

CHITTAGONG UNIVERSITY OF ENGINEERING & TECHNOLOGY
B. Sc. Engineering Level-2 Term-I Final Examination 2020

Subject: Civil Engineering

Paper : Engineering Mathematics-III (Math-201)

Time : 2 Hours

Full Marks: 200

*Answer any THREE questions from EACH section. Use separate script for EACH section.
The figures in the right margin indicate full marks.*

SECTION-A

- Q.1. (a) Define unitary matrix. Show that matrix $A = \begin{bmatrix} 1 & 1+i \\ 1-i & -1 \end{bmatrix}$ is not unitary. (18)
- (b) Consider the following digraph form an adjacency matrix and compute its clique(s) (16)

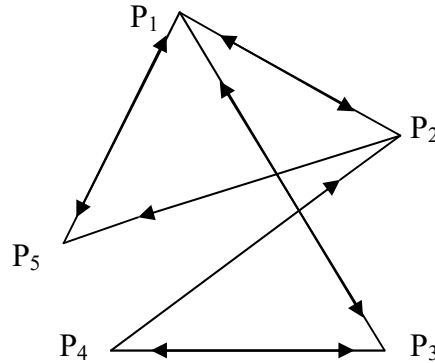


Fig. 1(b)

- (c) Applying elementary transformations, find the inverse of the matrix. (16)
- $$\begin{pmatrix} 1 & 2 & 3 \\ 1 & 3 & 4 \\ 1 & 4 & 3 \end{pmatrix}$$
- Q.2. (a) Find the values of 'b' for which the following system has non-trivial solutions. (14)
- $$\begin{aligned} 2x + 3by + (3b + 4)z &= 0 \\ x + (b + 4)y + (4b + 2)z &= 0 \\ x + 2(b + 1)y + (3b + 4)z &= 0 \end{aligned}$$
- (b) Define Eigen values and eigenvectors of the square matrix. Find the eigenvalues and corresponding eigenvectors of the matrix. (22)
- $$\begin{pmatrix} 3 & 1 & 4 \\ 0 & 2 & 6 \\ 0 & 0 & 5 \end{pmatrix}$$
- (c) State Cayley Hamilton theorem. Verify the theorem for the matrix (14)
- $$A = \begin{bmatrix} -6 & 3 \\ 1 & -4 \end{bmatrix}$$
- Q.3. (a) Define Laplace transform of the function $f(t)$. If $\mathcal{L}\{F(t)\} = f(s)$, show that $\mathcal{L}\{e^{at}F(t)\} = f(s - a)$. (17)
- (b) Find the Laplace transformation of following functions: (20)
- (i) $e^{2t}\cos^2 t$ (ii) $t^2(\sin t + e^{-5t})$
- (iii) $e^{-3t}(\cosh 2t + \sin 2t)$
- (c) Evaluate the following improper integral $\int_0^\alpha e^{-2t} t \cos t \, dt$ (13)

SECTION-B

- Q.4. (a) Define direction cosines and direction ratios of a directed line. If a straight line makes angles α, β, γ with the coordinate axes, show that, (16)
- $$\sin^2 \alpha + \sin^2 \beta + \sin^2 \gamma = 2$$
- (b) The direction cosines of two lines are connected by relations $al - bm + cn = 0$ and $pl^2 + qm^2 + rn^2 = 0$. Drive the condition of perpendicularity of the lines. (16)
- (c) Find the point where the line $x + 2y + 4z - 2 = 0 = 2x + 3y - 2z + 3$ cuts the plane $2x - y + 4z + 8 = 0$ (18)

- Q.5. (a) Find an equation for a plane passing through the intersection of $x + 2y - 3z + 1 = 0$ and $2x - y + z + 2 = 0$, and parallel to the line $\frac{x-1}{1} = \frac{y+2}{-2} = \frac{z+1}{3}$ (22)
- (b) Define shortest distance between two straight lines. Find the shortest straight lines. Find the shortest distance between the lines $\frac{x+7}{-8} = \frac{y-5}{3} = \frac{z-4}{1}$ and $3x - 4y + 12 = 0 = 3z + 2y - 57$ (28)
- Q.6. (a) Define divergence and curl of a vector field. Find the directional derivative of $f(x, y, z) = x^2 - y^2 + 2z^2$ at the point P(1, 2, 3) in the direction of the line PQ where Q is the point (5, 0, 4). (20)
- (b) What is irrotational vector? Show that $\vec{A} = r^3 \vec{r}$, where, $\vec{r} = \vec{i}x + \vec{j}y + \vec{k}z$, is irrotational. (13)
- (c) Find the total work done in moving a particle in a force field given by $\vec{F} = 3xy\vec{i} - 5z\vec{j} + 10x\vec{k}$ along the curve $x = t^2 + 1$, $y = 2t^2$, $z = t^3$ from $t = 1$ to $t = 2$. (17)

-:- The End -:-

CHITTAGONG UNIVERSITY OF ENGINEERING & TECHNOLOGY
B. Sc. Engineering Level-2 Term-I Final Examination 2020

Subject: Civil Engineering

Paper : Engineering Mathematics-III (Math-201)

Time : 2 hr. 30 min.

