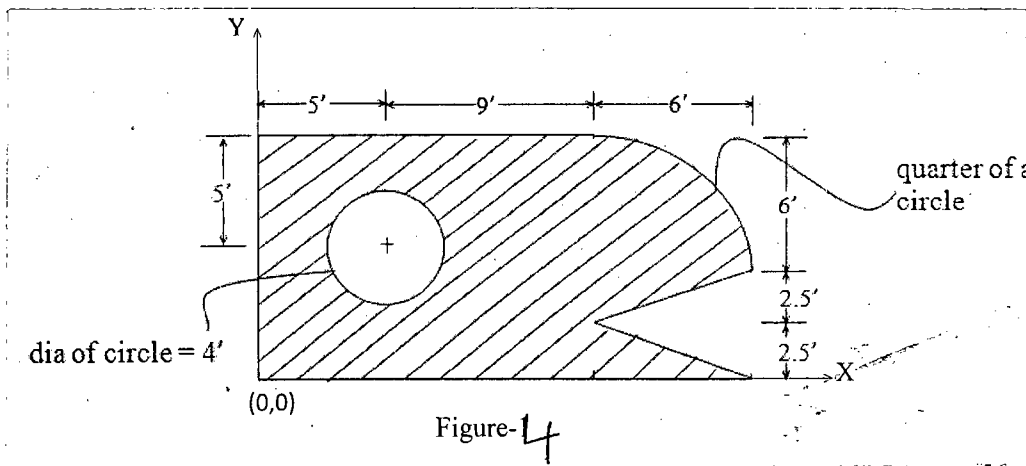
Assume reasonable values for missing data.

- 5. (a) Find the 'Y' coordinate of centroid of the hatched area shown in Figure 4. Point of origin is shown in the figure. (14)

**CE 361 (URP)**

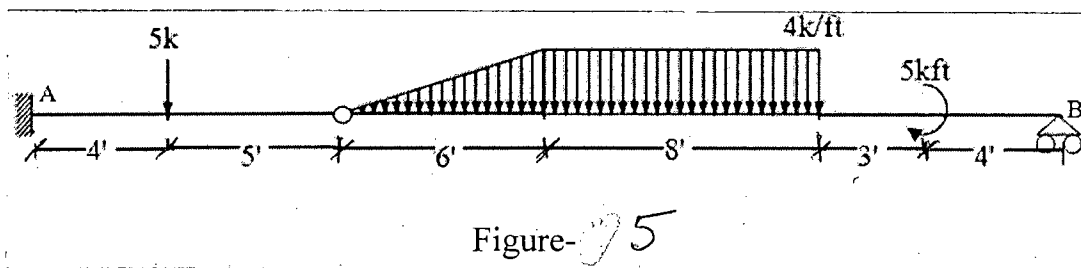
**Contd ... Q. No. 5**

(b) Determine the moment of inertia of the hatched area of Figure 4 about its centroidal axis which is parallel to X-axis. (21)

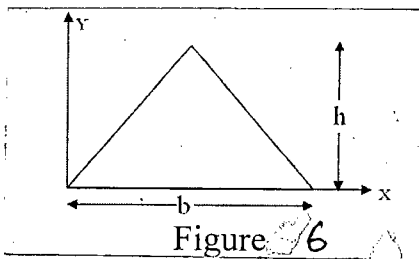


6. (a) Define structural determinacy. AB is a beam shown in Figure 5. Determine if the beam is structurally determinate or not. (7)

(b) Draw shear force and bending moment diagrams of the beam (Figure 5). (28)



7. (a) Find by integration of the 'Y' coordinate of center of gravity of the plane triangle shown in Figure 6. (8)



(b) Find moment of inertia of the triangle (Figure 6) about its base by direct integration. (8)

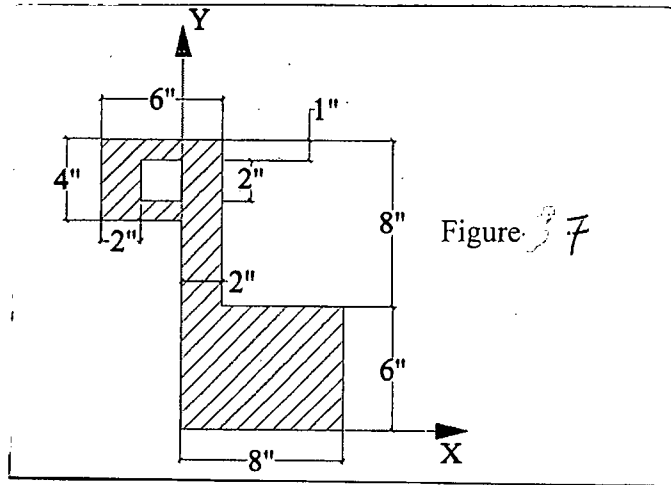
(c) State Parallel Axis Theorem. Using the result found in question 6(b), find moment of inertia of the same triangle about a line passing through its centroid parallel to base using transfer formula. (6)

**CE 361 (URP)**

**Contd ... Q. No. 7**

(d) Find the centroidal coordinates of the hatched area shown in Figure 7. (Position of the axes shown in the Figure).

