

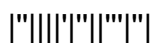
II B. Tech II Semester Regular Examinations, August - 2014
ENGINEERING GEOLOGY
(Civil Engineering)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks

1. What is geology? Explain the importance of Geology in civil engineering constructions? Write brief study of case histories of failure of some civil engineering constructions due to geological draw backs.
2. What is mineral? Describe physical chemical properties of given minerals
i) Quartz ii) Feldspar iii) Garnet iv) Calcite v) Muscovite
3. Define rock? Write Form, texture and structure of igneous rock.
4. What is fault and what are the parts of faults and give their types of fault with neat sketch and how they are important in civil engineering.
5. Define landslides? What are the causes and effects of landslides and write measures to be taken to prevent their occurrence.
6. How do you evaluate the subsurface analysis using Electrical resistivity methods? Add a note on interpretation techniques of geophysical methods.
7. Enumerate the geological consideration relating to the construction of gravity dam and arch dam. What geological investigations of rock types and structures are necessary for assessing the suitability of such dam sites?
8. Discuss the geological consideration in tunneling over break and lining?



Code No: R22015

R10

SET - 2

II B. Tech II Semester Regular Examinations, August - 2014
ENGINEERING GEOLOGY
(Civil Engineering)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks

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1. What is engineering geology? What are the effects of weathering with reference to dams and reservoir and tunnels?
2. Write an essay on different physical properties of minerals and mention some of the economic minerals.
3. Define strike and dip? Explain the geological classification of sedimentary rocks giving suitable examples.
4. What are folds? Explain the parts and types with diagram and their significance in civil engineering construction.
5. What is meant by ground water? Explain common types of ground water, and explain geological controls of ground water movement?
6. What is importance of geophysical investigations? Explain Gravity method and magnetic method?
7. Write types of dams? What are geological conditions necessary for the stability of dam?
8. Write the following:
  - a) Lining of tunnel
  - b) effect of tunneling on the ground role of geological consideration
  - c) over break

Code No: R22015

R10

SET - 3

**II B. Tech II Semester Regular Examinations, August - 2014**  
**ENGINEERING GEOLOGY**  
(Civil Engineering)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions  
All Questions carry **Equal** Marks

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1. Enumerate the various branches of geology. Explain the importance of structural geology to major civil engineering construction?
2. Describe physical, chemical properties of given minerals
i) Olivine ii) Hornblende iii) Biotite iv) Kyanite v) Garnet
3. Distinguish the following:
i) Granite ii) Basalt iii) Pegmatite iv) Conglomerate v) sandstone
4. Define unconformity and its types with neat sketch? Explain how to recognize unconformity in field relation in civil engineering.
5. Define porosity and permeability? Explain importance of study of ground water and ground water exploration

6. Write an essay on geophysical studies by electrical and seismic method and give their special importance of geophysical studies.
7. Describe the analysis of the dam failure of the past and how geological factors influencing water lighness and life of reservoir.
8. What are purposes of tunneling? Describe with neat sketches the ideal geological conditions for the alignment of a tunnel

Code No: R22015

R10

SET - 4

II B. Tech II Semester Regular Examinations, August - 2014
ENGINEERING GEOLOGY
(Civil Engineering)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks

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1. Describe rock weathering? Add a note on agents of weathering and their effects on rocks with reference to dams in civil engineering?
2. Describe the following properties of economic minerals
  - i) Chlorite
  - ii) magnetite
  - iii) Galena
  - iv) Graphite
  - v) Bauxite
3. What is the metamorphism? Describe various types of texture and structure developed in the rocks due to metamorphic processes.
4. Define strike and dip? Explain geological structures associating with rocks such as folds and faults and how they are important in civil engineering.
5. Define landslide? Write their causes and effects, how measures to be taken to prevent their occurrence.
6. What is the importance of geophysical investigations? And discuss special geophysical importance of radiometric method and geothermal method.
7. Describe geological consideration in the selection of dam sites, and explain the primary causes for dam failures of the past.
8. Discuss the methods of tunneling in hard rock's? How folds and faults in these rocks affect tunneling.