Full Marks: 200

Date : 28 November 2021

(This Examination is conducted according to the decision of 135th Academic Council meeting)
Answer any THREE questions from EACH section. Use separate script for EACH section.
The figures in the right margin indicate full marks.

SECTION-A

Q.1. (a) Define following matrices with example. (10)

(i) Orthogonal Matrix, (ii) Triangular Matrix, (iii) Nilpotent Matrix

(b) Find all values of “a” for which the resulting system has (i) no solution, (20)
(ii) a unique solution and (iii) infinitely many solutions.

$$\begin{aligned}x + y - z &= 3 \\x - y + 3z &= 4 \\x + y + (a^2 - 10)z &= a\end{aligned}$$

(c) Find, if possible, a nonsingular matrix P such that $P^{-1}AP$ is diagonal, where (20)

$$A = \begin{bmatrix} 3 & 0 & 0 \\ 2 & 3 & 0 \\ 0 & 0 & 3 \end{bmatrix}$$

Q.2. (a) Compute the inverse of the given matrix A , if it exists, where (15)

$$A = \begin{bmatrix} 1 & 2 & -3 \\ -4 & -5 & 2 \\ -1 & 1 & -7 \end{bmatrix}$$

(b) Define unit step function. Find the inverse laplace transform of following functions: (25)

$$\begin{aligned}(i) & \frac{s+1}{(s^2+2s+2)^2} \\(ii) & e^{-3s} \left(\frac{2}{s^3} + \frac{6}{s^2} + \frac{9}{s} \right)\end{aligned}$$

(c) Evaluate $\int_0^\infty e^{-5t} t \sin t \, dt$ (10)

Q.3. (a) Solve the following differential equations, using the Laplace transform technique, (30)

(i) $Y''(t) + 9Y(t) = 18t$; $Y(0) = 0$, $Y\left(\frac{\pi}{2}\right) = 0$

(ii) $tY''(t) + 2Y'(t) + tY(t) = \sin t$; $Y(0) = 1$

(b) The currents i_1 and i_2 in mesh are given by the differential equations (20)

$$\begin{aligned}\frac{di_1}{dt} - wi_2 &= a \cos pt \\ \frac{di_2}{dt} + wi_1 &= a \cos pt\end{aligned}$$

Find $i_1(t)$ and $i_2(t)$ by laplace transform if $i_1(0) = i_2(0) = 0$.

SECTION-B

Q.4. (a) Define direction cosines and direction ratios of a line, and establish a relation between them. (16)

(b) A variable plane makes intercepts on the coordinate axes, the sum of whose square is constant. Find the locus of the foot of the perpendicular from the origin to the plane. (18)

(c) Find the shortest distance between the lines $\frac{x-1}{2} = \frac{y-2}{2} = \frac{z-3}{4}$; $\frac{x-2}{3} = \frac{y-3}{4} = \frac{z-4}{5}$. State whether the lines are coplanar or not. (16)

Q.5. (a) Obtain the equation of the circle lying on the sphere $x^2 + y^2 + z^2 - 2x + 4y - 6z + 3 = 0$ and having its centre at $(2, 3, -4)$. (16)

(b) Define directional derivative of a scalar function. Show that $df = \text{grad} f \cdot d\mathbf{r}$ (16)

(c) Find the equations of the tangent line and the normal plane to the curve $x^2 + y^2 + z^2 = 1, x + y + z = t$ at $(1, 0, 0)$. (18)

Q.6. (a) State the Gauss Divergence theorem. Applying the theorem, evaluate (20)

$$\oiint_S \mathbf{F} \cdot d\mathbf{S}, \text{ where}$$

$\mathbf{F} = (2x^2 - 3z)\mathbf{i} - 2xy\mathbf{j} - 4x\mathbf{k}$ and S is the closed surface which encloses the tetrahedron $x=y=z=0, 2x+2y+z = 4$.

(b) Verify the Stoke's theorem for $\mathbf{F} = y\mathbf{i} + (x - 2xz)\mathbf{j} - xy\mathbf{k}$ over the upper half of the surface $x^2+y^2+z^2 = 100$ bounded by its projection on the xy-plane. (30)

-:- The End -:-

CHITTAGONG UNIVERSITY OF ENGINEERING & TECHNOLOGY
B. Sc. Engineering Level-2 Term-I Final Examination 2020

Subject: Civil Engineering

Paper : Engineering Materials (CE-203)

Time : 2 hr. 30 min.

