

SECTION – A

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

Assume reasonable value for any missing data.

1. Find the reactions for the frame ABCD of Fig. 1. Hence, draw axial force, shear force and bending moment diagrams for this frame structure. (26 ¼)

2. Using differential equations of equilibrium, find the general expressions for shear and bending moment for the beam shown in Fig. 2. Using the derived equations, draw shear force and bending moment diagrams. Locate the position of maximum bending moment and its magnitude. (26 ¼)

3. A wide flanged unsymmetrical I-section is formed by three 50 mm thick planks connected together with lag screws as shown in Fig. 3. If each screw can resist a shear of 8500 N, determine the pitch (spacing) of the screws to connect the top and bottom flanges with the web section. Also, determine the maximum shearing stress in the beam section. (26 ¼)
 Given: The section carries a maximum shear force of 92 kN.

4. (a) Using neat sketches, derive expressions for longitudinal and hoop stresses for a cylindrical pressure container of shell thickness 't'. It is subjected to an internal pressure intensity 'p₀' and has inside and outside diameters of D_i and D_o respectively. (12)
 (b) A thin cylindrical drum 4 feet–4 inches in diameter and 20 feet in length has a shell thickness of 0.65 inch. Find the longitudinal and transverse stresses when the drum is subjected to an internal pressure of 200 psi. Also, determine the change in diameter and change in length of the drum. (14 ¼)
 Given: E = 29 × 10⁶ psi and Poisson's ratio = 0.30.

5. A box beam supports two concentrated loads as shown in Fig. 4. Compute the maximum value of 'P' that will not cause shearing stress to exceed 1.10 MPa. Compute the corresponding maximum flexural stress in the beam. (26 ¼)

CE 211

SECTION – B

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

6. (a) As shown in Fig. 5, a rigid beam of negligible weight is pinned at one end and attached to two vertical rods. The beam was initially horizontal before the load $W = 50$ kips was applied. Find the vertical movement of W . **(16 ¼)**
- (b) A beam with a force of 500 kN at one end is supported by a strutted cable as shown in the Fig. 6. Find the horizontal and vertical components of the reactions at A, B and D. If the allowable tensile stress is 140 MPa and the allowable compressive stress is 100 MPa, what is the required cross-sectional area of members AC, BC and CE? **(10)**
7. Two solid shafts of different materials are rigidly fastened together and attached to rigid supports as shown in Fig. 7. The aluminum segment is 3 inch in diameter, and $G_{al} = 4 \times 10^6$ psi. The steel segment has a diameter of 2 inch and $G_{st} = 12 \times 10^6$ psi. The torque, $T = 10$ kip-in., is applied at the junction of the two segments. Compute the maximum shearing stress developed in the assembly. **(26 ¼)**
8. A solid tapered steel shaft is rigidly fastened to a fixed support at one end and is subjected to a torque T at the other end as shown in Fig. 8. Find the angular rotation of the free end if $d_1 = 150$ mm, $d_2 = 50$ mm, $L = 500$ mm, and $T = 3$ kN-m. Assume that the usual assumptions of strain in prismatic circular shafts subjected to torque apply, and let $G = 200$ GPa. **(26 ¼)**
9. (a) A box beam is composed of four planks, each 2 inch by 8 inch, securely spiked together to form the section shown in Fig. 9. If $W_0 = 300$ lb/ft, find P to cause a maximum flexural stress of 1400 psi. **(26 ¼)**
10. A small steel T beam is used in an inverted position to span 400 mm. If, due to the application of the three forces shown in the Fig. 10, the longitudinal gage at A registers a compressive strain of 50×10^{-5} , how large are the applied forces? $E = 200$ GPa. **(26 ¼)**
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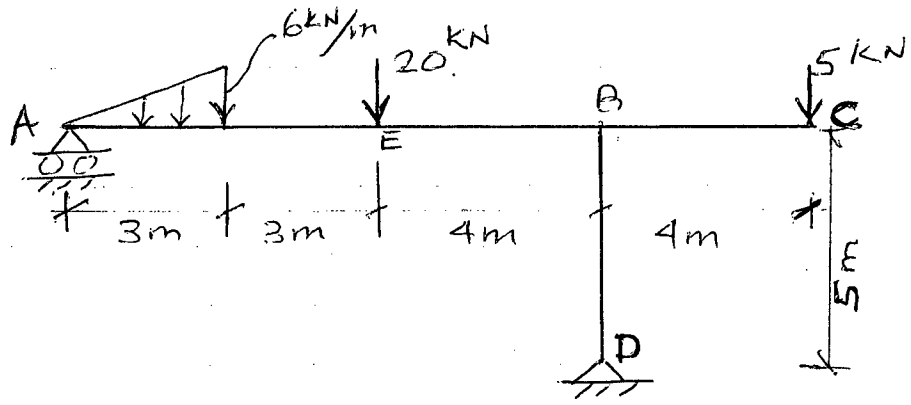


