BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-3/T-1   BURP Examinations 2012-2013

Sub : **CE 361** (Elements of Solid Mechanics)

Full Marks : 210                                          Time : 3 Hours

The figures in the margin indicate full marks.

USE SEPARATE SCRIPTS FOR EACH SECTION

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## SECTION – A

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

Assume reasonable value(s) for missing data (if any).

1. (a) Differentiate among 'centre of gravity', 'centre of mass' and 'centroid'. **(5)**

(b) An element is subjected to multi-axial loading. What are the assumptions to justify principle of superposition to determine the normal strain components of that element? Write down the equations of strain in X, Y and Z direction. **(6)**

(c) The rigid bar ABC (Figure-1) is supported by fixed supports at both ends. AB is made of aluminum (E = 75 GPa, linear thermal expansion factor = $23.1 \times 10^{-6}$ m/m °C$^{-1}$), has a length of 1.5 m and a cross sectional area of 400 mm$^2$; BC is made of steel (E = 200 GPa, linear thermal expansion factor = $12 \times 10^{-6}$ m/m °C$^{-1}$), has a length of 1.2 m and a cross sectional area of 520 mm$^2$. If temperature is increased by 15°C, determine the support reactions and hence the thermal stresses in both the materials. **(24)**
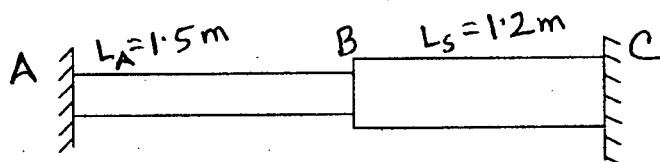


Figure- 1

2. (a) Find the 'Y' coordinate of the centroid of the hatched area shown in Figure-2. Point of origin is shown in the figure. Hint: (i) initially you may choose any point as point of origin and finally report the answer based on the origin point as mentioned in the question. (ii) the general equation of such parabolic curve $Y^2 = 4aX$. **(13)**

(b) Determine the moment of inertia of the hatched area shown in Figure-2 about an axis which is parallel to X-axis and passing through (–2, –2) point. **(22)**
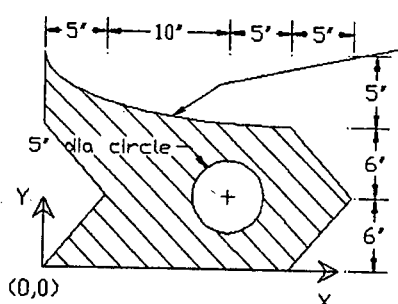


Figure- 2

3. (a) What is the difference between 'Resilience' and 'Toughness' of a material? **(6)**

   (b) With necessary sketch, describe 'elastic deformation' and 'plastic deformation' of a member from an atomic perspective. **(11)**

   (c) Determine the polar moment of inertia of the shaded area shown in Figure-3 about the centre of the arc. Hint: for triangular area, you may use the two theorems of moment of inertia. **(18)**
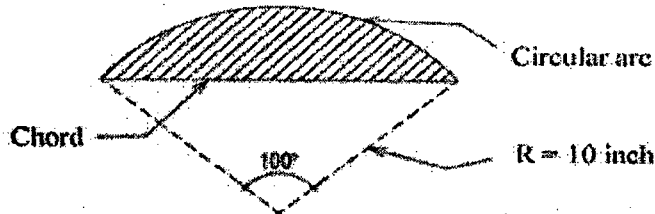
Circular arc

Chord

$100°$

R = 10 inch

Figure- 3

4. (a) Write down five points on which selection of factor of safety (F.S) depend. **(7)**

   (b) A pin is used to attach a clevis to the rope. The maximum force in the rope can be 100 KN. If the maximum shear stress allowed in a pin is 40 MPa, calculate the diameter of the pin. Note that the pin is in double shear. **(8)**

   (c) Draw shear force and bending moment diagram of the beam shown in Figure-4. All the distances shown in the figure are in meter. **(20)**

8 KN-m   12 KN   2 KN/m   4·5 KN/m   15 KN

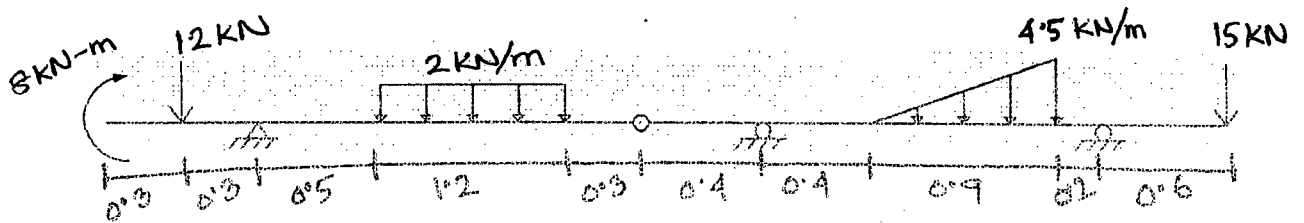0·3   0·3   0·5   1·2   0·3   0·4   0·4   0·9   0·1   0·6

Figure- 4

## SECTION – B

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

5. (a) Define structural determinacy. Write a short note on equations of equilibrium. **(7)**