(13)



8. (a) Define shear force and bending moment with brief discussion on their sign convention.

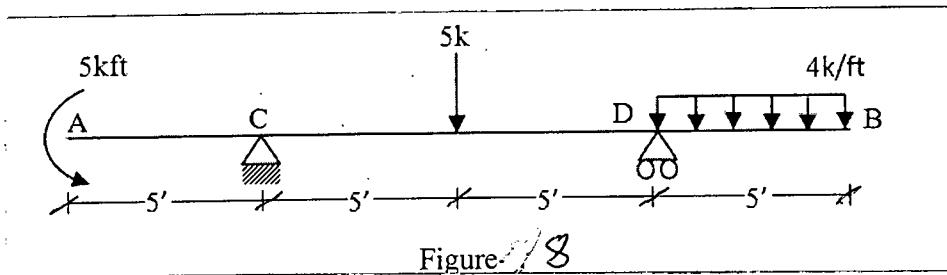
(7)

(b) Find the reactions of the beam shown in Figure 8 and draw its free body diagram.

(8)

(c) Draw shear force and bending moment diagrams of the beam (Figure 8).

(20)



Sub : **PLAN 321** (Housing and Real Estate Development)

Full Marks : 210

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) "A city's housing market is composed of number of submarkets: yet they are related" – explain the statement with proper examples. (5)
- (b) What do you understand by building permit? Discuss the market effect of building permit with graphical representation. (10)
- (c) What are the sources of market inefficiencies in real estate market? Briefly describe two simplistic approaches for assessing the market disequilibrium. (2+8=10)
- (d) What are the factors affecting the structural vacancy of housing? Discuss both from home-owner's and tenant's perspective. (10)
  
2. (a) Explain how the trade-off between commuting and housing cost affect the housing consumption of urban residents? (8)
- (b) State the underlying assumptions of 'Residential bid rent' theory. How the environmental quality and location of schools, markets and other facilities affect the bid rent function of a city? Explain with graphical representation. (2+10=12)
- (c) What do you mean by implicit price of housing attributes? How can you determine the implicit price of a particular housing attribute by Hedonic approach? (2+8=10)
- (d) Define real estate. What are the different types of property rights associated with real estate? (2+3=5)
  
3. (a) Explain real estate trade cycle with the help of simple stock flow model. (12)
- (b) Write short notes on the following: (3×4=12)
  - (i) Performance zoning
  - (ii) Impact fees
  - (iii) Large lot zoning
- (c) In a monocentric city, urban density averages around six (06) units of house per acre. Annual agricultural rent from farming is Bangladeshi taka (BDT) 50,000 per acre per year (1 square mile = 640 acres). Structure cost of a dwelling is BDT 22,00,000. Cost of commuting is 1800 Tk/mile/year for an average household. Calculate the monthly rent of housing at city center and at the edge of the city applying "Recardian Rent Theory". Distance to the edge of the city is 20 miles from center. Assume an interest rate of 9% per year. (11)

**PLAN 321**

4. (a) Give a brief description of different supply side and demand side housing policies. Which one of these you think will be most appropriate alleviating the low income housing problem in context of Dhaka? Give proper reasons in support of your statement. (10+10=20)
- (b) How does the housing voucher program differ from rent certificate? Which one do you think should be better from recipient's perspective? Give proper explanation with graphical representation. (5+10=15)

**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 (any five) (5×7=35)
- (i) Difference between Housing and Settlement policies.
  - (ii) Climatic and geographical factors affecting housing development and design.
  - (iii) Housing institutions in Bangladesh and their role in housing development.
  - (iv) Assessing housing need and demand.
  - (v) Housing finance in Bangladesh.
  - (vi) Slums and present pattern of housing development in Dhaka.
  - (vii) Urbanization and marginalization in housing.
6. (a) How did industrialization affected housing in the metropole and in the periphery? (17 1/2)
- (b) How did it usher in new concepts for housing development? (17 1/2)
7. (a) Discuss why high-density housing development is imperative for Bangladesh now. (17 1/2)
- (b) Discuss how high-quality living environment may be achieved even in high-density housing. Discuss strategies for Bangladesh with reference to housing in Singapore. (17 1/2)
8. Critically discuss the Housing Policy of Bangladesh and how it affects housing development. (35)
-

**SECTION – A**

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

Symbols have their usual meaning.