FIG. 1

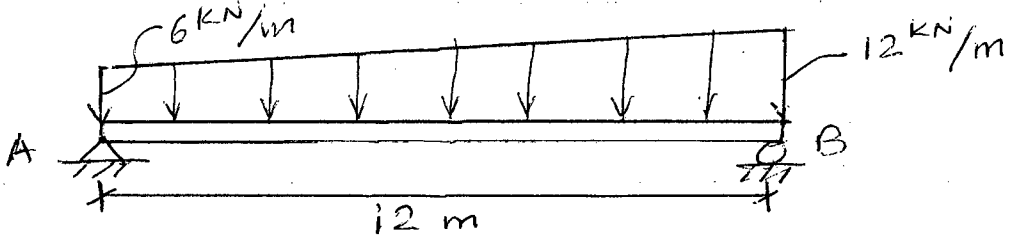


FIG. 2

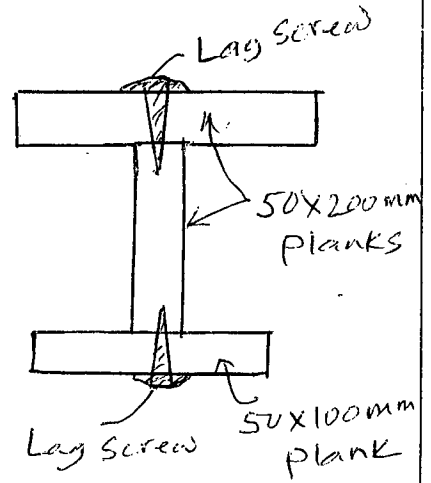


FIG. 3

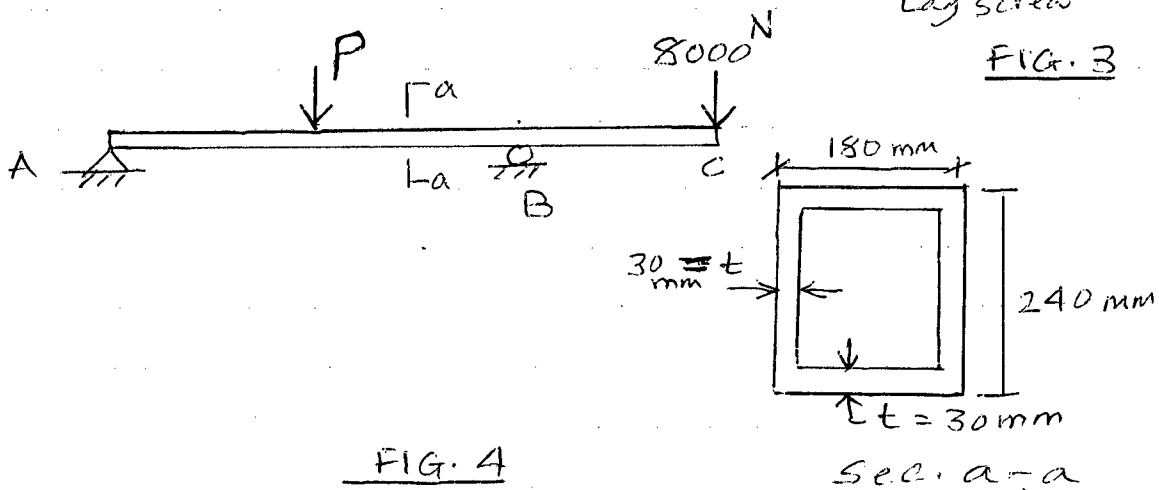


FIG. 4

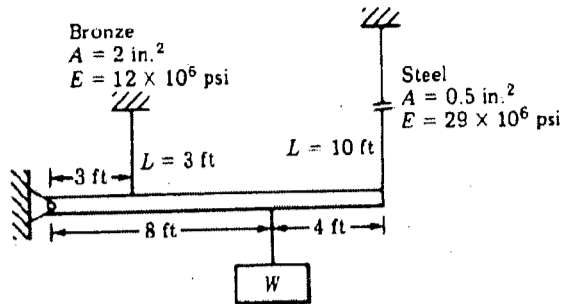


Fig. 5 Figure-1

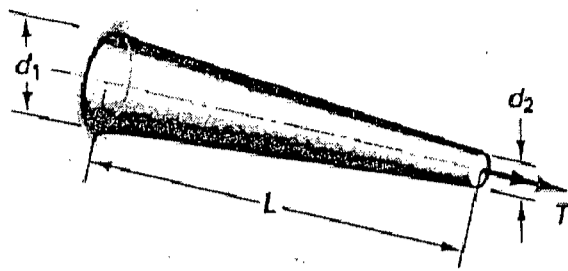


Figure-4 Fig. 8

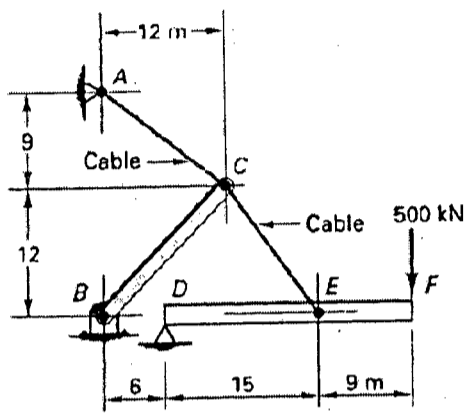


Figure-2 Fig. 6

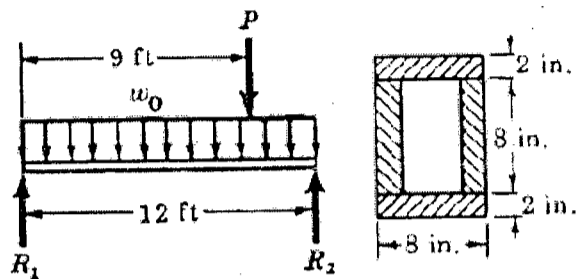


Figure-5 Fig. 9

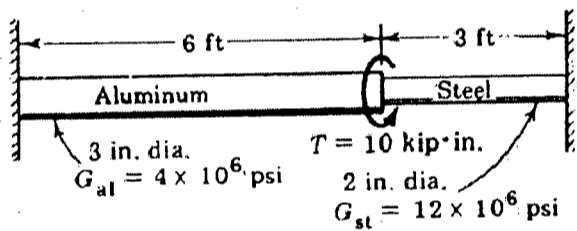
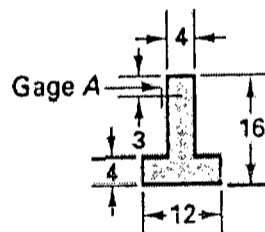
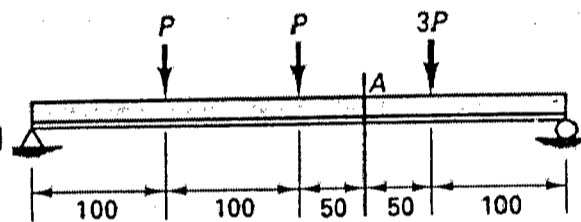


Figure-3 Fig. 7



Beam section Figure-6

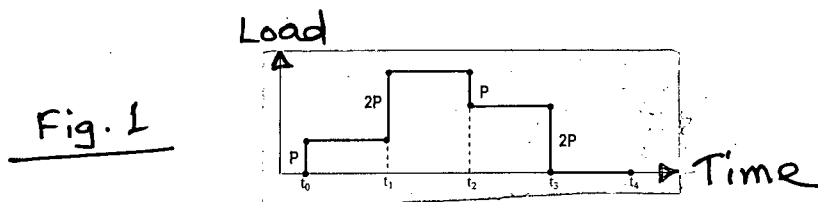
Fig. 10

SECTION - AThere are **FOUR** questions in this section. Answer any **THREE**.

1. (a) Compare the suitability of sea sand with river sand for use in concrete and mortar. Briefly describe the tests for sand. (5+5=10)
 (b) List the types of cast iron. What are the effects of Silicon and Sulphur on iron? Compare the structure of wrought iron and mild iron. (3+4+3=10)
 (c) Why slaked lime should be used fresh? Briefly describe the factors responsible for hydraulicity of lime. Describe the chemical and physical process involved in hydration of lime. (3+4+3=10)
 (d) List the requirements of a good sound insulating material. (5)

2. (a) Show the different parts of a tree in a neat sketch. Describe the 'knots' and 'radial shakes' types of defects of tree. (5+5=10)
 (b) Why seasoning of trees is important? List the methods of timber seasoning. What is the main process involved in water seasoning? (3+3+4=10)
 (c) Why water seasoning method of timber is popular in Bangladesh? (5)
 (d) Compare between: (i) natural rubber and synthetic rubber; (ii) thermosetting material and thermoplastic material. (5+5=10)