Full Marks: 200

Date : 21st November 2021

*(This Examination is conducted according to the decision of 135th Academic Council meeting)
Answer any TWO questions from EACH section. Use separate script for EACH section.
The figures in the right margin indicate full marks. Use standard value if needed.*

SECTION-A

- Q.1. (a) How workability of concrete is maintained in Ready mix concrete where fresh concrete is transported for long time? (10)
- (b) Design a concrete mix using a maximum aggregate size of 40mm to be used for a road slab subjected to applications of deicing chemicals having a 28 days strength of 35 MPa. The slab will be in contact with soil that has a sulfate content of 0.55% slump value should not be more than 50mm. The material properties are as follows. (40)
- Cement: sp. Gr.- 3.15
Coarse aggregates:
Bulk sp.gr. (SSD) = 2.60
Oven dry unit wt. = 1700 kg/m³
Absorption capacity = 1.1%
Effective absorption = 0.8%
Fine aggregates:
Bulk sp.gr. (SSD) = 2.70
Fineness modulus = 2.65
Absorption capacity = 1.8%
Surface moisture = 2.2%
- Q.2. (a) Which type of cement is generally used in the following cases and why? (18)
- (i) Mat Foundation, (ii) Highway Slab, (iii) Dam, (iv) Concrete casting in frost action, (v) Pre cast column, (vi) Concreting in running water
- (b) Describe the hydration and strength development of pure compounds of cement with graphical representation. (12)
- (c) What is meant by ferrocement? What are the advantages of using ferrocement? Discuss the various applications of ferrocement. (12)
- (d) Explain the corrosion mechanism of steel in reinforced concrete. (11)
- Q.3. (a) What are the field and laboratory tests performed on aggregates? What are their significances? (15)
- (b) What are meant by “good sand” & bulking of sand? How bulking is affected by size of sand in cement concrete mix? Explain them with neat sketches. (15)
- (c) Write short notes on: (20)
- (i) Fly Ash,
(ii) Paints & Varnish,
(iii) Flash setting & False setting,
(iv) Drying shrinkage,
(v) Fiber Board Reinforced plastic,
(vi) Segregation & Bleeding

SECTION-B

- Q.4. (a) What is meant by conversion of timber? List the various market forms of timber. State the characteristics of a good timber. (15)
- (b) Identify & briefly discuss the following terms with a neat sketch: (i) Pith (ii) Bark (iii) Medulary Ray (iv) Annual ring (v) Heart wood (vi) Sap wood. (20)
- (c) What is meant by vulcanization? What are the special properties of synthetic rubber? (08)
- (d) Does water an engineering material? Justify your answer. Does it have any effect on concrete property? (07)
- Q.5. (a) What is rotary kiln? Explain working principles of its various zones with a neat sketch. (20)
- (b) Why a brick is needed for drying & burning? Explain various stapes of brick burning with their actions & specifications. (15)
- (c) What are the various characteristics of good bricks? How can you quality a brick, in the field?
- Q.6. (a) What is w/c ratio? Explain with neat sketch, how & why strength of concrete varies with w/c ratio. (15)
- (b) Between cylinder & cube specimen for compressive strength test of concrete, which one gives greater values of strength & why? (10)
- (c) What is the significance of Fineness modulus? Calculate Fineness modulus of the following sieved sand sample. (25)

Sieve No.	Weight Retained (gm)
#4	0
#8	0
#16	3.24
#30	12.58
#40	142.36
#50	256.58
#100	72.32
#200	10.48
Pan	2.47

Draw the gradation curve and comment on the shape of the curve.

-:- The End -:-

CHITTAGONG UNIVERSITY OF ENGINEERING & TECHNOLOGY
B. Sc. Engineering Level-2 Term-I Final Examination 2020

Subject: Civil Engineering
Paper : Engineering Materials (CE-203)
Time : 2 Hours

Full Marks: 200

*Answer any TWO questions from EACH section. Use separate script for EACH section.
The figures in the right margin indicate full marks. Use standard value if needed.*

SECTION-A

- Q.1. (a) What is slump test? Why is it performed? How to adjust slump if it does not meet the requirement? (7)
- (b) It is required to design a concrete mix of a minimum compressive strength of 25 MPa at 28 days for an airfield pavement. The laboratory tests on controlling mix show a standard deviation of 4 MPa. A slump of 25 mm is specified. The material properties are as follows: (43)
- Maximum size of coarse aggregate = 40 mm
Specific gravity of coarse aggregate = 2.68
Dry rodded density of coarse aggregate = 1600 kg/m³
Effective absorption of coarse aggregate = 0.4%
Specific gravity of cement = 3.15
Specific gravity of fine aggregate = 2.64
Fineness modulus of fine aggregate = 2.8
Surface moisture in fine aggregate = 4%
- Q.2. (a) What is w/c ratio? How it affects concrete property? (10)
- (b) What is gel/space ratio? (13)
- Calculate the strength of concrete having 70% hydration where 100 gm of cement is mixed with 50 ml of water. Specific volume of cement is 0.319 ml/gm and 1 ml of cement produces 2.06 ml of gel after hydration.
- (c) Laboratory experiments conducted at CUET on a particular mix showed a strength of 25 MPa for fully matured concrete. Find whether formwork can be removed for an identical concrete placed at Rajshahi at the age of 20 days when the average temperature is 7°C and the concrete is likely to be subjected to a stripping stress of 15 MPa. Use Plowman's coefficient A = 21 and B = 61. (14)
- (d) Calculate the volume of various materials in 100 cft of the following concrete (13)
- (i) Plain cement concrete (1: 2: 4) and
(ii) Reinforced cement concrete (1: 2: 3) with 0.5% reinforcement.
- Q.3. (a) What is workability? What are the tests performed to determine workability? In flow test, the spread diameter of concrete is found 36 cm after test. Calculate flow percent. (14)
- (b) What are segregation and bleeding? How to prevent those phenomena? (12)
- (c) What is lightweight concrete? Compare it with ordinary plain concrete? What are the various varieties of lightweight concrete? What are their desirable properties? (15)
- (d) What are field mix ratio & real mix ratio? Explain their practical significance. (9)