   (b) AB is a beam shown in Figure-5. Determine if the beam is structurally determinate or not. If determinate, draw shear force diagram and bending moment diagram of this beam. **(28)**
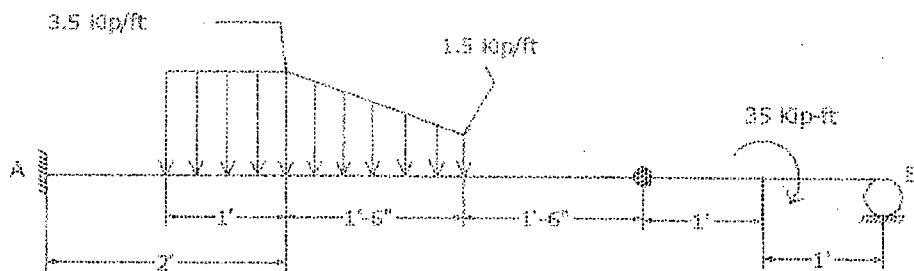
3.5 kip/ft   1.5 kip/ft   35 Kip-ft

A   B

1'   1'-6"   1'-6"   1'   1'

2'

Figure - 5

## CE 361

6. (a) What is a parallel force system? A parallel force system is shown in Figure-6. Determine the value of resultant force and its distance from point A. **(10)**
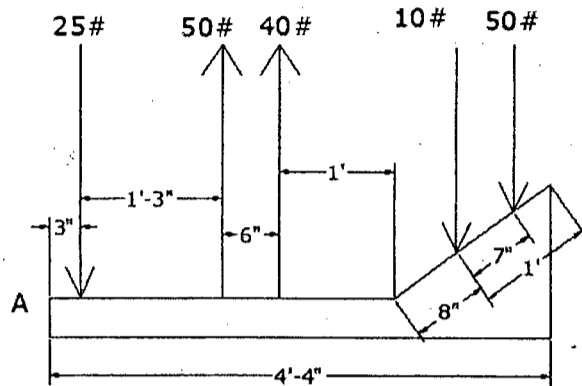
Figure-6

(b) Two rectangular bodies P in AB plane and Q in BC plane are shown in Figure-7. Weight of body P is 30 kip and body Q is 20 kip. The forces acting on this body are shown in the figure. Determine the cable tension and surface reaction of AB plane. Also determine the angle ACB. **(25)**
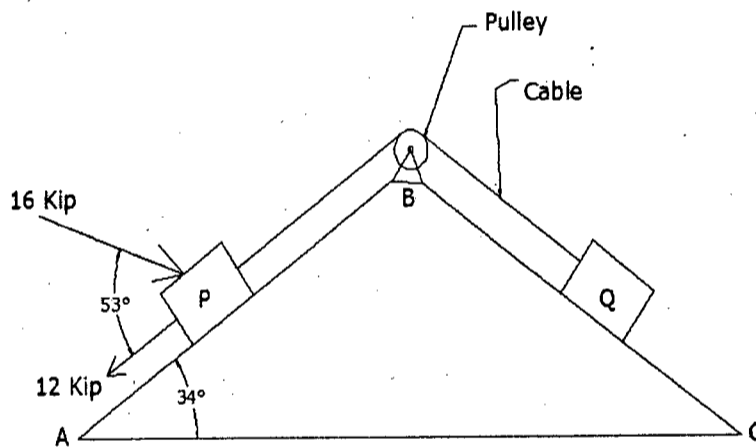
Figure-7

7. (a) What is the difference between non-coplanar concurrent force and coplanar non-concurrent force system? Explain with figures. **(7)**

(b) There are four spheres A, B, C and D shown in Figure-8. Weight of sphere A is 10 kip, sphere B is 12 kip, C is 5 kip and D is 5 kip. Diameter of sphere A is 3 feet, B is 3 feet and 3 inch, C is 2 feet and D is 2 feet. Determine the surface reactions on sphere D from both vertical and horizontal surfaces. **(28)**

Figure-8

# CE 361

8. (a) Define shear force and bending moment. (7)

(b) ABC is an overhanging beam shown in Figure-9. Draw shear force diagram and bending moment diagram of this beam for the given loading condition. (28)



Figure-9

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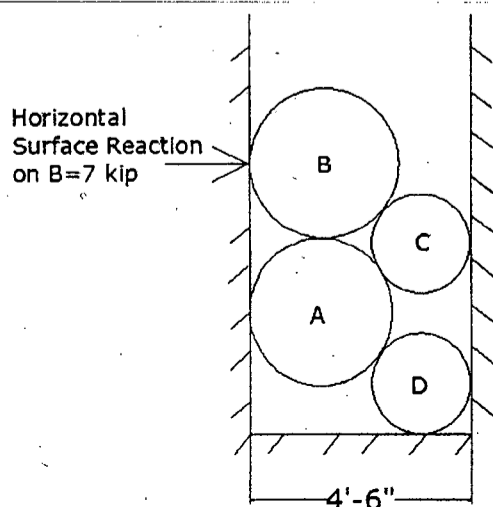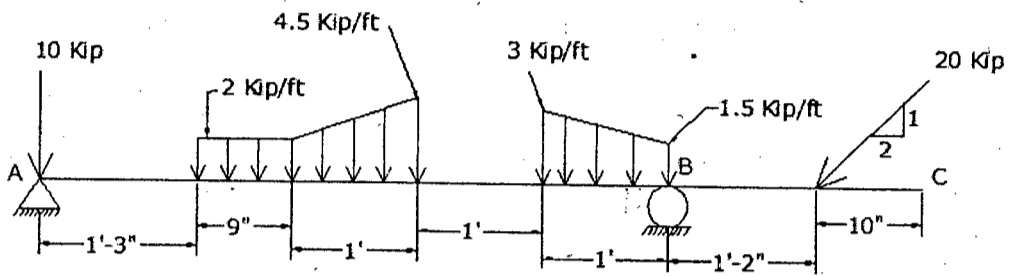
BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-3/T-1    BURP Examinations 2012-2013