3. (a) Write down the functions of silica and sodium in glass. Compare between crown glass and flint glass. (3+4=7)
 (b) Write down the characteristics of strain components of an elastic material, a plastic material and an elasto-visco-plastic material. Give example of these materials. (7+3=10)
 (c) For the following loading sequence (Fig. 1) draw the likely strain response with time of (i) a plastic material and (ii) an elasto-plastic material. Assume equal time interval i.e., $\Delta t = t_1 - t_0 = t_2 - t_1 = t_3 - t_2 = t_4 - t_3$. (8+10=18)



4. (a) Define spalling of concrete. How does the ferrocement reduce the chances of further spalling of concrete? (4+4=8)
 (b) Describe with neat sketches how ferrocement can be used to repair walls with dampness. (10)
 (c) How can you prevent corrosion of steel in RC element and steel member? (6)

CE 201

(d) Write down the main functions of paint. Compare between 'oil varnish' and 'sprit varnish'.

(5+6=11)

SECTION – B

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

5. (a) What are the characteristics of good bricks? What are the laboratory tests of bricks? (10)
(b) What are the compressive strength and absorption requirements for bricks as per BDS208:2002? What are the factors on which coloring of bricks depend? (10)
(c) Draw plan of a Hoffman's continuous kiln and briefly state the operations. (15)

6. (a) What are the materials for Civil Engineering constructions? Define standard, specification and test method. Show a typical specification of aggregates mentioning at least three properties. (15)
(b) Briefly state the essential requirements of stones. What is the classification of aggregates? (10)
(c) Differentiate between fineness modulus (F.M.) and grading of an aggregate mix. Find the F.M. of a sand sample from the following sieve analysis results. (10)

Sieve size, mm	4.75	2.36	1.40	1.18	0.60	0.30	0.15	0.075	PAN
Amount Retained, gm	6.0	13.7	20.0	59.1	90.9	50.1	40.2	16.9	3.1

7. (a) What are the functions of various oxides in cement? What are the types and field tests of cement? (15)
(b) What are the uses, specification and classification of plasters? (10)
(c) What are the background data and job specification requirements in the ACI method of concrete mix design? (10)
8. (a) What is quality control? Why and how does the concrete strength vary? Design a concrete mix by the 'Minimum Voids Method' from the following data: (15)
 Voids in coarse aggregate = 45 percent; Voids in fine aggregate = 30 percent,
 Allowances for cement = 12 percent; Allowances for fine aggregate = 10 percent
 Assume reasonable value for missing data, if any.
(b) What are the stages and calculations in the British method of mix design? Find the target mean-strength for a mix if the characteristic strength is 25 MPa, standard deviation is 4 MPa and the percentage of allowed defectives is 10. (10)
(c) Briefly state curing and methods of curing of concrete. (10)

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

1. (a) Prove vectorially that the lines joining the middle points of the sides of a quadrilateral taken in order is a parallelogram. (15)
- (b) Specify the conditions required to be fulfilled by the vectors **a**, **b**, **c** so that $\mathbf{a} \times (\mathbf{b} \times \mathbf{c}) = (\mathbf{a} \times \mathbf{b}) \times \mathbf{c}$. (10)
- (c) If **a**, **b**, **c** are non-coplanar vectors then prove that the following four points are coplanar: (10)
- $$-\mathbf{a} + 4\mathbf{b} - 3\mathbf{c}, 3\mathbf{a} + 2\mathbf{b} - 5\mathbf{c}, -3\mathbf{a} + 8\mathbf{b} - 5\mathbf{c}, -3\mathbf{a} + 2\mathbf{b} + \mathbf{c}.$$
2. (a) If \mathbf{c}_1 and \mathbf{c}_2 are constant vectors and k is a constant scalar, show that $\mathbf{H} = e^{-kx}(\mathbf{c}_1 \sin ky + \mathbf{c}_2 \cos ky)$ satisfies $\frac{\partial^2 \mathbf{H}}{\partial x^2} + \frac{\partial^2 \mathbf{H}}{\partial y^2} = 0$. (10)
- (b) Find the equations of the tangent line and the normal plane at the point (1, -2, 5) to the curve $x^2 + y^2 + z^2 = 30, x + y + z = 4$. (15)
- (c) Find $\nabla \cdot (r^3 \mathbf{r})$ where \mathbf{r} is the position vector. (10)
3. (a) Find the values of the constants a and b so that the surface $ax^2 - byz = (a+2)x$ will be orthogonal to the surface $4x^2y + z^3 = 8$ at (1, -2, 1). (10)
- (b) Show that the gradient of a scalar function f is a vector along the normal to the level surface whose magnitude is the greatest rate of change of f . (15)
- (c) Find curl of \mathbf{F} where $\mathbf{F} = (x^2 - y^2 + 2xz)\mathbf{i} + (xz - xy + yz)\mathbf{j} + (z^2 + x^2)\mathbf{k}$. Also show that the vectors given by curl \mathbf{F} at the points P(1, 2, -3) and Q(2, 3, 12) are orthogonal. (10)
4. (a) Is the vector field $\mathbf{F} = (x^3z - 2xyz)\mathbf{i} + (xy - 3x^2yz)\mathbf{j} + (yz^2 - xz)\mathbf{k}$ solenoidal? If so, find a vector function \mathbf{V} such that $\mathbf{F} = \nabla \times \mathbf{V}$. (18)
- (b) For $\mathbf{F} = 3xy\mathbf{i} + y^3\mathbf{j}$, evaluate $\int_C \mathbf{F} \cdot d\mathbf{r}$ where C is the curve $y = x^3$ in the xy -plane from (0, 0) to (2, 8). (17)