SECTION-B

- Q.4. (a) What do you mean by the term “property of a material”? Why is it important for any type of Civil Engineering construction? Name the various properties of Engineering materials with at least two examples of each. (18)
- (b) How can you classify the aggregate according to their gradation? Explain their importance in Civil Engineering construction with neat sketches. (13)
- (c) Name at least five important tests of coarse aggregates with their significance in practical applications. Explain the laboratory procedure of aggregate impact value test. (19)
- Q.5. (a) What are the functions of sand in construction? (6)
- (b) What is fineness modulus? (29)
- Draw the gradation curve for the following sieve analysis:
- | | | | | | | | | | |
|------------------|----|----|-----|------|-----|-----|------|------|-----|
| Sieve No. | #4 | #8 | #16 | #30 | #40 | #50 | #100 | #200 | Pan |
| Wt. Regained, gm | 0 | 0 | 15 | 26.5 | 38 | 195 | 160 | 58 | 7.5 |
- (c) The fineness modulus of sand & brick khoa are 2.8 & 6.9 respectively. Their combined modulus is 5.5. If 7.5 cft of comined well compacted mixture is required, determine the volume of sand & brick khoa in loose state. Consider shninkage factor is 0.8. (15)
- Q.6. (a) Name the factors that affect the quality of good bricks. What are the harmful constituents of brick clay? Why are they termed harmful? (14)
- (b) Name various steps in the manufacturing process of bricks. Discuss the various steps of burning bricks. Why bricks are to be burned? (17)
- (c) What is the standard size of brick in our country? Is it economical? Justify your answer. (10)
- (d) Which type of kiln is preferred by manufacturer of Bangladesh? Why? What are the tests that carried out in the field to determine the quality of good bricks? Explain them. (9)

--: The End -:

CHITTAGONG UNIVERSITY OF ENGINEERING & TECHNOLOGY

B. Sc. Engineering Level-2 Term-I Final Examination 2020

Subject: Civil Engineering

Paper : Computer Programming & Numerical Methods in Civil Engineering (CE-205)

Time : 2 hr. 30 min.

Full Marks: 150

Answer any TWO questions from EACH section. Use separate script for EACH section.

The figures in the right margin indicate full marks. Use standard value if needed.

SECTION-A

Q.1. (a) What are the essential difference between trapezoidal and waddles rules sin numerical evaluation of definite integral. (10)

(b) The population of a town in decennial census was as given below. Estimate the population for the year 2025. (20)

Years	1991	2001	2011	2021	2031
Population in thousands	46	64	80	92	104

(c) Write the theorems needed for Bisection & Iteration method? (7½)

Q.2. (a) Using Newton, Raphson method, find the root of the equation $x \log_{10} x = 1.5$ (22½)

(b) Using Rungl-kutta method of fourth order, solve for $y(0.1)$, $y(0.2)$, $y(0.3)$ given, that $y' = xy + y^2$, $y(0) = 1$ (15)

Q.3. (a) Solve the system of equation by Gauss elimination method. (17)

$$\begin{aligned} x_1 + x_2 + x_3 + x_4 &= 2 \\ x_1 + x_2 + 3x_3 - 2x_4 &= -6 \\ 2x_1 + 3x_2 - x_3 + 2x_4 &= 7 \\ x_1 + 2x_2 + x_3 - x_4 &= -2 \end{aligned}$$

(b) Fit an exponential curve for the form $y = ab^x$ with following data: (20½)

x	1	2	3	4	5	6	7
y	0.1	1.2	1.7	2.3	3.5	4.9	6.8

SECTION-B

Q.4. (a) What is pivot element? Differentiate between initial value problem & boundary value problem. (7½)

(b) A simply supported beam carries a concentrated load $P(lb)$ at its midpoint. Corresponding to various values of P , the maximum deflection $Y(inch.)$ is measured. The data are given below. Find a law of the type $Y = a + bp$ by the method of least squares. (15)

P	100	125	140	160	180	200
Y	0.45	0.55	0.60	0.70	0.80	0.85

- (c) A beam is loaded as shown in Fig.Q.5(c). Use the bisection method to solve for the position inside the beam where there is no moment. (15)