**II B. Tech II Semester Regular Examinations, August– 2014**  
**HYDRAULICS AND HYDRAULIC MACHINERY**  
 (Civil Engineering)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions  
 All Questions carry **Equal** Marks

- ~~~~~
1. a) Explain the terms: i) specific energy    ii) critical depth and    iii) Critical velocity.  
 b) In a rectangular open channel of 5 m width the flow rate is  $12 \text{ m}^3/\text{s}$  and depth of flow is 1.0 m. Determine the critical depth and the alternate depth. (6M+9M)
  2. a) Explain the term hydraulic jump. Derive an expression for the downstream depth of hydraulic jump.  
 b) Define specific energy and draw the specific energy diagram. Explain how it is useful for the open channel flow. (8M+7M)
  3. Assuming that the viscous force  $F$  exerted by a fluid on a sphere of diameter  $D$  depends on the viscosity  $\mu$ , mass density of the fluid " $\rho$ ", and the velocity of the sphere  $v$ , obtain an expression for the viscous force. (15M)
  4. a) Obtain an expression for the force exerted by a jet of water on a fixed vertical plate in the direction of the jet.  
 b) A jet of water of diameter 100 mm moving with a velocity of 35 m/s strikes a curved fixed symmetrical plate at the center. Find the force exerted by the jet of water in the direction of the jet, if the jet is deflected through an angle of  $120^\circ$  at the outlet of the curved plate. (7M+8M)
  5. a) Explain how hydraulic turbines are classified.  
 b) Explain briefly the principles on which a Kaplan turbine works. (7M+8M)
  6. a) What is cavitation? How can it be avoided in reaction turbine?  
 b) What is the basis of selection of a turbine at a particular place? (8M+7M)
  7. Define a centrifugal pump. Explain the working of a single stage centrifugal pump with neat sketches. (15M)
  8. Write short notes on the following:  
 a) Firm Power  
 b) Secondary power  
 c) Diversity factor  
 d) Load duration curve. (15M)



**II B. Tech II Semester Regular Examinations, August–2014**  
**HYDRAULICS AND HYDRAULIC MACHINERY**  
(Civil Engineering)

Time: 3 hours

Max. Marks: 75

Answer any FIVE Questions

All Questions carry Equal Marks

1. a) Derive the condition for depth of flow of a most economical circular channel section subject to the condition for maximum velocity.  
b) Determine the economical cross-section for an open channel of trapezoidal section with side slopes of 1 vertical to 2 horizontal, to carry 12 m<sup>3</sup>/s, the bed slope being 1/2100. Assume Manning coefficient as 0.022. (7M+8M)
2. Define specific energy? Sketch the specific energy curve and explain regimes of flow? Indicate the features of critical flow? Deduce the condition for minimum specific energy and the related expressions in rectangular channels? (15M)
3. a) Explain different types of hydraulic similarities that must exist between a prototype and its model.  
b) Explain the terms: distorted models and undistorted models. What is the use of distorted models? (7M+8M)
4. a) Derive the expression for the force exerted by a water jet on a plate moving in the same direction of the jet with a velocity less than that of the jet.  
b) A blade turns the jet of diameter 2.5cm at a velocity of 25 m/s by 60°. Determine the force exerted by the blade on the fluid. (8M+7M)
5. a) What are the main differences between impulse and reaction turbines?  
b) List the various efficiencies used to express the performance of hydraulic turbines. (7M+8M)
6. a) What are unit quantities? Define the unit quantities for turbine.  
b) By means of a neat sketch explain the governing mechanism of Francis turbine. (7M+8M)

**II B. Tech II Semester Regular Examinations, August–2014**  
**HYDRAULICS AND HYDRAULIC MACHINERY**  
 (Civil Engineering)

Time: 3 hours

Max. Marks: 75

Answer any FIVE Questions

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1. a) Explain the terms specific energy of a flowing liquid, minimum specific energy, critical depth, critical velocity and alternate depths as applied to non-uniform flow.
 b) A trapezoidal channel has a bed width of 5 m, side slopes of 1 upon 1.5 and Manning's $n = 0.016$. Compute the critical slope and the corresponding discharge for a critical depth of 2 m (7M+8M)
2. a) Define a back water curve and derive an expression for finding the length of the back water curve.