MATH 237**SECTION - B**

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

5. (a) Using Green's theorem, find the area of the region enclosed by $y = x$, $y = -x$, $y = 4$. (10)

(b) State the divergence theorem and verify for $\vec{F} = (x^2 - z^2)\hat{i} + 2xy\hat{j} + (y^2 + z)\hat{k}$ taken over the region bounded by the cylinder $y^2 + z^2 = 4$ and the planes $x = 0$, $x = 2$. (25)

6. (a) Find $L\{Ci(t)\}$ (10)

(b) If $L\{F(t)\} = f(s)$, then show that $L\left\{\int_0^t F(u)du\right\} = \frac{f(s)}{s}$ and hence find

$$L\left\{\int_0^t \frac{1 - e^{-u}}{u} du\right\}. \quad (15)$$

(c) Evaluate $\int_0^{\infty} \frac{\cos 6t - \cos 4t}{t} dt$. (10)

7. Evaluate the following:

(a) $L^{-1}\left\{\frac{3s+7}{s^2-2s-2}\right\}$ (8)

(b) $L^{-1}\left\{\frac{2s+3}{(s+1)^2(s+2)^2}\right\}$ by using Heaviside's expansion formula. (15)

(c) $L^{-1}\left\{\frac{s}{(s^2+1)^2}\right\}$ by using convolution theorem. (12)

8. (a) Solve $Y''(t) + 2Y'(t) + 5Y(t) = e^{-t} \sin t$, $Y(0) = 0$, $Y'(0) = 1$ by using Laplace transform. (18)

(b) Use Laplace transform technique to solve the following boundary value problem: (17)

$$\frac{\partial U}{\partial t} = 2 \frac{\partial^2 U}{\partial x^2}, \quad 0 < x < 5, \quad t > 0,$$

given that $U(0, t) = 0$, $U(5, t) = 0$, $U(x, 0) = 10 \sin(4\pi x)$.

SECTION – A

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

1. (a) What is composite material? Derive the equation of stiffness of composite when loading is parallel to the fibre direction. (3+6)
 (b) A glass fibre reinforced composite consists of 45% glass fibres with a modulus of elasticity of 70 GPa and 55% resin (polyester) matrix having a modulus of 3.5 GPa. (14 1/3)
 - (i) Compute the modulus of elasticity of the composite in the longitudinal direction.
 - (ii) If the composite has a cross-sectional area of 250 mm² and a stress of 50 MPa is applied in the longitudinal direction, calculate the magnitude of the load carried by each of the fibre and matrix phases.
 - (iii) Determine the individual strain in each phase and comment on the obtained values.

2. (a) What is glass? Explain using volume-temperature diagram how glass transition temperature varies with cooling rates? (3 1/3 +7)
 (b) Describe float glass manufacturing process of window (sheet/plate) glass. (13)

3. (a) How a material attains superconducting properties? Explain superconducting magnetic levitation of a bullet train. (3+8)
 (b) A parallel plate capacitor can store 4×10^{-5} coulomb charge at an applied potential of 10 kV. The separation between the plate is 0.25 mm. (12 1/3)
 - (i) Calculate the area of the plate if the dielectric is BaTiO₃ or vacuum.
 - (ii) If a total capacitance of 0.025 μF is required for a particular device application, how many plates of BaTiO₃ would be required to make the capacitor? Given that $\epsilon_0 = 8.85 \times 10^{-12}$ F/m and assume identical area of BaTiO₃ obtained from(i).