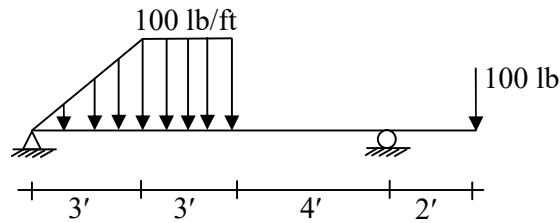


Fig.Q.5(c)

- Q.5. (a) Differentiate between: (10)

- (i) Local function & global function
- (ii) Local variable & Global variable
- (iii) Static variable & Register variable
- (iv) Pointer & Array

- (b) What happens if an array's initializer has more values than the size of the array? (7½)

- (c) Write a C++ Program that computes the sum of reciprocals $S = 1 + \frac{1}{2} + \frac{1}{3} + \dots + \frac{1}{n}$, where n is the smallest integer for which $n \geq s$. (10)

- (d) Write a C++ Program to check the trigonometry $\cos 2x = 2 \cos^2 x - 1$ using do-while loop. (10)

- Q.6. (a) Write a C++ program to calculate the reactions at supports of the beam shown in Fig.Q.7(a). (16)

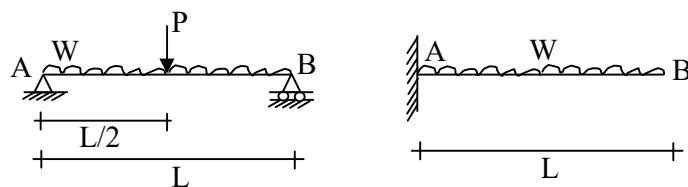


Fig.Q.7(a)

- (b) `int man ()` (17½)

```
{ int I = 20, j = 10 ;
  do { j + 1 = I ;
      i++ ; }
  while ( j ≤ 200 ) ; }
```

- (i) How many times the loop will run? (ii) Show the output of 'j'

- (c) Write the importance of iteration in C++. (04)

∴ The End ∴

Subject: Civil Engineering

Paper : Mechanics of Materials-I (CE-211)

Time : 2 Hours

Full Marks: 150

*Answer any THREE questions from EACH section. Use separate script for EACH section.
The figures in the right margin indicate full marks. Use standard value if needed.*

SECTION-A

- Q.1. (a) Determine the resultant internal forces acting on the cross section of the frame (Fig. 1(a)) at points F and G. The contact at E is smooth. (22)
- (b) A differential element taken from a curved bar is shown in Fig. Q 1(b). Show that $\frac{dN}{d\theta} = V$, $\frac{dV}{d\theta} = -N$, $\frac{dM}{d\theta} = -T$ and $\frac{dT}{d\theta} = M$ (15^{1/2})
- Q.2. (a) The rigid bar ABC shown in Fig. Q.2(a) is pinned at B and attached to the two vertical rods. Initially, the bar is horizontal and the vertical rods are stress-free. Determine the stress in the aluminum rod if the temperature of the steel rod is increased by 40°C. Neglect the weight of the bar ABC. (18)
- (b) The three bars are made of steel and form a pin-connected truss. If the truss is converted when $T_1=50^\circ\text{C}$, determine the vertical displacement of joint A when $T_2=100^\circ\text{C}$. Each bar has a cross-sectional area of 2 in². Assume $E=200\text{GPa}$ and $\alpha = 11.7 \mu\text{m}/(\text{m}^\circ\text{C})$ (19^{1/2})
- Q.3. (a) A solid shaft is loaded as shown in Fig. Q. 3(a). Using $G = 83 \text{ GPa}$, determine the required diameter of the shaft if the shearing stress is limited to 60 MPa and the angle of rotation at the free end is not to exceed 4 degree. (20)
- (b) The shaft has a diameter of 80 mm and due to friction at its surface with the hole, it is subjected to a variable torque described by the function $t = 25xe^{x^2} (\text{N.m/m})$, where x is in meters. Determine the minimum torque T_0 needed to overcome friction and cause it to twist. Also, determine the absolute maximum stress in the shaft. (17^{1/2})

SECTION-B

- Q.4. (a) Determine the shape factor of the beam's cross section. Figure Q 4(a) (17¹/₂)
(b) The figure Q 4(b) shows the load vs elongation diagram of specimens X and Y. If (20)
their cross-sectional areas are $A_x = 0.28 \text{ in}^2$, $A_y = 0.35 \text{ in}^2$ and gage lengths are $L_x = L_y = 6 \text{ inch}$ respectively, determine which specimen is made of (i) stronger, (ii) stiffer, (iii) more resilient, (iv) more ductile, and (v) tougher material.
- Q.5. (a) A timber beam of rectangular section of length 10m is simply supported. The (20)
beam carried a UDL of 12 kN/m run over the entire length and a point load of 15 kN at 4m from the left support. If the depth is two times the width and the stress in the timber is not to exceed 6 N/mm^2 , find the suitable dimensions of the section.
(b) An I-section consists of following sections. (17¹/₂)
Upper flange = 130 mm × 50 mm
Web = 50 mm × 200 mm
Lower flange = 200 mm × 50 mm
If the beam is subjected to a shearing force of 50 kN, find the maximum shear stress across the section. Also draw the shear stress distribution diagram.
- Q.6. (a) The diagram shown in Fig. Q. 6(a) is shear force diagram for a beam in S.I. units, (17¹/₂)
which rests on two supports, one being at the left hand end. Deduce directly from the shear force diagram (i) loading on the beam, (ii) bending moment at 2 m interval along the beam (iii) position of the second support. Also draw the bending moment diagram for the beam and indicate the position and magnitude of maximum value on it.
(b) Determine the support reactions and draw the axial force, shear force and bending (20)
moment diagrams for the frame shown in Fig. Q 6(b). Joints B and C are rigid.