 b) A rectangular channel of 5 m width discharges water at the rate of $1.6 \text{ m}^3/\text{s}$ into a 5 m wide apron with 1/2800 slope at a velocity of 5 m/s. Determine the height of the hydraulic jump and energy loss. (7M+8M)
3. What do you mean by dimensional numbers? Name any four dimensional numbers. Define and explain Reynold's number, Froude's number and Mach number. Derive expressions for any above two numbers. (15M)
4. a) Show that the force exerted by a jet of water on an inclined fixed plate in the direction of the jet is given by $F_x = \rho a V^2 \sin^2 \theta$, where $a =$ Area of the jet, $V =$ velocity of the jet and $\theta =$ inclination of the plate with the jet.
 b) A blade turns the jet of diameter 3 cm at a velocity of 20 m/s by 60° . Determine the force exerted by the blade on the fluid. (7M+8M)
5. a) What is draft tube? What are its functions?
 b) Describe functions of various main components of Pelton turbine with neat sketch (7M+8M)
6. a) What do you mean by surge tank? What are different types of surge tanks?

II B. Tech II Semester Regular Examinations, August–2014
HYDRAULICS AND HYDRAULIC MACHINERY
(Civil Engineering)

Time: 3 hours

Max. Marks: 75

Answer any FIVE Questions

All Questions carry Equal Marks

1. a) Derive the condition for the best side slope of the most economical trapezoidal channel.
b) Using Bazins formula, determine the discharge through a rectangular ordinary earthen channel 2 m wide and 0.6 m deep with a slope of 1 on 2600. Assume Bazins constant $k = 1.303$. If Manning constant for this type is 0.025, determine and compare the flow. (7M+8M)
2. a) Define hydraulic jump and explain under what circumstances it occurs (7M+8M)
b) Obtain an expression for the depth after the hydraulic jump and the loss of head due to the jump. Write the assumptions made. (7M+8M)
3. State Buckingham's Π -theorem. Why this theorem is considered superior over the Rayleigh's method for dimensional analysis. (8M)

4. a) Define the terms: i) Impact of jets, and ii) Jet propulsion. (8M)
b) A jet of water of diameter 55 mm moving with a velocity of 20 m/s strikes a fixed plate in such a way that the angle between the jet and the plate is 60° . Find the force exerted by the jet on the plate i) in the direction normal to the plate, and ii) in the direction of the jet. (6M+9M)
5. a) How will you classify the turbines? (7M+8M)
b) Differentiate between turbines and pumps. (7M+8M)
6. What do you understand by the characteristics curves of turbine? Name the important characteristics of a turbine. (15M)
7. Draw and discuss the operating characteristics of a centrifugal pump (15M)

II B. Tech II Semester Regular Examinations August - 2014
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
 (Com. to CE, ME)

Time: 3 hours

Max. Marks: 75

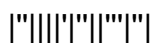
Answer any **FIVE** Questions
 All Questions carry **Equal** Marks
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1. Define Managerial Economics. Explain its characteristics and importance.
2. Define price elasticity of demand. What are the different methods used to measure the price elasticity?
3. Define MRTS. Explain Cobb-Douglas Production function.
4. What do you mean by a market? What are the concepts considered for dividing the markets? What are the features of Perfect competition?
5. Define business cycle. What are its phases and features?
6. Calculate the net present value of two projects and suggest which of the two projects should be accepted assuming a discount rate of 10%.

|                    | Project A | Project B |
|--------------------|-----------|-----------|
| Initial Investment | Rs. 30000 | Rs.50000  |
| Estimated life     | 5 years   | 5 Years   |
| Scrap Value        | Rs.2000   | Rs.4000   |

Annual Cash inflows after tax and depreciation

| Years     | 1     | 2     | 3     | 4    | 5    |
|-----------|-------|-------|-------|------|------|
| Project A | 10000 | 15000 | 8000  | 6000 | 4000 |
| Project B | 40000 | 30000 | 10000 | 5000 | 4000 |



7. Define ratio. Explain different ratios used to analyse the performance of the organization.
8. The following Trial balance was extracted from the books of XYZ Ltd., on March 31, 2013. Prepare a Trading account and Profit and loss account for the year ended March 31, 2013 and a Balance sheet as on that date.

Closing stock was valued at Rs.90000