MME 295

4. (a) "Dislocation motion is intrinsically difficult in ceramics compared to pure metals". Explain with neat sketches. (8 1/3)
- (b) Justify the use of silicon nitride ceramic in harsh environment of an internal combustion engine. (5)
- (c) Derive the equation to show how survival probability of a ceramic component depends on both the stress and the volume. (10)

SECTION – B

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

5. (a) Draw the crystal structure of CsCl, NaCl and ZnS. (8)
- (b) On the basis of crystal structure, compute theoretical density of NaCl. Given, (5)
Atomic radius: $r_{\text{Na}} = 0.102 \text{ nm}$, $r_{\text{Cl}} = 0.181 \text{ nm}$
(Assume any missing data).
- (c) Compare and contrast between the properties of ionically and covalently bonded ceramics. (10 1/3)
6. (a) How does MO/SiO₂ ratio affect the formation of glass. (6)
- (b) Mention the functions of basic raw materials for body materials of traditional ceramics. (7)
- (c) With neat sketches, briefly describe different stages in sintering of ceramic green bodies. (10 1/3)
7. (a) Compare the dislocation motion in metals with that in ionic and covalent ceramics. (7)
- (b) Discuss why ceramics are usually much stronger in compression than in tension. (10 1/3)
- (c) Write a short note on 'Creep of Ceramics'. (6)
8. (a) Give a brief account on injection moulding process for thermoplastic polymers. (9)
- (b) Compare and contrast between melting temperature and glass transition temperature. (7)
- (c) Discuss the deformation behaviour of elastomers with neat sketches. (7 1/3)
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SECTION – A

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

1. (a) Give a list of different geologic hazards. Discuss the importance of geology in the study of any two geo-hazards. (10)
- (b) In a tabular form, show how geological time is divided and sub-divided into various era, period and epoch. Briefly describe any two eras. (13)
- (c) Write short notes on (answer any three): (4×3=12)
 - (i) Angular Unconformity
 - (ii) Contact Metamorphism
 - (iii) Glacial Till
 - (iv) Schist

Show diagrams where applicable.
2. (a) What is magma? What factors are thought to cause volcanic eruption? Where do such volcanic eruptions take place? (10)
- (b) Classify sedimentary rocks based on method of formation. Briefly describe one rock of each type. (9)
- (c) Describe the role of different agents of metamorphism. What kind of changes take place during metamorphism? Explain what do you mean by grade of metamorphism. (16)
3. (a) Explain with diagrams which type of fault system exists in the Himalayas and in San Francisco. (6)
- (b) What do you know about the earthquake risk in Bangladesh? (6)
- (c) Briefly discuss how folds may be formed. (7)
- (d) Briefly describe the formation of the following, show figure where applicable (answer any four): (4×4=16)
 - (i) Horst and Graber
 - (ii) V-shaped rock outcrop
 - (iii) Flood basalt
 - (iv) Barrier lake
 - (v) Oceanic trench
4. (a) Describe the three mechanisms for glacial erosion. (9)
- (b) Briefly describe with sketches different types of sand dunes. (12)
- (c) What do you mean by longshore drift? How is it generated? (6)
- (d) What is PANGAEA? List the evidences that led to the acceptance of the theory of continental drift. (8)

CE 203

SECTION – B

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

5. (a) Why is studying Geomorphology important for Civil Engineers in Bangladesh? Explain with an example. (10)
- (b) Write short notes on (i) Dendritic, (ii) Parallel, (iii) Radial types of drainage patterns with diagrams. (10)
- (c) Explain the following terms: (i) Drainage Density and (ii) Stream Frequency. With Bangladesh context, explain (with diagram) how these parameters can vary among the different regions. (15)
6. (a) Explain with diagram the variation of the various morphological parameters of a river basin as it flows in the downstream direction. Explain these variations in the context of Bangladesh. (20)
- (b) With all necessary diagrams, explain the channel cross sectional changes during one flood season. Explain the movement of light and heavy particles during the season. Explain these changes with the variation in the river discharge as well. (15)
7. (a) What is river transportation? What are the factors affecting the transportation power of a river? How the knowledge of river transportation can help in determining (i) suitable size and (ii) adequate volume of blocks in flood protection embankment design? (18)
- (b) What is Rational Method? Why is it so popular? What are the assumptions of this method? How to use the method for a real world case where the land use is diversified and has different values of Coefficients of Run Off? Explain with an example. (17)
8. (a) Briefly describe how modern dating techniques may be used to determine the age of rocks. Also state the limitations. (10)
- (b) What physical properties are used for the identification of minerals? Briefly describe any three properties. (13)
- (c) Write short notes on the following minerals (answer any three) (4×3=12)
- (i) Kaolinite (ii) Graphite (iii) Mica (iv) Plagioclase Felspar (v) Quartz
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SECTION – A