-:- The End -:-

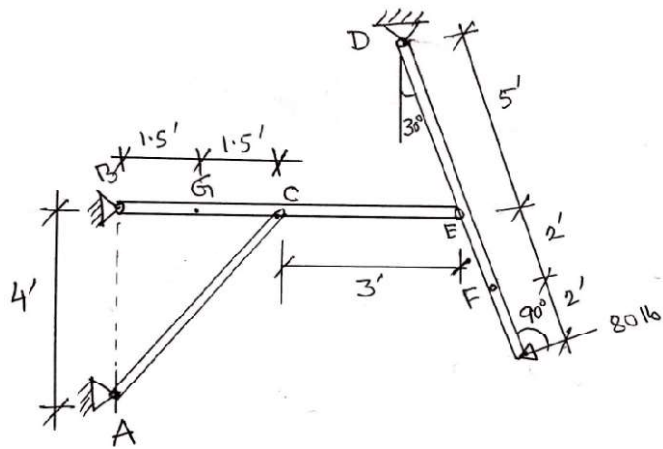


Fig. Q1(a)

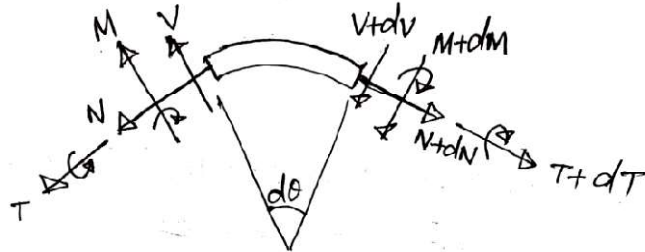


Fig. Q1(b)

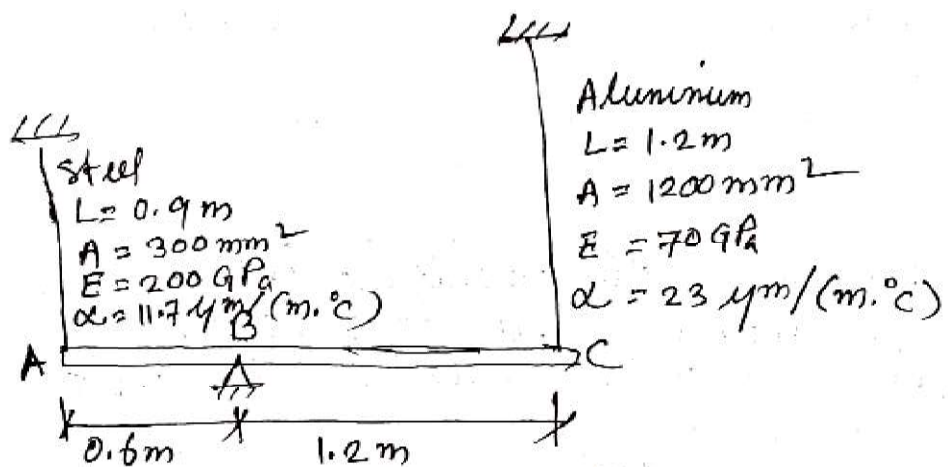


Fig. Q2(a)

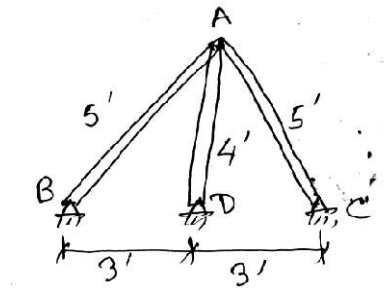


Fig. Q2(b)

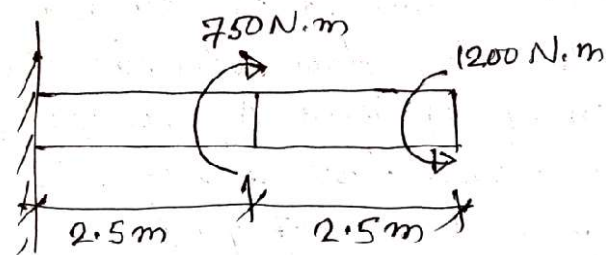


Fig. Q3(a)