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

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## SECTION – A

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

1. (a) Identify the linkages between Real Estate sector and economic base of a city. Depict the market situation in Real Estate.                                    (5+5=10)

   (b) State the conditions of shifting real estate market demand and supply curve focusing on demand and supply factors of real estate market.                           (9)

   (c) Define the following (any three)                                           (3×3=9)

         (i) Lemon Market

         (ii) Real Estate contract

         (iii) Title insurance

         (iv) Promissory note

   (d) Explain Real Estate trade cycle in short.                                      (7)

2. (a) According to 'Ricardian Rent theory', derive the equations for calculating both housing rent and land rent at city centre and city edge/periphery. Show the major components of housing rent with proper graphical representation.                     (7+4=11)

   (b) Assume a city in which urban residential density averages around 3500 households (HHs) per sq. mile and each HH occupies one dwelling unit. Structure cost of a dwelling is BDT 80,00,000 and interest rate is 7%/year. Annual agricultural rental income from farming tends to fluctuate around BDT 6,00,000 per sq. mile. The cost of commuting for an average HH with yearly income of about BDT 10,00,000 could be about BDT 16,000/year/mile. Distance of city edge from city centre is 20 miles and distance from employment centre to the house/dwelling is 2 miles. Calculate the monthly house rent and land rent/sq. mile both at the urban edge and city centre. If the city is not fully circular and the city centre is located on the straight edge of a water body, calculate how far that city's edge will be for the above given data.                                         (10)

   (c) Discuss the functional procedure of Bond market-based mortgage institutions as a housing finance system.                                                        (7)

   (d) Define Real Estate according to Real Estate Development and Management Act, 2010. Classify Estate.                                                        (2+5=7)

# PLAN 321

3. (a) With the help of Filtering model of housing market, derive the relationship between large moving cost and HH's responses to increase in income. Provide graphical representation if needed. (12)

(b) Assume a city where all HHs have the same income and real income is constant over time. Will there be filtering in the city? (5)

(c) The owners of rental property can deduct routine maintenance cost from their gross income; homeowners cannot. Does the deductibility of maintenance cost decrease the relative cost of renting, thus creating a bias towards renting? (7)

(d) Justify the effectiveness of spatial effluent fee policy as an alternative to industrial zoning policy. (11)

4. (a) Discuss the trade-offs associated with demolishing the high-rise clusters of public housing and replacing them with dispersed low-rise buildings. (5)

(b) Under the supply side policy of Government's housing assistance program, assume that the offer of $100 public housing decreased housing consumption. Total units of housing service available in the market are 3000 and monthly income is $600. Price of housing is 30 cents per unit of housing service/month. Suppose that the govt. increases the rent on a 1000 unit dwelling from $100 to $140. (5+5=10)

(i) Using a graph show the budget point with both $100 and $140 public housing.

(ii) Assume that the HH starts with housing consumption of 1200 units. Draw a set of indifference curves such that the HH accepts the offer of $100 public housing, but is indifferent between its original choice and $140 public housing.

(c) Depict short and long-run market effects of public housing with proper illustration. (9)

(d) The following figure shows that the consumer prefers cash to free public housing under an assumption that a system of cash transfers would not increase housing price. (6+5=11)
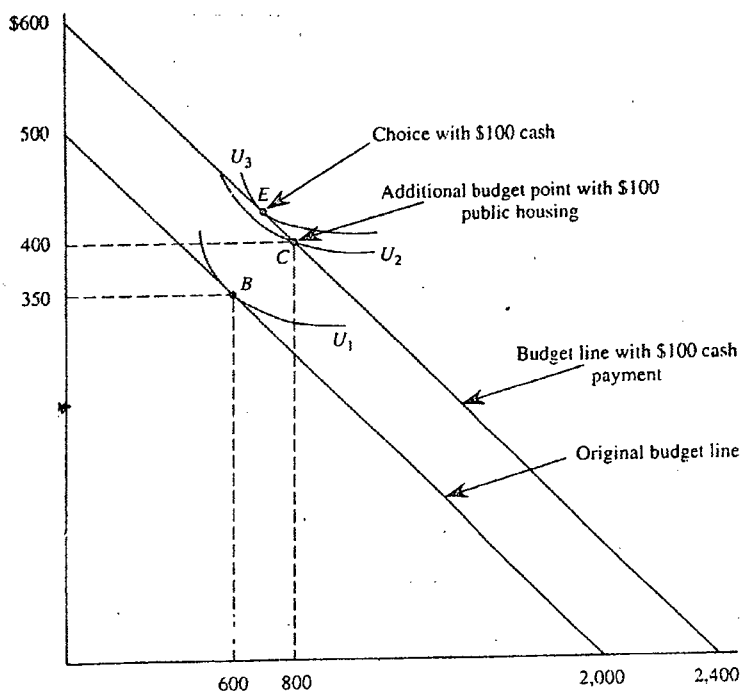
# PLAN 321

## Contd ... Q. No. 4(d)

(i) Redraw the budget line under the assumption that cash transfers increase housing price from 25 to 45 cents per unit.