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

1. (a) What is meant by the term operating leverage? The degree of operating leverage for x company is 5 times whereas it is 7 times for 'z' company. What does it imply? (4 1/3)
- (b) Bogside Farm and Sterling farm are two blueberry farms. Bogside Farm has higher variable cost as it depends on migrant workers to pick its berries by hand, whereas Sterling Farm has higher fixed cost as a result of its investment in expensive machine to pick its berries. Following are the income statements of these two blueberry farms: (19)

Income Statements

	<u>Bogside Farm</u>	<u>Sterling Farm</u>
Sales	Tk. 100,000	Tk. 100,000
Less: Variable costs	<u>60,000</u>	<u>30,000</u>
Contribution	40,000	70,000
Less: Fixed costs	<u>30,000</u>	<u>60,000</u>
Net profit	<u>10,000</u>	<u>10,000</u>

Requirement:

- (i) Considering CM ratio, break-even point and margin of safety expression, determine which company will earn greater profit in condition of high demand of the product and low demand of the product.
- (ii) With calculations show which farm will earn greater profit under the condition of 10% increase in sales and 10% decrease in sales.
2. (a) Discuss the concept - costs, expenses, losses and assets from cost accounting point of view. Give one example illustrating the relationship between them. (4)
- (b) Distinguish between among manufacturing overhead, administrative overhead and selling and distribution overhead with examples. (4)
- (c) Listed below are the number of costs typically found in organisations. (12)
- (i) Hamburger burs in Wendy's outlets;
- (ii) Advertising by a dental office;
- (iii) Apples processed and canned by Del Monte;

HUM 353

Contd... Q. No. 2(c)

- (iv) Boxes used for packing detergent produced by the company;
- (v) Wages of workers assembling computers;
- (vi) Microchips used in producing calculators;
- (vii) Shipping costs in merchandise sold;
- (viii) Thread used in a garment factory;
- (ix) Sugar used in soft-drink production;
- (x) Electricity used in operating machines;
- (xi) Property taxes on the factory;
- (xii) Sales person's commission.

Indicate whether each cost would typically be treated as direct cost or an indirect cost with respect to units of product. Also classify each cost as either variable, fixed or mixed costs with respect to volume or level of activity.

(d) "Manufacturing cost is composed of three components– direct materials, direct labour and manufacturing overhead." Give examples of each component for a furniture manufacturing plant.

(3 1/3)

3. (a) The data below have been taken from the cost record of porter manufacturing company. A careful study shows average shipping cost will be Tk. 44,000 for 3000 units and if the number of units are 5000, the average shipping cost will be Tk. 60,000.

(6)

Required:

- (i) Using high and low point method, determine the variable cost per unit and the fixed cost in total.
- (ii) Draw a linear cost equation.

(b) Name the three types of inventories that appear on a manufacturer's balance sheet.

(3 1/3)

(c) The following costs and inventory data are taken from the accounting records of Meriwell company for the year ended on December 31st, 2012:

(14)

<u>Cost incurred:</u>	<u>Tk.</u>
Direct labor cost	70,000
Purchase of raw materials	118,500
Indirect labour	30,000
Maintenance, factory equipment	6,000
Advertising expenses	90,000
Insurance, factory	800
Sales commission	35,000
Administrative manager's salary	55,000
Supervisor's salary	12,000

HUM 353

Contd... Q. No. 3(c)

<u>Cost incurred:</u>		<u>Tk.</u>
Rent, factory		30,000
Rent, office		25,000
Rent, showroom		13,000
Utilities (70% for factory, 30% for office)		15,000
Supplies (60% for factory, 40% for office)		3,000
Power and electricity		2,500
Fuel for factory equipment		700
Depreciation, factory equipment		30,000
Director's fees		15,000
<u>Inventories</u>	<u>Jan, 01, 2012</u>	<u>Dec, 12, 2012</u>
Raw materials	Tk. 7,000	Tk. 15,000
Work-in process	10,000	5,000
Finished goods	20,000	35,000

Required:

- (i) Prepare a statement of cost of goods sold,
- (ii) Also prepare an income statement if sales amount is Tk. 700,000.