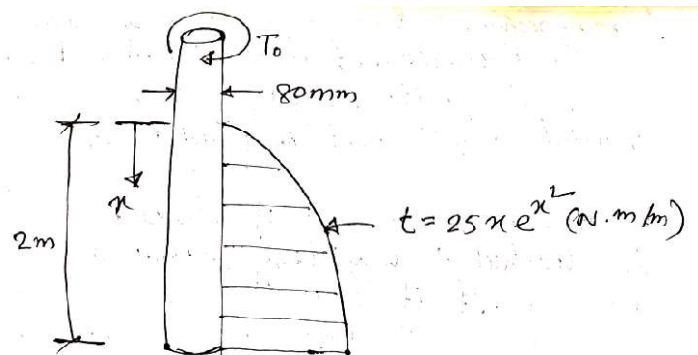


Fig. Q3(b)

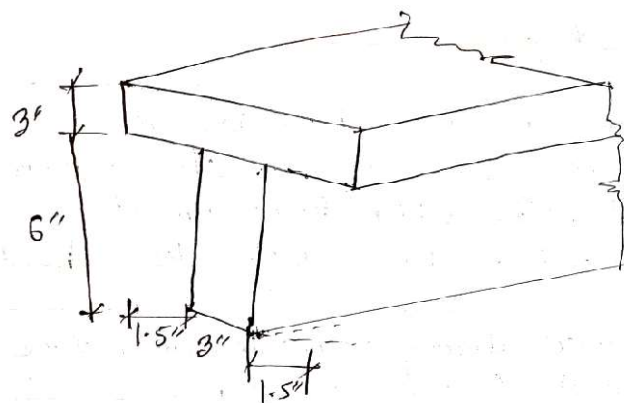


Fig. Q4(a)

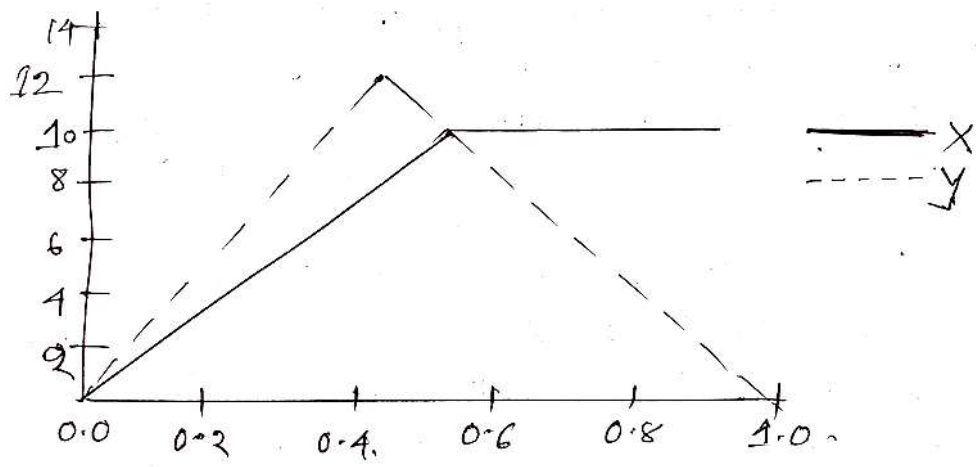


Fig. Q4(b)

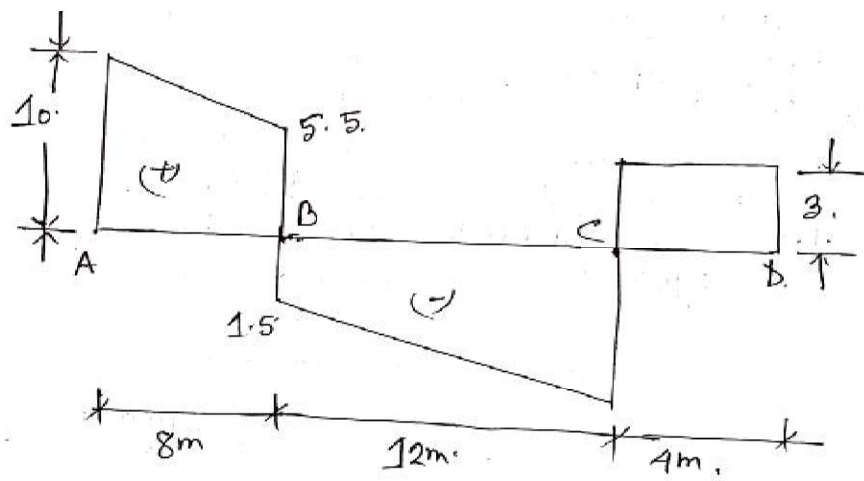


Fig. Q6(a)