1. (a) For the switching operation in a CMOS inverter, show that the propagation delay is give by (15)

$$t_p \cong \frac{1.7 C}{k'_n \frac{W}{L} V_{DD}}$$
- (b) Derive a CMOS complex gate for the following logic function. Use as few transistors as possible (20)

$$f(x_1, x_2, x_3, x_4) = \sum m(2, 3, 5, 6, 7, 10, 11, 13, 14)$$
2. (a) Using only a four bit and a two bit adder and some basic gates construct a one-digit BCD adder and explain its operation. (13)
- (b) Design a circuit that multiplies an eight-bit unsigned number by 3 using single ripple-carry adder. (10)
- (c) Write the verilog code for a 16 bit adder with overflow function using Concatenate operator. (12)
3. (a) Write the difference between a latch and flip flop. (4)
- (b) Design a circuit (i) that can be used for edge detection in a flipflop using basic logic gates only (ii) that can be used for elimination of mechanical switch contact "bounce" using a flipflop. (2×8)
- (c) Construct (3×5)
  - (i) a J-K flip with a D flip flop
  - (ii) a D flip flop with a J-K flip
  - (iii) A T flip with a D flip flop
4. (a) Design a 4 bit up counter with parallel load and synchronous reset capability. (11)
- (b) Design a universal shift register that can be made to function as any of the four types of register (16)
  - (i) inhibit clock, (ii) shift right, (iii) shift left and (iv) parallel load
- (c) Write the verilog code for a n bit Up/Down Counter with parallel load synchronous reset capability. (8)

**EEE 303****SECTION – B**

There are **FOUR** questions in this section. Answer any **THREE**.  
If you think that any problem has missing data, make a reasonable assumption and state it in your solution.

5. (a) With the help of Boolean Algebra, design the simplest sum-of-products circuit that implements the function  $f(x_1, x_2, x_3) = \sum m(1, 3, 4, 6, 7)$ . Assuming the inputs are available in uncomplemented form only, make an assessment of structure's cost. Also, draw the simplest gate level circuit diagram of the same function which will optimize the amount of delay faced by a propagating signal. (20)

- (b) Use at least two methods to determine whether the two following logic expressions represent the same function. (15)

$$\text{expression 1: } x_1 \bar{x}_3 + x_2 x_3 + \bar{x}_2 \bar{x}_3$$

$$\text{expression 2: } (x_1 + \bar{x}_2 + x_3)(x_1 + x_2 + \bar{x}_3)(\bar{x}_1 + x_2 + \bar{x}_3)$$

6. (a) A logic circuit with two outputs realizes the following functions (23)

$$f_1(x_1, x_2, x_3, x_4) = \sum m(0, 2, 4, 6, 7, 9) + D(10, 11)$$

$$f_2(x_1, x_2, x_3, x_4) = \sum m(2, 4, 9, 10, 15) + D(0, 13, 14)$$

Design the minimum-cost circuit for this structure and draw its gate-level circuit diagram. Also, compare its cost with combined costs of two circuits that realize  $f_1$  and  $f_2$  separately. The assessment should be made assuming that the inputs are available in both uncomplemented and complemented forms.

- (b) State the verilog code to realize the function  $g(a, b, c, d) = \sum m(0, 1, 2, 4, 5, 7, 8, 9, 11, 12, 14, 15)$  using (i) gate level primitives and (ii) continuous assignment. Make sure that the devised circuit is as simple as possible. (12)

7. (a) Using Boolean Algebra, realize a minimum-cost car safety alarm which considers four input parameters: whether the door is closed, whether the key is in its slot, whether there is seat pressure, and whether the seat belt is closed. The alarm makes a sound if (i) the door is not closed and the key is in its slot (ii) the door is closed, the driver is on the seat, the key is in and the seat belt is not closed. Draw the circuit diagram for the design. (18)

- (b) Draw the circuit diagram for a 8 to 3 priority encoder and write its verilog code. Explain any special statement that could be required to write this code. (17)

8. (a) Design the following logic function using a 4 to 1 multiplexer and as few other logic gates as possible. The input variables are available only in uncomplemented forms for this function. (18)

$$f(x_1, x_2, x_3, x_4, x_5) = x_1 x_2 + x_1 x_3 + \bar{x}_1 \bar{x}_2 \bar{x}_4 \bar{x}_5 + x_3 x_4 x_5 + x_1 x_4$$

- (b) Design the function  $f(a, b, c) = \sum m(1, 2, 3, 5, 6)$  in an optimized form using a single binary decoder and other 2-input standard logic gates. Write an efficient verilog code that represents the function of this problem. (17)

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

1. (a) Why central reservation are kept in a roadway? (5)
  - (b) How is the accuracy of O-D survey data checked? (5)
  - (c) What considerations should be taken into account for road-side interview of O-D survey? (15)
  - (d) In Bangladesh, the road layout is designed for left hand side driving direction. In other countries, the direction is sometimes opposite. Draw a full cloverleaf interchange for right hand side driving direction. (10)
2. (a) "A properly designed channelized layout can replace a rotary intersection" – justify this statement. (15)
  - (b) To study the quality of intra urban bus service in Dhaka city, a case study of route 1J- Motijheel to Pallabi (14.64 km) was undertaken. Following particulars were collected for this route using Moving Observer Method. (20)