| Ledger Account             | Amount    |            |
|----------------------------|-----------|------------|
|                            | Debit Rs. | Credit Rs. |
| Opening Stock              | 10000     |            |
| Purchases and sales        | 20000     | 40000      |
| Returns                    | 2000      | 1000       |
| Discount                   | 1000      | 2000       |
| Capital and Drawings       | 5000      | 65000      |
| Cash and bank Overdraft    | 7000      | 12000      |
| Debtors and Creditors      | 19000     | 12000      |
| Carriage                   | 3000      |            |
| Freight                    | 4000      |            |
| Salaries                   | 6000      |            |
| Stationary                 | 4000      |            |
| Land and Building          | 35000     |            |
| Plant and Machinery        | 15000     |            |
| Fixtures and Fittings      | 5000      |            |
| Bills Receivable & Payable | 6000      | 4000       |
| General Reserve            |           | 6000       |
| Total                      | 1,42,000  | 1,42,000   |

Code No: R22013

**R10**

**SET - 2**

**II B. Tech II Semester Regular Examinations August - 2014**  
**MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS**

(Com. to CE, ME)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions

All Questions carry **Equal** Marks

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1. How basic Managerial Economics is different from Economics? Explain its relation with other subjects.
2. Define Elasticity of demand. Explain different types of elasticity of demand and its significance.
3. What are Law of variable proportions and Law of returns to scale? What are Isocosts and Isoquants?
4. Explain any two Managerial Theories of firm.
5. Define partnership. Explain the features, advantages and disadvantages of partnership.
6. From the following Balance sheet of Excellency Limited, calculate Debt-Equity Ratio.

Liabilities	Amount Rs.	Assets	Amount Rs.
Equity share capital	600000	Land and Building	1200000
Preference share capital	500000	Plant and Machinery	300000
15% debentures	800000	Sundry debtors	250000
Term loans	100000	Stock	150000
Secured loans	50000	Cash at Bank	100000
Short term loans	150000	Loans and advances	150000
Public deposits	200000	Preliminary expenses	50000
Share premium	20000	Discount on issue of shares	10000
Sundry creditors	80000	Loss on issue of debentures	45000
Reserve and Surplus	60000	P/L A/c- Accumulated up to last year	450000
Provision for taxation	50000		395000

7. Define capital budgeting. What are the different methods used for calculating capital budgeting?
8. From the following balance sheets of X Ltd. On 31 December, 2012 and 2013, you are required to prepare:
- A schedule changes in working capital
 - A funds flow statement

Liabilities	2012 (Rs)	2013 (Rs)	Assets	2012 (Rs)	2013 (Rs)
Share Capital	100000	100000	Goodwill	12000	12000
General reserve	14000	18000	Building	40000	36000
Profit & Loss A/C	11000	8000	Plant	37000	36000
Sundry Creditors	10000	7400	Investments	10000	11000
Bills Payable	4200	1800	Stock	30000	23400
Provision for Taxation	16000	20000	Bills Receivable	2000	3200
Provision for Doubtful	400	600	Debtors	18000	19000
			Cash/bank	6600	5200
Total	155600	155800		155600	155800

The following additional information has also been given:

- Depreciation charged on plant was Rs4000 and on Building Rs 4000.
- Interim dividend of Rs 8000 was paid during the year 2013.

Code No: R22013

R10

SET - 3

II B. Tech II Semester Regular Examinations August - 2014
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Com. to CE, ME)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions

All Questions carry **Equal** Marks

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1. Explain about different economic tools used in Managerial Economics. What are demand distinctions?
2. Why you have to forecast demand? Explain different methods for forecasting demand.
3. Define costs. Explain different cost concepts.
4. Explain Price-output determination under Monopolistic Competition.
5. What are the differences between Public and private enterprises? Explain different types of public enterprises.

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6. Prepare a Trading and Profit and loss account and balance sheet from the following trial balance.