(ii) Draw a set of indifference curves such that the consumer prefers free public housing (with no change in price) to the cash transfer (with the associated increase in price).

## SECTION – B

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

Provide diagrams where necessary.

5. Write short notes on the following (7×5=35)

   (a) Tangible and intangible components of housing,

   (b) Qualities of good housing,

   (c) Location of housing according to the bid-rent curve,

   (d) "There are bid businesses to be made from slum development". Explain the logic of this statement.

   (e) State at least three guidelines for locating housing in hazard prone area.

6. (a) What are the qualities that planners should seek when planning housing? (10)

   (b) What are three starting points for achieving positively performing housing? (10)

   (c) Compare the above aspects with residential areas of Bangladesh. (15)

7. (a) What questions need to be answered satisfactorily before designating new land for residential development? (10)

   (b) What is the formula for projecting housing need (PHN)? Explain. (10)

   (c) What are the long term projections assumptions for the demand for new homes? (10)

   (d) Why it is risky to predict housing need beyond 10-11 years after adoption of a project plan? (5)

8. (a) "If left to market forces, the property market tends to allocate land according to the highest and best use of each land parcel". Explain this statement in terms of allocation of land for residential purpose. (15)

   (b) In view of the above statement where are the urban poor placed? How are they accommodated? (10)

   (c) Why are informal settlements crowded or have very high density? (10)

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BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA
L-3/T-1    BURP Examinations 2012-2013
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

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## SECTION – A

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

1. (a) Briefly discuss the generalized process and the participatory approach of water resource planning.    **(12)**

   (b) Write the essential conditions for formation of precipitation. Show in a schematic diagram the cycle of formation of raindrops in the atmosphere.    **(7)**

   (c) Briefly describe the forms of precipitation.    **(6)**

   (d) Estimate the constant rate of withdrawal from 1375 ha reservoir in a month of July during of which the reservoir level dropped by 0.75 cm in spite of an average inflow into the reservoir 0.5 $Mm^3$/day. During the month the average seepage loss from the reservoir was 2.5 cm, total precipitation on the reservoir was 18.5 cm and the total evaporation was 9.5 cm. What is the ratio of runoff to precipitation?    **(10)**

2. (a) Briefly describe the factors affecting evaporation.    **(6)**

   (b) What is Pan-coefficient? Briefly describe the energy budget method of estimating evaporation from a lake.    **(6)**

   (c) What do you mean by (i) direct runoff (ii) interflow (iii) natural flow (iv) Effective rainfall?    **(8)**

   (d) Calculate total potential evapotranspiration from an area (28° N latitude) for the month of December by Penman method. The data and equation are given below:    **(15)**

   Mean temperature = 25°C, mean relative humidity = 65%

   mean observed sunshine hours = 9 h, wind speed at 2 m height = 85 km/day

   Slope of the saturation vapour pressure-temperature curve at 25°C = 1.4 mm of $H_g$ per °C,

   extraterrestrial radiation = 11 mm of water per day, reflection coefficient = 0.24,

   maximum possible sunshine hours = 10.8 hr.

   $$H_b = 2.01 * 10^{-9} (T_{avg})^4 \left[ 0.56 - 0.092 \sqrt{e_a} \right] (0.1 + 0.9 \, n/N)$$

3. (a) What are the inlet and outlet works in a storm water drainage system?    **(2+2+5)**
   An industrial area of 90 ha contains the outlet at a distance of 800 m. The maximum depth of rainfall is 43 mm during the time of concentration of 25.5 min. calculate the peak discharge at the outlet and slope of the area.

   (b) What do you mean by (i) Invert elevation (ii) Porosity (iii) Specific yield?    **(6)**

   (c) Describe confined and unconfined aquifer with neat sketch. Derive an equation for steady flow to a well in a confined aquifer.    **(5+5)**

Contd ... Q. No. 3

(d) A 40 cm well completely penetrates an unconfined aquifer of saturated depth 30 m and co-efficient of Permeability 45 m/day. Under steady state of pumping the drawdown at the well was found to be 3.0 m and the radius of influence was 300 m, if the discharge is required to increase 5% from the present condition, how much the diameter of the well have to be increased? **(10)**

4. (a) The following are ordinates of a hydrograph of flow from a catchment area of 773 km$^2$ due to a 6-h rainfall. Derive the ordinates of a 6-h unit hydrograph. **(9)**

| Time (h) | 0 | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 66 | 72 | 78 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow (m$^3$/s) | 40 | 60 | 215 | 360 | 400 | 350 | 270 | 205 | 145 | 100 | 70 | 50 | 40 | 40 |