Table 01

Journey: North bound

Section	Journey Time (minutes)	Stopped Time (minutes)	Vehicles met with in the opposing direction						Vehicles in the same direction	
			Car	Bus	CNG	Human Hauler	Motorcycle	Rickshaw	Overtaking vehicles	Overtaken vehicles
Notre Dame College-Shahbagh	10.91	0.83	142	65	40	4	14	47	2	56
Shahbagh-Bijoy Sarani	26.57	13.21	1108	215	269	18	141	1	58	57
Bijoy Sarani-Pallabi	40.17	10.05	1593	252	580	15	145	368	7	187

Table 02

Journey: South bound

Section	Journey Time (minutes)	Stopped Time (minutes)	Vehicles met with in the opposing direction						Vehicles in the same direction	
			Car	Bus	CNG	Human Hauler	Motorcycle	Rickshaw	Overtaking vehicles	Overtaken vehicles
Pallabi - Bijoy Sarani	56.96	24.38	1502	231	757	15	102	300	36	251
Bijoy Sarani - Shahbagh	27.10	13.29	796	138	656	0	48	1	4	67
Shahbagh - Notre Dame College	15.59	2.43	321	252	119	7	26	65	3	58

Contd ..... P/2

**PLAN 343**

**Contd ... Q. No. 2(b)**

Table 03

PCE Values by Vehicle Types	
Car	1
Bus	2.5
CNG	0.5
Human Hauler	0.5
Motor Cycle	0.3
Rickshaw	0.8

Using Table 01, 02 and 03, calculate the following for both North and South bound direction

- (i) Traffic flow (PCU/min)
- (ii) Journey Speed (KPH)
- (iii) Running Speed (KPH)

3. (a) What are the methods available for measuring spot speed? What are the criteria you would consider for selecting a site for spot speed survey? (5+5=10)
- (b) Which principle is followed for 'No Overtaking Zone' marking? When is this road marking used – describe with a figure. (10)
- (c) A study on parking management was conducted at Kawran Bazar commercial area. For this purpose, a parking usage survey by patrol was carried out for 2 hours at 15 minutes time interval. From parking inventory survey the parking volume was found as 50 and the parking bays available were 60. From the survey data following parking accumulation curve was generated. (15)

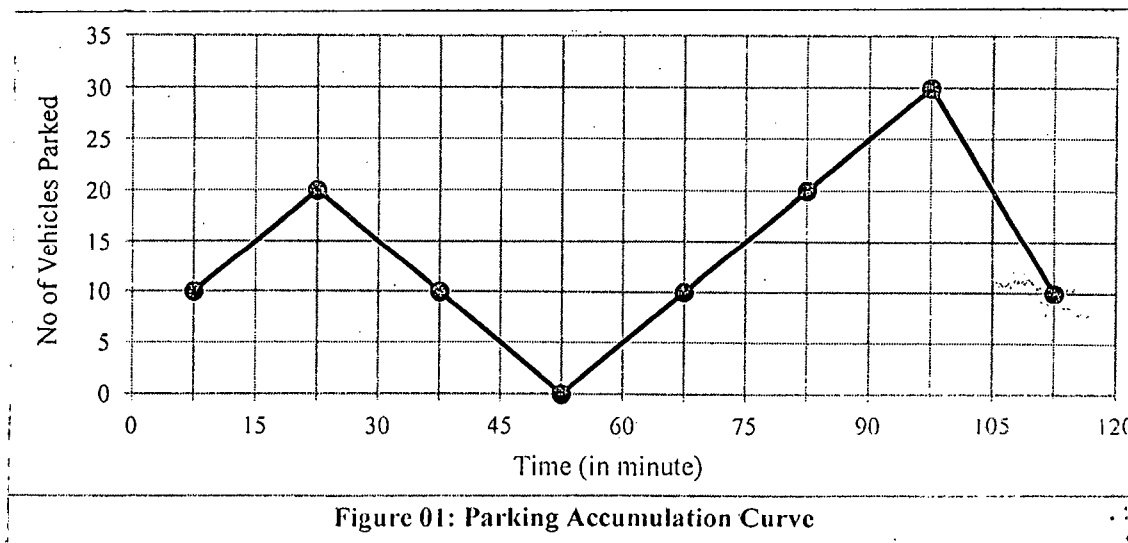


Figure 01: Parking Accumulation Curve

Calculate –

- (i) Parking Load (veh hour)
- (ii) Average parking duration (minutes)
- (iii) Parking turnover (veh/hr/bay)
- (iv) Parking index (%)

**PLAN 343**

- 4. (a) What is the main disadvantages of direct-timing procedure for spot-speed measurement. Describe the methods of eliminating the disadvantages. Use figure where necessary. (15)
- (b) Suppose you are planning to improve the parking condition of a central business district. What strategy would you propose and what would be the ways to accomplish the strategy? (12)
- (c) Table 04 shows the average spot speed of varied streams of particular traffic volume found in the route - Motijheel to Pallabi. Calculate Time-mean speed of the route. (8)