| Particulars            | Debit (Rs.) | Credit (Rs.) |
|------------------------|-------------|--------------|
| Capital                |             | 100000       |
| Machinery              | 30000       |              |
| Stock                  | 16000       |              |
| Wages                  | 50000       |              |
| Carriage inwards       | 500         |              |
| Salaries               | 5000        |              |
| Factory rent           | 2400        |              |
| Repairs                | 400         |              |
| Fuel and power         | 2500        |              |
| Buildings              | 40000       |              |
| Sundry debtors         | 20000       |              |
| Sales                  |             | 203600       |
| Purchases              | 122000      |              |
| Creditors              |             | 12500        |
| Returns outwards       |             | 2000         |
| Returns inwards        | 3600        |              |
| Drawings               | 2000        |              |
| Discounts allowed      | 750         |              |
| Discounts received     |             | 250          |
| Office expenses        | 1000        |              |
| Manufacturing expenses | 600         |              |
| Bills payable          |             | 8500         |
| Bills receivable       | 5000        |              |
| Cash in hand           | 2400        |              |
| Cash at bank           | 15400       |              |
| Office rent            | 1800        |              |
| Total                  | 326800      | 326800       |

7. What is capital budgeting? Explain its need. How it is different from working capital?
8. Interpret the performance of the company from the following data:

| Ratio | Actual | Standard |
|-------|--------|----------|
|       |        |          |

Code No: R22013

R10

SET - 4

**II B. Tech II Semester Regular Examinations August - 2014**  
**MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS**  
(Com. to CE, ME)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions  
All Questions carry **Equal** Marks

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1. Define Law of Demand. Explain determinants of demand and exceptions of law of Demand.
2. 'New product does not have past data to forecast demand'. Will you support this statement. Illustrate.
3. What is BEP? Explain BEP curve. Why an organisation has to achieve BEP?
4. Explain different models of pricing.
5. Explain the features, advantages and disadvantages of Joint Stock Company.
6. Write a short note on
a) Double entry book keeping b) Ledger c) Journal
7. From the following balance sheet calculate current ratio, quick ratio, Debt-equity ratio and interpret the results:

Liabilities	Rs.	Assets	Rs.
Equity share capital	1500	Plant and machinery	975
Debentures	400	Stock	550
Creditors	200	Debtors	550
Outstanding expenses	100	Cash in hand	375
Profit and loss account	100	Prepaid expenses	50
Bank loan	200		
Total	2500		2500

8. A business needs a new machine and has to make a choice between two machines A and B. From the following data suggest which machine is best by using Payback period, ARR and NPV.

	Machine A	Machine B
Initial cost	40000	55000

II B. Tech II Semester Regular Examinations August - 2014
PROBABILITY AND STATISTICS
 (Com. to CE, CHEM, PE)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions
 All Questions carry **Equal** Marks
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1. a) Two marbles are drawn in succession from a box containing 10 red, 30 white, 20 blue and 15 orange marbles, with replacement being made after each drawing. Find the probability that  
 i) both are white      ii) first is red and second is white.
- b) A businessman goes to hotels X, Y, Z; 20%, 50%, 30%, of the time respectively. It is known that 5%, 4%, 8% of the rooms in X, Y, Z hotels have faulty plumbing. What is the probability that businessman room having fault plumbing is assigned to hotel Z. (8M+7M)

2. Find:

a) The constant K such that

$$f(x) = \begin{cases} Kx^2, & \text{if } 0 < x < 3 \\ 0, & \text{otherwise} \end{cases} \quad \text{is a probability function}$$

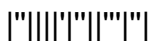
i) Find the distribution function F(x)      ii) P(1 &lt; X ≤ 2)