(b) What is shifting control? Why shifting control occurs? **(5)**

(c) Write short notes on (i) Float-Gauge (ii) Bubble Gauge (iii) Wire Gauge. **(9)**

(d) The following data were obtained in a stream gauging operation. A current meter with a calibration equation, v = 0.3 N + 0.03 where N = revolutions per second, was used to measure the velocity at 0.6 depth. Calculate the discharge using area-velocity method. **(12)**

| Distance, m | 0 | 2 | 4 | 6 | 9 | 12 | 15 | 18 | 20 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Depth, m | 0 | 0.5 | 1.2 | 1.9 | 2.3 | 1.8 | 1.7 | 1.6 | 1.5 | 1.2 | 0.8 | 0 |
| No. of revolution | 0 | 75 | 80 | 125 | 140 | 120 | 110 | 105 | 90 | 85 | 70 | 0 |
| Time, s | 0 | 150 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 150 | 0 |

## SECTION – B

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

5. (a) What are the steps of water resources planning? Write short notes on regional and project planning. **(5+5)**

(b) What are the principles of IWRM? Differentiate traditional and integrated approach in water resources planning? **(3+7)**

(c) Why water vision is important in IWRM? What are the scopes of situation analysis in planning cycle of IWRM? **(4+6)**

(d) Discuss the rationale for water pricing in IWRM concept. **(5)**

6. (a) Briefly discuss different modes of sediment transport in natural river. Differentiate flashy and perennial river. **(6+4)**

(b) Define (i) Helicoidal flow (ii) Marginal embankment (iii) Artificial cutoff. **(4+4+3)**

(c) Classify groynes. What are the low cost measures of river bank protection? **(6+4)**

(d) Describe the functions of guide bank. **(4)**

## WRE 309

7. (a) What are the requirements of navigable waterways? Describe the options for achieving open channel navigation. **(4+5)**

(b) Write short notes on (i) Dredging process (ii) Flash flood. **(4+3)**

(c) Differentiate (i) Capital and maintenance dredging (ii) Hydraulic and mechanical dredger. **(4+4)**

(d) What are the structural measures of flood mitigation? Briefly describe the stages of national flood management program. **(5+6)**

8. (a) What are the factors governing in planning an irrigation project? Classify irrigation project based on area coverage. **(5+3)**

(b) Write short notes on – **(3+4+3)**

(i) Effective rainfall (ii) Furrow irrigation (iii) Cropping pattern.

(c) Sketch a layout of an irrigation canal network. Differentiate watershed and contour canal. **(5+4)**

(d) Define check flooding. Describe the advantages of sprinkler irrigation over other surface irrigation methods. **(4+4)**

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BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-3/T-1    BURP Examinations 2012-2013

Sub : **PLAN 343** (Traffic and Transportation Study)

Full Marks : 210                             Time : 3 Hours

The figures in the margin indicate full marks.

USE SEPARATE SCRIPTS FOR EACH SECTION

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## SECTION – A

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

1. (a) Draw the relationship between time and space for Dhaka city transportation system? What are the factors for creating such relationship?      **(6+8=14)**

   (b) "The greater the distances from the CBD area, the lower the prices of the land" – do you agree with the statement? Discuss with necessary diagrams.      **(8)**

   (c) What do you understand by revealed preferences and stated preferences?      **(8)**

   (d) "There is a trade-off between two basic roadway functions: mobility and accessibility" – illustrate this trade off scenario with necessary diagram.      **(5)**

2. (a) "There is a paradigm shift from 'Predict and Provide' to 'Predict and Prevent' in the traffic management of transportation system" – explain this statement with necessary examples.      **(10)**

   (b) Draw a comparative scenario among different types of passenger modes.      **(9)**

   (c) "Transportation is a derived demand" – do you agree with the statement? Argue with necessary examples.      **(6)**

   (d) What is Minimum Stopping Distance (MSD)? Which factors are responsible for controlling MSD?      **(2+8=10)**

3. (a) As a transport planner, you are assigned to redesign the traffic system of BUET campus. Which mode of travel will get priority in your design for a sustainable transport system and why? List two more solutions for having a sustainable traffic system in the campus area.      **(2+8+6=16)**

   (b) Give a brief description of the components of Rings of Mobility.      **(15)**

   (c) Write one important criticism of Burgess' Urban Land Use Model.      **(4)**

4. (a) Recently some of the access roads inside the Dhanmondi Residential Area are regulated into one way direction for controlling traffic congestion. Do you think it's a good solution for controlling traffic? Explain by mentioning merits and demerits of one way street system.      **(2+13=15)**

   (b) Write about the characteristics of a completely motorized network system with a diagram.      **(8)**

   (c) Draw a diagram to discuss the speed flow relationship in determining the roadway capacity.      **(7)**