Table 04

Average spot speed (km/hr)	Volume of the streams (Vehicle hour)
3.5	1
7.5	4
11.5	11
15.5	7
19.5	20
23.5	44
27.5	80
31.5	82
35.5	79
39.5	49
43.5	36
47.5	26
51.5	9
55.5	10
59.5	3

**SECTION – B**

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

- 5. (a) All urban road system must support three functional categories of travel. Explain each of these categories. (10)
- (b) What is Automobile Dependency? Briefly describe its impacts on the transport system. (10)
- (c) Make a comparative analysis among different urban road patterns. (15)
  
- 6. (a) Describe "Multi-modal Transportation Planning" and its importance in achieving a balanced and integrated transportation system. (15)
- (b) With the help of popular urban land use policies, discuss about the necessity of integrating land use and transportation planning in reducing automobile dependency and expanding the use of public transport. (20)

**PLAN 343**

**Contd ... Q. No.**

7. (a) Explain how the evolution of transportation system resulted in the four major categories of urban spatial structure. In your answer, give examples of cities falling into those categories and state their identifiable features. (20)
- (b) What do you understand by "Transportation System Management" and what purpose does it serve? (10)
- (c) Define "Passenger Car Unit" and explain its importance in conducting transportation analysis. (5)
8. (a) Describe the acronym "PIEV". (5)
- (b) Describe the various types of road capacities and state the ideal conditions required for capacity determination. (9+6=15)
- (c) A distributor road has a length of 400 m between two intersections A and B. Traffic movement on the road is limited to a maximum speed of 60 km/h. If a car moves in the direction A to B, then at what distance (maximum) from B, a stop sign should be placed so that the car completely stops at intersection B? (15)
- (Use standard values for roadway features).
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## BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-3/T-1 B. Sc. Engineering Examinations 2014-2015

Sub : **HUM 225** (Accounting)

Full Marks : 140

Time : 3 Hours

The figures in the margin indicate full marks.

Symbols have their usual meaning.

USE SEPARATE SCRIPTS FOR EACH SECTION

**SECTION – A**There are **FOUR** questions in this Section. Answer any **THREE**.

1. (a) Various costs and sales data for Rendd Company for the year ended on December 31, 2014 are as follows:

**(14)**

Depreciation, factory equipment	Tk. 27000
Depreciation, office equipment	3000
Administrative expenses	110000
Utilities, factory	8000
Maintenance, factory	40000
Supplies (30% for factory, 70% for office)	12000
Insurance factory	4000
Purchase of raw materials	12500
Direct labour	15000
Sales	600000
Rent (60% for factory, 40% for office)	45000
Selling expenses	60000
Sales salaries	30000
Property taxes, factory	15000

Inventories	January 1	December 31
Raw Materials	Tk. 9000	Tk. 6000
Work in process	17000	30000
Finished Goods	20000	40000

Requirements:

Prepare a cost of goods sold statement and an Income statement for the year.

- (b) The Lakeshore Hotel's guest day of occupancy and custodial supplies expenses over the last seven months were:

**(9 1/3)**

Month	Guest-Days of Occupancy	Custodial Supplies Expense
March	4000	Tk. 75000
April	6500	82500
May	8000	105000
June	10500	120000
July	12000	135000
August	9000	107500
September	7500	9750

Guest-Day is a measure of the overall activity at the hotel. For example, a guest who stays at the hotel for three day is counted as three guest days.

Required:

- Using the high-low method, estimate a cost formula for custodial supplies expense.
- Using the cost formula, what would you expect to be incurred at an occupancy level of 11000 guest-day?

**HUM 225**

2. (a) Bekobe company manufacturers and sells a specialized cordless telephone for high electromagnetic radiation environments. The company's contribution format income statement for the most recent year is given below:

**(18)**

Sales (20000 units @ Tk. 60)	Tk. 1200000
Less: Variable cost	900000
Contribution margin	300000
Less: Fixed cost	240000
Net Income	60000

Requirements:

- (i) Compute the company's CM ratio and variable cost to sales ratio.
  - (ii) Compute the company's break-even point in both units and sales in taka.
  - (iii) Assume that sales increase by tk. 4,00,000 next year. If cost behavior patterns remain unchanged by how much will the company's net income increase?
  - (iv) Refer to the original data, assume that next year management wants to earn a profit of tk. 90000. How many units will have to be sold to earn this target profit?
  - (v) Refer to the original data, compute the company's margin of safety in taka and in percentage form.
  - (vi) Compute the company's degree of operating leverage at the present level of sales. Assume that company's sales increase by 8% next year. By what percentage would you expect net income to increase? Use degree of operating leverage (DOL) to obtain your answer. Verify your answer as calculate above by preparing a new contribution format income statement showing an 8% increase in sales.
- (b) What is CVP analysis? Describe the limitations of CVP analysis.

**(5 1/3)**

3. (a) Lexus Company recorded the following transactions for the just completed month.