b) If the probability density function of X is given by

$$f(x) = \begin{cases} \frac{x}{2} & \text{for } 0 < x \leq 1 \\ \frac{1}{2} & \text{for } 1 < x \leq 2 \\ \frac{(3-x)}{2} & \text{for } 2 < x \leq 3 \\ 0 & \text{else where} \end{cases}$$

Find the expected value of  $f(x) = x^2 - 5x + 3$ . (8M+7M)

3. a) Wireless sets are manufactured with 25 soldered joints each. On the average 1 joint in 500 is defective. How many sets can be expected to be free from defective joints in a consignment of 10000 sets?
- b) The mean and variance of binomial distribution are 4 and  $\frac{4}{3}$  respectively. Find P(x ≥ 1). (8M+7M)





4. Determine the mean and standard deviation of sampling distribution of variances for the population 3, 7, 11, 5 with  $n = 2$  and sampling is with replacement. (15M)
5. a) A random sample of 400 items is found to have mean 82 and S.D. of 18. Find the maximum error of estimation at 95% confidence.  
b) Measurements of the weights of a random sample of 200 ball bearings made by a certain machine during one week showed a mean of 0.824 and a S.D. of 0.042. Find maximum error at 95% confidence and 90% confidence interval. (7M+8M)
6. a) Explain the procedure generally followed in testing of hypothesis.  
b) Write short note on Type I and Type II error. (8M+7M)

7. Four coins were tossed 160 times and the following results were obtained.

|                    |    |    |    |    |   |
|--------------------|----|----|----|----|---|
| No. of heads       | 0  | 1  | 2  | 3  | 4 |
| No. of Frequencies | 17 | 52 | 54 | 31 | 6 |

Under the assumption that coins are balanced, find the expected frequencies of 0, 1, 2, 3 or 4 heads, and test the goodness of fit ( $\alpha = 0.05$ ) (15M)

8. An E-Seva Kendra in a Small town has only one bill receiving window with a cashier handling the cash transaction and giving receipts. He takes on average 5 minutes per customer. The customers come at random with an average of 8 per hour and the arrivals are Poisson in nature. Determine:
- Average queue length
  - Expected idle time of the cashier
  - Expected time a new arrival Spends in system.
  - Expected waiting time of a new arrival before his service is started.
  - Probability that a person has to spend for at least 10 minutes in the system.

[Hint :  $\lambda = 8$ ,  $\mu = 10$  per hour]

(15M)

**II B. Tech II Semester Regular Examinations August - 2014**  
**PROBABILITY AND STATISTICS**  
 (Com. to CE, CHEM, PE)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions  
 All Questions carry **Equal** Marks

1. a) For any three arbitrary events A, B, C Prove that  
 $P(A \cup B \cup C) = P(A) + P(B) + P(C) - P(A \cap B) - P(B \cap C) - P(C \cap A) + P(A \cap B \cap C)$ .  
 (8M+7M)
- b) State and prove Baye's Theorem.

2. a) If probability density function

$$f(x) = \begin{cases} Kx^3 & \text{in } 0 \leq x \leq 3 \\ 0, & \text{elsewhere} \end{cases}$$

Find the value of K and find the probability between  $x = \frac{1}{2}$  and  $x = \frac{3}{2}$ .

- b) A random variable X has the following probability distribution

|      |   |    |    |    |    |    |    |    |
|------|---|----|----|----|----|----|----|----|
| X:   | 1 | 2  | 3  | 4  | 5  | 6  | 7  | 8  |
| f(x) | K | 2K | 3K | 4K | 5K | 6K | 7K | 8K |

Find the value of i) K      ii)  $P(x \leq 2)$       iii)  $P(2 \leq x \leq 5)$       (7M+8M)

3. a) If the probability is 0.05 that a certain wide-flange column will fail under a given axial load.  
 Find: i) at most two will fail      ii) at least four will fail
- b) If the chance that any of the 10 telephone lines busy at an instant is 0.2. What is the most probability of this number.  
 (8M+7M)

5. a) A random sample of 400 items is found to have mean 82 and S.D. of 18. Find the maximum error of estimation at 95% confidence. Find the confidence limits for the mean if  $\bar{X} = 82$ ?
- b) Measurements of the weights of a random sample of 200 ball bearing made by a certain machine during one week showed a mean of 0.824 and a S.D of 0.042. Find maximum error at 95% confidence. Find the confidence limits for the mean if  $\bar{X} = 32$ ? (7M+8M)

6. a) What is meant by Level of Significance? (7M+8M)
- b) Write the formula for testing the hypothesis concerning "Two Means"?

7. Eight students were given a test in a STATISTICS and after one month coaching they were given another test of the similar nature. The following table gives the increase in marks in the second test over the first.