   (d) How smart growth system can control the automobile dependence?      **(5)**

# PLAN 343

## SECTION – B

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

5. (a) Draw a typical cross-section of RHD (Roads and Highways Department) road which is expected to carry about 4000 PCU/hr in the design year. Also show the provision for NMV lanes. Use the following table to see the design standards: **(15)**

| Design type | Design year traffic volume (PCU/hr) | Cross section (widths in meter) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Crest width | Carriageway (No. of lanes) | Median | Paved shoulders | Divider | NMV lanes | Verge/Tree belt |
| 1 | 4500-8500 | 36.2 | 2×11 (6) | 1.6 | 2 × 1.8 | 2 × 0.6 | 2×3 | 2×0.9 |
| 2a | 2100-4500 | 28.8 | 2×7.3 (4) | 1.6 | 2 × 1.8 | 2 × 0.6 | 2×3 | 2×0.9 |
| 3a | 1600-2100 | 16.3 | 7.3 (2) | --- | --- | 2 × 0.6 | 2×3 | 2×0.9 |
| 4a | 800-1600 | 15.2 | 6.2 (2) | --- | --- | 2 × 0.6 | 2×3 | 2×0.9 |
| 5 | 400-800 | 9.8 | 5.85 (2) | --- | 2 × 1.2 | --- | --- | 2×0.95 |
| 6 | <400 | 9.8 | 3.7 (1) | --- | 2 × 1.2 | --- | --- | 2×1.85 |

(b) Discuss time mean speed and space mean speed with appropriate examples. **(10)**

(c) "Two types of traffic need to switch lanes in the middle of the full clover leaf interchange that may cause an increased risk of collisions" – Discuss. **(5)**

(d) How can the total person-km of travel along Dhaka-Chittagong highway in the year of 2013 be computed from traffic volume survey data of that year? **(5)**

6. (a) What percentile speeds are often used as the criteria in establishing an upper and lower speed limits for vehicles on major highways for traffic management purposes? Given the following ten spot speed data on Dhaka-Sylhet highway what would be the upper and lower speed limits for vehicles that can be set for traffic regulations? **(3+7=10)**

30, 35, 40, 50, 54, 60, 62, 62, 65, 70 (in km/hr)

(b) "At Nilkhet intersection along Mirpur Road, vehicle actuated signals are to be installed in which green periods will vary in relation to the actual demands made by traffic" – Before installing this system what type of vehicle flow measurement will be needed and why? **(6)**

(c) What is meant by 'expansion factor' in the context of O-D data collected from roadside interview survey? Why are these factors needed to be calculated after collecting data? **(7)**

(d) "Traffic delay studies are of considerable value to highway planners since they enable them to pinpoint locations where conditions are unsatisfactory" – What are those delays and how are these measured? **(12)**

# PLAN 343

7. (a) A parking patrol survey was conducted on a typical day at two peak periods (11:00 am to 1:00 PM and 6:00 pm to 8:00 pm) at the interval of 15 minutes in the off-street parking facility of "Orchard Point Shopping Center". The following curve is prepared on the basis of the survey results. Interpret the curve on the basis of parking accumulation, difference between parking demands at two peak periods and parking index. **(15)**

**Parking accumulation curve**
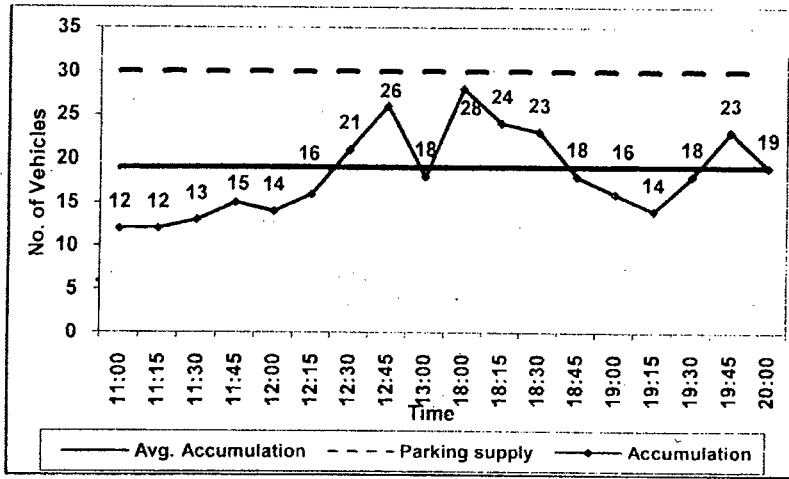


(b) Sketch the layout and dimension for a 60° angular parking. **(6)**

(c) What are the major challenges of 'park and ride' system of peripheral parking? **(6)**

(d) A 'round about' has been newly constructed at Palashi intersection. Discuss its advantages and disadvantages. **(8)**

8. (a) "The latest development in the field of instrumentation for traffic volume counts is the video system" – What are the advantages of this system in content of Dhaka city? **(5)**

(b) Write short notes on the following terms (any six): **(5×6=30)**

   (i) Prohibitory sign

   (ii) Stop lines

   (iii) Building line and control line

   (iv) Diamond interchange

   (v) Desire line graph

   (vi) Registration number plate survey

   (vii) Curb

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-3/T-1   BURP Examinations 2012-2013

Sub : **HUM 225** (Accounting)

Full Marks : 140                                      Time : 3 Hours

The figures in the margin indicate full marks.

Symbols indicate their usual meaning.