**(10)**

- (i) Tk. 80000 in raw material were purchased on account.
- (ii) Tk. 71000 in raw material were requisitioned for use in production. Of this amount, Tk. 62000 was for direct materials and the remainder was for indirect material.
- (iii) Total labor wages of Tk. 112000 were incurred of this amount Tk. 101000 was for direct labor and the remainder was for indirect labor.
- (iv) Additional manufacturing overhead cost of Tk. 175000 were incurred.

Required: Record the above transactions in Journal entries as per job order costing.

- (b) Ethan company uses direct labour hour for the allocation of overhead cost. It is estimated that direct labor hour is 11000 and Tk. 257400 is estimated total manufacturing overhead.

**(9)**

The company incurred actual manufacturing overhead costs of Tk. 249000 and 10800 total actual direct labour hours during the period.

**HUM 225**

**Contd ... Q. No. 3(b)**

Required:

- (i) Calculate the pre-determined overhead rate.
  - (ii) Determine applied manufacturing overhead cost.
  - (iii) Find out underapplied or overapplied manufacturing overhead.
- (c) (i) What is job order costing? Give an example. (4 1/3)
- (ii) Describe the differences between job order costing and process costing
4. (a) What is Income tax? Describe the characteristics of Income tax. (5)
- (b) Describe the classification of tax on the three different basis. (12)
- (c) The Alex House Inc. is a large retailer of winter sports equipment. An Income statement for the company's Ski Department for a recent quarter is presented below: (6 1/3)

The Alex House Inc. Income Statement – Ski Department For the Quarter Ended March 31		
Sales		150000
Less: Cost of goods sold		90000
Gross margin		60000
Less: Operating expenses:		
Selling expenses	30000	
Administrative expenses	10000	(40000)
Net operating Income		20000

Ski's sell, on the average, for Tk. 750 per pair. Variable selling expenses are Tk. 50 per pair Ski's sold. The remaining selling expenses are fixed. The administrative expenses are 20% variable and 80% fixed. The company does not manufacture its own Ski's, it purchase them from a supplier for Tk. 450 per pair.

Required:

Prepare an Income Statement for the quarter using the contribution approach.

**SECTION – B**

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

5. (a) Discuss the various user groups of accounting information. (4 1/3)
- (b) Mount View Motel has the following transactions on May, 2014. (19)

May-1:	The owner invested Tk. 10,00,000 cash.
May-2:	Advertised the business in "Daily Star" for Tk. 15,000 on account.
May-6:	Purchased office equipment for Tk. 250,000; paying Tk. 50,000 in cash with the remaining on account.
May-10:	Purchased supplies for cash Tk. 60,000.
May-12:	Provide services and billed client for Tk. 300,000.
May-15:	Withdraw cash for personal use Tk. 10,000
May-18:	Salary for the month paid in cash Tk. 25,000.
May-20:	Paid balance due to Daily Star.
May-22:	Received from customers on account from May 12 transaction.
May-24:	Provide services for cash Tk. 20,000.

**HUM 225**

**Contd ... Q. No. 5(b)**

Required:

- (i) Prepare a tabular summary from the above transaction.
- (ii) Prepare an income statement for the month.

6. (a) What is the basic accounting equation? Explain briefly. (4 1/3)

(b) Pizza Home is a fast-food shop in gulshan. It has following events for June, 2013: (19)

June 1 :	Pizza home invested Tk. 400,000 in the business.
June 4 :	Bought furniture for Tk. 200,000 from Hatil furniture on account.
June 7 :	Bought supplies for Tk. 350.000 for cash from several suppliers.
June 11 :	Paid advertising expenses Tk. 35,000 cash.
June 13 :	Hired a sales manger for Tk. 300 per day.
June 15 :	Sold pizza for Tk. 45,000 to a birthday party for cash
June 18 :	Paid Tk. 55,000 to Hatil furniture.
June 22 :	Took loan Tk. 75,000 by a note payable.
June 26 :	Received a utility bill for Tk. 3500.
June 27 :	Paid salary to the sales manger for the month.

Required:

- (i) Show journal entries;
- (ii) Prepare "Cash account".

7. (a) At the end of its first month of operations, Watson Answering service has the following trial balance. (23 1/3)

Watson Answering Service Trial Balance August 31, 2014		
Accounts Titles	Debit Tk.	Credit Tk.
Cash	5,400	-
Accounts receivable	2,400	
Supplies on hand	2800	-
Prepaid Insurance	1,300	-
Equipment	60,000	-
Notes payable	-	40,000
Accounts payable	-	2,400
Ray, Watson, Capital	-	30,000
Ray, Watson, Drawings	1000	-
Service revenues	-	4900
Salaries expenses	3,200	-
Utilities expenses	800	-
Advertising expenses	400	-
	<u>77,300</u>	<u>77,300</u>



**HUM 225**

**Contd ... Q. No. 7(a)**

Other data:

- (i) Insurance expires at the rate of Tk. 200 per month.
- (ii) Tk. 1000 of supplies are on hand at August 31.
- (iii) Monthly depreciation on the equipment is Tk. 900.
- (iv) Interest of Tk. 500 on the notes payable has accrued during August.