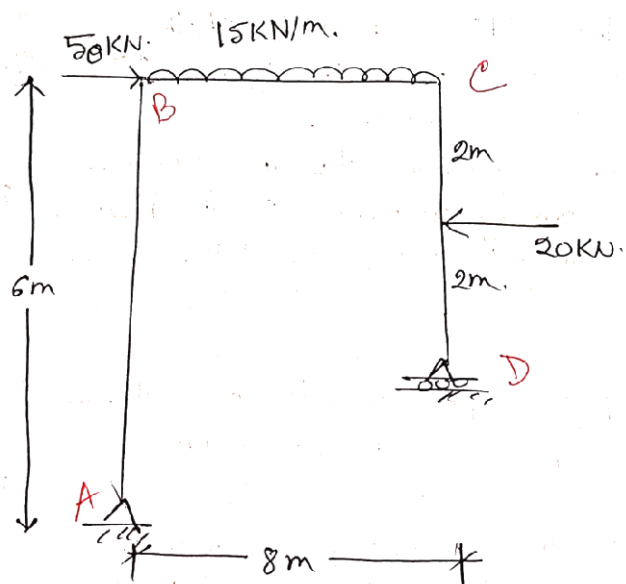


Fig. Q6(b)

CHITTAGONG UNIVERSITY OF ENGINEERING & TECHNOLOGY

B. Sc. Engineering Level-2 Term-I, Final Examination 2020

Subject: Civil Engineering

Paper : Principle of Accounting & Costing (Hum-201)

Time : 2.30 Hours

Full Marks: 150

Answer any TWO questions from EACH section. Use separate script for EACH section.

The figures in the right margin indicate full marks.

SECTION-A

- Q.1. (a) What is financial Accounting? State the objectives of financial Accounting. (10)
- (b) What is Account? Classify the various types of accounts with example. (10)
- (c) State the characteristics of Accounting information. Discuss the users of Accounting. (17.5)

- Q.2. (a) What is Journal? Distinguished between Journal and Ledger. (10)
- (b) Marias Repair shop was started on May 1 by Mr. Nabil. A summary of May transactions is presented below: (27.5)

May-1	Invested Tk.50,000 cash, Tk.10,000, Furniture and Tk.8000 equipment to start the repair shop.
May-3	Purchased equipment for Tk.5,000 cash, supplies for Tk.2,500 cash.
May-5	Incurred Tk.1,000 of advertising OXP in Beacon news on Account.
May-8	Received Tk.8,000 cash from customers for repair service.
May-10	Withdrew Tk.1,000 for personal use.
May-15	Provided repair services on account for repair service Tk.2,000
May-17	Paid Tk.300 for accents payable.
May-20	Received Tk.1,500 from customers in advance.
May-21	Collected Tk.700 of accounts receivable.
May-24	Paid Salaries Tk.2000, Rent Tk.1500, other utilities Tk.500
May-27	Consumed supplies Tk.500 Instruction,
Prepare Journal book.	

- Q.3. (a) Discuss the factors to be considered before calculating depreciation. (10)
- (b) Jamuna Oil Company Purchased a new machine on 01.01.2016 costing Tk.1,20,000 with estimated life time 4 years and estimated machine hours 100,000 hours. The machine used 15000 hours in 2016. 20,000 hours in 2017, 1000 hours in 2018, 30,000 hours in 2019. Prepare depreciation schedule under the following methods: (27.5)
- (i) Units of activity method,
 - (ii) Double declining balance method,
 - (iii) Sum of the year digit method.

SECTION-B

- Q.4. (a) Define Cost Accounting. Discuss different types of cost with examples. (15)
- (b) From the following figures of Lubna Manufactures Ltd. Prepare a cost sheet for the month ended on June 2021: (22.5)

Raw materials:	Taka
01-06-2021	90,000
30-06-2021	60,000
Work In progress	
01-06-2021	1,55,000
30-06-2021	1,23,000
Finished goods	
01-06-2021	33,000
30-06-2021	25,000
Raw material purchased	2,75,000
Direct wages	39,000
Donation	5,000
Factory expense	65,000
Office and administrative exp	35,000
Sale of scrap	5,000
Selling & distribution exp. Sales is 120% of total cost.	25,000

- Q.5. (a) Define CVP analysis. State the various assumptions that underlying behind CVP analysis. (10)
- (b) What is Breakeven point? Prepare a Break even chart by using hypothetical data. (10)
- (c) Ken Park Co. provides the following information: (17.5)
- Sales per unit Tk.700
- Variable cost per unit Tk.400
- Fixed cost Tk.6,00,000
- Unit produce and sales 2,500 units.
- Required:
- Prepare income statement
 - Calculate Break even point in unit and in amount.

- Q.6. (a) Define overhead. Discuss various types of overhead with example. (10)
- (b) In a factory there are two service departments and 3 production departments. In April 2020 the departmental expenses were: (27.5)

Production dept.	Tk.
A	65000
B	60000
C	50000
Service dept.	Tk.
P	12000
Q	10000

The service department expenses are distributed on % basis as follows:

	A	B	C	P	Q
P	30%	40%	15%	-	15%
Q	40%	30%	25%	5%	-

Prepare overhead distribution summary by using (i) Repeated method, (ii) Equation method.

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