USE SEPARATE SCRIPTS FOR EACH SECTION

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## SECTION – A

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

1.  (a) Explain "Revenue Recognition Principle" and "Historical Cost Principle" according to the Conceptual Framework of Accounting.                                                                  **(3⅓)**

    (b) Mr. X started a merchandising company "ABC" on January 01, 2014. The following transactions occurred during the month:                                                                **(20)**

    | | |
    |---|---|
    | January 01 · | Mr. X takes a loan of Tk. 2,00,000 from Mr. Y. |
    | January 02 | He invests Tk. 1,00,000 in the business. |
    | January 04 | Hired three employees who will be paid Tk. 12,000 salary each and who will start working from January 05. |
    | January 06 | Purchased goods worth Tk. 40,000. Paid cash Tk. 25,000 and signed a note of the rest amount to be paid later. |
    | January 10 | Received cash Tk. 45,000 in advanced from the customers even if the goods are not sent. |
    | January 25 | Paid Tk. 45,000 rent for next three months. |
    | January 27 | Sells goods worth Tk. 65,000 on credit. |
    | January 30 | Paid. Tk. 10,000 utilities expense and Tk. 3,000 electricity bill expanse by cash. |
    | January 30 | Salary of the month January is payable which is worth Tk. 36,000. |
    | January 31 | Receives cash 30,000 from the customers for goods sold on January 27. |

    **Requirements:**

    (i) Prepare journal entries for the above transactions.

2.  (a) Why may a trial balance not contain up to date and complete financial information?          **(3⅓)**

    (b) Given below is a Trial Balance of XYZ Advertising Agency as at October 31, 2012.          **(20)**

    XYZ Advertising Agency

    Trial Balance

    October 31, 2013

    | | Debit (Tk.) | Credit (Tk.) |
    |---|---|---|
    | Cash | 80000 | |
    | Advertising supplies | · 40000 | |
    | Prepaid Insurance | 30000 | |
    | Office Equipment | 250000 | |

# HUM 225

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

|  | Debit (Tk.) | Credit (Tk.) |
|---|---|---|
| Notes Payable |  | 60000 |
| Accounts Payable |  | 45000 |
| Unearned Revenue |  | 25000 |
| Mr. Arafat, Capital |  | 195000 |
| Mr. Arafat, Drawing | 10000 |  |
| Service Revenue |  | 175000 |
| Salaries Expense | 50000 |  |
| Rent Expense | 40000 |  |
|  | 500,000 | 500,000 |

Other Data:

- Advertising Supplies on hand at October 31 total Tk. 7,000.
- Expired Insurance for the month is Tk. 2,500.
- Depreciation for the month is Tk. 6,000.
- Unearned Revenue earned in October totals Tk. 16,000.
- Services provided but not recorded at October 31 are Tk. 18,000.
- Interest accrued at October 31 is Tk. 1,000.
- Accrued Salaries at October 31 are Tk. 20,000.

**Requirements**:

(i) Give necessary Adjusting Entries as on October 31, 2012.

(ii) Prepare an Adjusted Trial Balance.

3. (a) What is the difference between Deferrals and Accruals in accounting? **(3⅓)**

(b) "Depreciation is not a cash expense". Explain this statement with example. **(2)**

(c) Presented below is an adjusted trial balance as of December 31, 2013. **(18)**

Z Consultancy Firm

Adjusted Trail Balance

December 31, 2013

|  | Debit (Tk.) | Credit (Tk.) |
|---|---|---|
| Cash | 11000 |  |
| Accounts Receivables | 22500 |  |
| Supplies | 5000 |  |
| Prepaid Insurance | 2500 |  |
| Printing Equipment | 60000 |  |
| Accumulated Depreciation |  | 34000 |
| Accounts Payable |  | 5000 |
| Interest Payable |  | 150 |
| Notes Payable |  | 5000 |

## HUM 225
### Contd ... Q. No. 3(c)

|  | Debit (Tk.) | Credit (Tk.) |
|---|---|---|
| Unearned Advertising Fees |  | 5600 |
| Salaries Payable |  | 1300 |
| Capital |  | 25500 |
| Drawing | 12000 |  |
| Advertising Revenue |  | 62700 |
| Salaries Expanse | 11300 |  |
| Insurance Expanse | 850 |  |
| Interest Expense | 500 |  |
| Depreciation Expanse | 6000 |  |
| Supplies Expense | 3600 |  |
| Rent Expense | 4000 |  |
|  | 139,250 | 139,250 |

**Requirements:**

(i) Prepare an Income Statement and an Owner's Equity statement for the year ended on December 31, 2013.

(ii) Also prepare a Balance Sheet as of December 31, 2013.

4. (a) "Double entry means there will be exactly two accounts". True or False? Justify your answer. **(3⅓)**

(b) Show the impact of the following transactions on every element of Accounting Equation in a tabular form. **(20)**

(i) Mr. Z invests Tk. 400000 in the business.

(ii) The company transfers Tk. 100000 in it's bank account.

(iii) Company purchases goods worth Tk. 45000 (on account) for resale.

(iv) Company purchases Furniture by paying cheque of Tk. 80000.

(v) Company sells the goods for Tk. 60000 by which the company pays off the amount due to its supplier of those goods.

(vi) The company pays interest expense Tk. 3000.

(vii) The company pays three years advance rent of Tk. 45000.

(viii) Mr. Z was hijacked where he lost Tk. 20000.