Required:

Prepare income statement (single step). Also prepare Owner's Equity statement and a classified Balance Sheet assuming Tk. 35,000 of the notes payable are long term.

8. (a) Following are the account balances of Butterfly Computer Services Limited for the year ended on 30th June, 2012:

(10)

Purchasing cost of computer	Tk. 20,00,000;
Sale revenue of computer	Tk. 34,00,000;
Service fees received	Tk. 300,000;
Salaries to hardware engineers	Tk. 200,000;
Advertisement expenses	Tk. 50,000;
Office rent	Tk. 60,000;
Maintenance expenses	Tk. 130,000;
Accounts payable	Tk. 80,000;
Tax payable	Tk. 5000;
Bad debts expenses	Tk. 50,000;
Prepaid insurance	Tk. 50,000;
Office equipment	Tk. 60,000;
Discount allowed	Tk. 85,000;
Bank balance	Tk. 455,000;
Salaries payable	Tk. 5000;
Accounts receivable	Tk. 600,000;
Opening stock of computer	Tk. 400,000;
Furniture	Tk. 250,000;
Capital	Tk. 600,000.

Required: Prepare a Trial Balance.

- (b) Following pieces of information have been taken from the records of a company:

(9)

Balance Sheet			
As at 31st December 2012			
Assets	Tk.	Owner's Equity & Liabilities	Tk.
Cash	20,000	Accounts payable	10,000
Accounts receivable	65,000	Salaries payable	3000
Inventories	20,000	Bonds payable	2000
Plants Machinery	100,000	10% Long Term Loan	50,000
Vehicles	5,000	Owner's Equity	145,000
Total	210,000	Total	210,000

Sales were Tk. 150,000 and net profit (after tax) was Tk. 30,000

Required: Calculate the following ratios:

- (i) Current ratio; (ii) Quick ratio; (iii) Debt-equity ratio; (iv) Return's on owner's equity;
- (v) Inventory turnover; (vi) Receivable turnover (based on sales).

Contd ..... P/6

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**Contd ... Q. No. 8**

(c) From the following information calculate the current assets, current liabilities and Inventory (assuming that there is no prepaid expenses):

**(4 1/3)**

Working capital	Tk. 120,000
Current ratio	2.5
Quick ratio	1.5

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Sub : **WRE 309** (Introduction to Water Resources Planning)

Full Marks : 210

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) Define integrated water resources management. How water can contribute to the reduction of poverty? Write short note on the importance of strategic vision in IWRM and also indicate the drivers and activities involved while determining the vision. (3+3+5=11)
- (b) Distinguish the traditional and integrated approach of water resources management. How political commitment can influence the work plans of IWRM planning process? (5+4=9)
- (c) What are the objectives of EIA? Write down the probable social components to be compared during EIA. (4+4=8)
- (d) Why institutions are important for promoting IWRM? What are the functions of regulatory bodies and service providers for effective water resources management? (3+4=7)
2. (a) Discuss the occurrence of "Helicoidal flow" in meandering river with necessary diagrams. Briefly discuss the classification of river based on the location of reach. (4+4=8)
- (b) Write short notes on (i) Aggrading river (ii) Development of cutoff (iii) Braided river. (4+4+3=11)
- (c) Write down the classification of groynes. Discuss the function of groynes having different alignments. (4+4=8)
- (d) What are the essential characteristics of a revetment? Draw schematic diagram of a typical revetment and discuss the classification of revetment based on construction material. (3+5=8)
3. (a) Write down the objectives of river training works. Differentiate capital and maintenance dredging. (4+5=9)
- (b) Write short note on (i) Classification of waterways in Bangladesh (ii) Lock and dam method of navigation (iii) Structural measures of flood mitigation. (3+3+4=10)
- (c) Briefly discuss the stages of national flood management program. What are the flood damage influencing factors? (4+4=8)
- (d) Discuss the processes of preliminary and detail survey involved while investigating the distribution system. (4+4=8)

**WRE 309/URP**

4. (a) Differentiate river basin planning and project planning in a water resources project. Give three examples of both single purpose and multipurpose water resources projects. **(4+4=8)**
- (b) Write short notes on – **(4+3+3+3=13)**
- (i) Border strip flooding (ii) Advantages of trickle irrigation (iii) Basin flooding (iv) Limitations of sprinkler irrigation.
- (c) Differentiate flash flood and river flood? Discuss different methods of calculating evapotranspiration. **(3+5=8)**
- (d) Determine the volume of water required to be diverted from the head works to irrigate area of 3000 ha using data given in the table below. Assume 85% as the effective precipitation to take care of the consumptive use of the crop. Also assume 60% efficiency of water supply application in the field and 80% as the conveyance efficiency of canal. **(6)**