4. (a) What is the basic difference between absorption costing and variable costing? (4 1/3)

(b) Chuck Wagon Grills manufacturing company makes a single product– a handmade specially barbecue grill that it sells for Tk. 210. Data for last years' operations are as follows:

(19)

Units produce	20,000
Units sold	19,000
<u>Variable costs per unit</u>	
Direct materials	Tk. 50
Direct labour	80
Variable manufacturing overhead	20
Variable selling and administrative overhead	10
<u>Fixed costs (Total):</u>	
Fixed manufacturing overhead	700,000
Fixed selling and administrative overhead	285,000

Required:

- (i) Compute unit product cost under both absorption costing and variable costing methods;
- (ii) Prepare income statement under both of the costing methods;
- (iii) Reconcile the amount of net income under two methods and interpret the situation.

HUM 353

SECTION – B

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

5. (a) What is the difference between revenue and gain? Explain with example. **(3 1/3)**

(b) Mr. Alex has started his computer service business on April 1st of 2015. the following transactions occurred during the month: **(20)**

- April 1: Invested cash in the business Tk. 30000.
- April 2: Purchased computer terminals for Tk. 20000 on account.
- April 3: Purchased supplies for Tk. 1500 cash.
- April 6: Performed computer services Tk. 8000 cash.
- April 8: Paid dues for purchase on account in April 2.
- April 19: Provide services on credit to a customer Tk. 5000.
- April 25: Paid expenses for the month: rent Tk. 1000; salaries Tk. 800 and utilities bill Tk. 200
- April 30: Received Tk. 5000 from the customer who has been previously billed in April 19.

Required:

- (i) Show the effects of transactions on accounting equation.
- (ii) From the equation analysis prepare the income statement for April 30, 2015.

6. (a) What is accrual basis and cash basis of accounting? **(4 1/3)**

(b) Mrs. Sherlin opened a consulting firm on May 1, 2015. Following transactions happened for the month of May: **(19)**

- May 1: Invested Tk. 200000 cash in the business.
- May 3: Purchased decorated office room for Tk. 150000 cash.
- May 5: Paid advertising expenses of Tk. 7000.
- May 10: Received Tk. 30000 as consultancy fees.
- May 18: Billed a client for services performed on credit Tk. 8500.
- May 25: Withdraw Tk. 5000 for personal use.
- May 28: Received dues on services provided on credit.
- May 29: Purchase supplies for office Tk. 2000 in cash.
- May 30: Paid salary to the office staff Tk. 10000.

Required:

Journalize the transactions in a good form.

HUM 353

7. (a) Selected transactions for the Temikon Company are presented in journal form below: (10)

Date (2015)	Account Titles	Ref.	Debit (Tk.)	Credit (Tk.)
August 5	Accounts Receivable	Dr.	4100	4100
	Service Revenue	Cr.		
August 12	Cash	Dr.	2400	2400
	Accounts Receivable	Cr.		
August 15	Cash	Dr.	3000	3000
	Service Revenue	Cr.		
August 18	Supplies	Dr.	1000	1000
	Cash	Cr.		

Post the transactions to Ledger Accounts and then prepare a trial balance.

- (b) What are the steps under the recording process? Describe. (3 1/3)

- (c) Max Corporation encounters the following situations: (10)

- (i) Collects Tk. 1000 from a customer in 2015 for services to be performed in 2016 last month.
- (ii) Incurred utility expense which is not yet paid in cash or recorded.
- (iii) Employees worked 3 days in 2015 and will not be paid until January, 2016
- (vi) Earned service revenue but has not yet received cash or recorded the transaction.
- (v) Paid Tk. 20000 rent on December 31 for the 4 months starting from next January.

Identify the type of adjusting entry that is needed to each transaction.

8. The adjusted trial balance columns of the worksheet for Erin Corporation has been presented in below: (23 1/3)

Erin Corporation
Adjusted Trial Balance
December 31, 2014

Account Title	Debit (Tk.)	Credit (Tk.)
Cash	5300	
Accounts Receivable	10800	
Supplies	1500	
Prepaid Insurance	2000	
Equipment	27000	
Accumulated Depreciation-Equipment		5600
Notes Payable		15000

HUM 353

Contd... Q. No. 8

Account Title	Debit (Tk.)	Credit (Tk.)
Accounts Payable		6100
Salaries Payable		2400
Internet Payable		600
Owner's Capital		13000
Owner's Drawings	7000	
Service Revenue		61000
Advertising expense	8400	
Supplies expense	4000	
Depreciation expense	5600	
Insurance expense	3500	
Salaries expense	28000	
Interest expense	600	
Total	103700	103700

Tk. 1000 of Prepaid Insurance expired during the year.

Required:

- (i) Prepare a non-classified Income Statement and owner's equity statement.
- (ii) Prepare a classified Balance Sheet. (Assume that Notes payable amount is for long-term liability).
- (iii) Identify Profit margin ratio and Current ratio.