(ix) The owner Mr. Z withdraws Tk. 50000 cash from the business's bank account.

(x) Mr. Z decides to sell the company for Tk. 600000.

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

5. (a) Define manufacturing and non manufacturing cost with examples. **(5)**

(b) From the following particulars calculate (1) Prime Cost (2) Factory Cost (3) Cost of Production and (4) Cost of Sales. **(18⅓)**

# HUM 225

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

| Particulars | Tk. | Particulars | Tk. |
|---|---|---|---|
| Direct Raw Materials | 33,000 | Depreciation of office building | 1,000 |
| Direct Wages | 35,000 | Depreciation of delivery Van | 200 |
| Direct Expenses | 3,000 | Bad debts | 100 |
| Factory Rent rates | 7,500 | Advertising | 300 |
| Indirect Wages (Factory) | 10,500 | Salaries of salesmen | 1,500 |
| Factory Lighting | 2,050 | Up keeping of delivery Van | 700 |
| Factory Heating | 1,500 | Bank charges | 100 |
| Power (Factory) | 4,400 | Commission on sales | 1,500 |
| Office Stationery | 900 | Rent and rates (Office) | 500 |
| Director's Remuneration (Factory) | 2,000 | Loose tools written off | 600 |
| Director's Remuneration (Office) | 4,000 | Ending finished goods | 10,000 |
| Factory Cleaning | 1,000 | (sales @ Rs. 40 per unit) | 50,000 |
| Sundry Office Expenses | 200 | Factory Stationery | 750 |
| Water supply (Factory) | 1,300 | Factory Insurance | 1,100 |
| Office Insurance | 500 | Legal Expenses (Office) | 400 |
| Rent of Warehouse | 300 | Depreciation Plant & Machinery | 2,000 |
| Purchased of raw material | 10,000 | Beginning finished goods | 4,000 |

6. (a) Define cost accounting and describe the purpose of cost accounting. $(3\frac{1}{3})$

(b) XYZ is a merchandising company. The company's revenues and expenses for the last two months are below: **(20)**

| | March | April |
|---|---|---|
| Sales units | 6000 | 9500 |
| Sales revenue | Tk. 420000 | Tk. 665000 |
| less: Cost of Goods Sold | 168000 | 266000 |
| Gross Margin | 252000 | 399000 |
| Less: Operating expenses: | | |
| Shipping expense | 56000 | 56000 |
| Advertising expense | 78000 | 90000 |
| Salaries & commission | 107000 | 143000 |
| Insurance expense | 18000 | 28500 |
| Depreciation expense | 6000 | 6000 |
| Rent | 12000 | 12000 |
| Total operating expense | 272000 | 320000 |
| Net Operating Income | Tk. 25000 | Tk. 63500 |

**Requirement:**

(i) Identify the behavioral classification of cost as variable, fixed and mixed cost.

(ii) Using High-low method separate the fixed and variable cost from mixed cost.

(iii) Using contribution margin format provide the Income Statement for 10000 units.

(iv) What is cost function for 12000 units? Determine the total cost for mixed items.

## HUM 225

7. (a) Define standard costing. What are the purposes of standard costing? **(5)**

(b) A textile company has produced 15,000 shirts during the year 2014. It has the following information– **(18 ⅓)**

|  | **Actual** | **Standard** |
|---|---|---|
| Direct material purchased and used | 23,000 square yards at the rate of Tk. 25 per yard | 2.75 square used for 1 output at Tk. 30 per yard. |
| Direct labor used | 10,000 hours at the rate of Tk. 20 per hour | 0.80 hour used for 1 unit of output at Tk. 20 per hour |
| Variable factory overhead | 5,000 machine hours at Tk. 27 per hour | 0.40 machine hour used for 1 unit of output at Tk. 25 per hour |
| Fixed factory overhead | Tk. 350,00 | Budgeted Tk. 450,000 and budgeted machine hour 9,000 hours |

**Required:**

(i) Calculate material, labor and factory overhead variance.

(ii) What does such variance indicate?

8. (a) Explain the relationship among variable, fixed and mixed cost with graph. **(5 ⅓)**

(b) Following data relates to a manufacturing company -THM Textile Limited. **(18)**

Number of units produced and sold each year   8,000 and selling price per unit Tk. 150.

**Variable cost per unit:**

| | |
|---|---|
| Direct materials | Tk. 25 |
| Direct labor | Tk. 40 |
| Variable Manufacturing Overhead | Tk. 10 |

**Fixed costs per year:**

| | |
|---|---|
| Fixed manufacturing overhead | Tk. 150,000 |
| Fixed selling and administrative expenses | Tk. 50,000 |

**Requirement:**

(i) Compute BEP in units and in value. (BEP = Break-Even-Point).

(ii) Compute Degree of Operating Leverage (DOL) and prove it by assuming 25% increase in sales.

(iii) Prepare income statement if the selling price increases by 20.00 Tk. per units, fixed cost increases by Tk. 150,000 and the sales volume decreases by 10%.

(iv) Compute the BEP in units if selling price increases by 15% and variable cost increases by 20%.

(v) Calculate Margin of Safety in value and in units.

(vi) What will be the amount of units to achieve the target profit after tax Tk. 450,000. Tax rate is 45% on profit.

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