Month	Temp (°F)	Percentage hrs of sunshine	Rainfall mm	Crop factor
June	70.8	9.90	75	0.80
July	74.4	10.2	108	0.85
August	72.8	9.60	130	0.85
September	71.6	8.40	115	0.85
October	69.3	7.86	105	0.65
November	55.2	7.25	25	0.65
December	47.1	6.42	0	0.60
January	48.8	8.62	0	0.60
February	53.9	9.95	0	0.65
March	60.0	8.84	0	0.70
April	62.5	8.86	0	0.70
May	67.4	9.84	0	0.75

**SECTION – B**

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

5. (a) Define Td, PWP, FC, PET, Risk. **(2×5=10)**
- (b) What is residence time? Mathematically proof that longer time is required to clean contaminated groundwater. (Use Table 1 & 2). **(5)**
- (c) The analysis of a storm yielded the following information regarding isohyets. Calculate the average depth of rainfall. **(15)**

Isohyet interval (mm)	70-80	80-90	90-100	100-110	110-120	120-130
Area (Km <sup>2</sup> )	10	85	113	98	136	67

- (d) Explain the factors affecting infiltration. **(5)**

**WRE 309/URP**

6. (a) Briefly discuss how basin and infiltration characteristics affect a storm hydrograph. (7)
- (b) The mean annual flood of a river is  $590 \text{ m}^3/\text{s}$  and the standard deviation of the annual flood time series is  $230 \text{ m}^3/\text{s}$ . What is the probability of a flood magnitude  $1200 \text{ m}^3/\text{s}$  occurring in the river within next 5 years? Use Gumbel's method and assume the sample size to be very large. (10)
- (c) The ordinates of a 6-h unit hydrograph are given. (18)

Time (hr)	0	3	6	9	12	18	24	30	36	42	48
Ordinate ( $\text{m}^3/\text{s}$ )	0	150	250	450	600	800	700	600	450	320	200

A storm had three successive 6-h intervals of rainfall magnitude of 3.0, 5.0 and 4.0 cm respectively. Assuming a  $\phi$  index of 0.20 cm/h and a base flow of  $30 \text{ m}^3/\text{s}$ , determine the flood hydrograph.

7. (a) State Theis assumptions. Proof that head (h) increases with increase in distance (r). (6+9=15)
- (b) Define groundwater management? Explain various levels of study of groundwater basin management. (2+8=10)
- (c) In a confined aquifer of 8 m thick, a 10 cm diameter well is pumped at a constant rate of 100 lit/minute. The steady state drawdown observed in two wells located at 10 m and 50 m distance from the centre of the well are 3 m and 0.05 m respectively. Compute the transmissivity and the hydraulic conductivity of the aquifer. (10)
8. (a) Compare several drilling methods. Which methods is suitable in your country? Justify your answer. (10+3=13)
- (b) Define well rehabilitation. Explain several causes and remedial measures of well rehabilitation. (10)
- (c) Estimate the permeability of a well pumping in a confined aquifer having 20 m thickness with the following data. (12)
- Distance of observation pipe from well = 100 m
- Drawdown after 1 hr pumping = 1 m
- Drawdown after 4 hr pumping = 1.5 m
- Storativity, S = 0.003

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Table 1: Estimated world water quantities

Item	Area (10 <sup>6</sup> km <sup>2</sup> )	Volume (km <sup>3</sup> )	Percent of total water	Percent of fresh water
Oceans	361.3	1,338,000,000	96.5	
Groundwater				
Fresh	134.8	10,530,000	0.76	30.1
Saline	134.8	12,870,000	0.93	
Soil Moisture	82.0	16,500	0.0012	0.05
Polar ice	16.0	24,023,500	1.7	68.6
Other ice and snow	0.3	340,600	0.025	1.0
Lakes				
Fresh	1.2	91,000	0.007	0.26
Saline	0.8	85,400	0.006	
Marshes	2.7	11,470	0.0008	0.03
Rivers	148.8	2,120	0.0002	0.006
Biological water	510.0	1,120	0.0001	0.003
Atmospheric water	510.0	12,900	0.001	0.04
Total water	510.0	1,385,984,610	100	
Fresh water	148.8	35,029,210	2.5	100

Table from World Water Balance and Water Resources of the Earth, Copyright, UNESCO, 1978.

Table 2: Global annual water balance

		Ocean	Land
Area (km <sup>2</sup> )		361,300,000	148,800,000
Precipitation	(km <sup>3</sup> /yr)	458,000	119,000
	(mm/yr)	1270	800
	(in/yr)	50	31
Evaporation	(km <sup>3</sup> /yr)	505,000	72,000
	(mm/yr)	1400	484
	(in/yr)	55	19
Runoff to ocean			
Rivers	(km <sup>3</sup> /yr)	—	44,700
Groundwater	(km <sup>3</sup> /yr)	—	2200
Total runoff	(km <sup>3</sup> /yr)	—	47,000
	(mm/yr)	—	316
	(in/yr)	—	12