|                   |   |    |   |    |    |   |    |   |
|-------------------|---|----|---|----|----|---|----|---|
| Student No.       | 1 | 2  | 3 | 4  | 5  | 6 | 7  | 8 |
| Increase of Marks | 4 | -2 | 6 | -8 | 12 | 5 | -7 | 2 |

Do the marks indicate that the students have gained from the coaching?

(5M)

8. A manager of a local hamburger restaurant in preparing to open a new fast food restaurant called Hasty Burgers. Based on the arrival rates at existing outlets. Manager expects customers to arrival at the drive in window according to a Poisson distribution, with a mean of 20 customers per hour. The service rate is flexible, however, the service time is expected to following an exponential distribution. The drive in window is single ever operation.
- a) What service rate is needed to keep average number of customers in the service system to 4?
- b) For the service rate in part (a), what is the probability that more than 4 customer are in the line and being served? (15M)

**II B. Tech II Semester Regular Examinations August - 2014**  
**PROBABILITY AND STATISTICS**  
 (Com. to CE, CHEM, PE)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions  
 All Questions carry **Equal** Marks

1. a) An anti-craft gun can take a maximum of 4 shots at an enemy plane moving away from it. The probabilities of hitting the plane at the first, second, third and fourth shots are 0.4, 0.3, 0.2 and 0.1 respectively. What is the probability that the gun hits the plane?
- b) Suppose 5 men out of 100 and 25 women out of 10,000 are color blind. A color blind person is chosen at random. What is the probability of the person being a male? (Assume male and female to be in equal numbers). (7M+8M)

2. a) A sample of 4 items is selected at random from a box containing 12 items of which 5 are defective. Find the expected number E of defective items.
- b) X is a continuous random variable with probability density function given by

$$f(x) = \begin{cases} Kx^{\alpha-1} & (1-x)B^{-1}, \text{ for } 0 < x < 1, \alpha > 0, B > 0 \\ 0, & \text{otherwise} \end{cases}$$

Find K and mean value of X.

(7M+8M)

3. a) If the chance that one of the ten telephone lines is busy at an instant is 0.2.
- i) What is the chance that 5 of the lines are busy?
- ii) What is the most probable number of busy lines and what is the probability of this numbers?
- iii) What is the probability that all the lines are busy?
- b) Fit a binomial distribution to the following frequency data. (8M+7M)

|   |    |    |    |    |   |
|---|----|----|----|----|---|
| x | 0  | 1  | 2  | 3  | 4 |
| y | 28 | 62 | 46 | 10 | 4 |

5. The mean mark in mathematics in a common entrance test will vary from year to year. If this variation of the mean mark is expressed subjected by a normal distribution with mean  $\mu_0 = 72$  and variance  $\sigma_0^2 = 5.76$ . i) What probability can we assign to the actual mean mark being somewhere between 71.8 and 73.4 for the next year's test. ii) Construct a 95% Bayesian interval for  $m$  if the from the next incoming class yielding a mean mark of 70 with S.D. of 8. iii) What posterior probability should we assign to the event of part (i). (15M)

6. a) Random samples of 400 men, and 600 women were asked whether they would like to have a flyover near their residence. 200 men and 325 women were in favor of the proposal. Test the hypothesis that proportions of men and women in favor of the proposal are same, at 5% level.
- b) In a city 250 men out of 750 were found to be smokers. Does the information support the conclusion that the majority of men in this city are smokers? (8M+7M)

7. a) A group of 5 patients treated with medicine 'A' weigh 42, 39, 48, 60 and 41 Kgs. Second group of 7 patients from the same hospital treated with medicine 'B' weigh 38, 42, 56, 64, 68, 69 and 62 Kgs. Do you agree with the claim that medicine B increases the weight significantly?
- b) Memory capacity of 10 students was tested before and after training. State whether the training was effective or not from the following scores. (8M+7M)

|                 |    |    |    |   |   |    |    |   |   |   |
|-----------------|----|----|----|---|---|----|----|---|---|---|
| Before Training | 12 | 14 | 11 | 8 | 7 | 10 | 3  | 0 | 5 | 6 |
| After Training  | 15 | 16 | 10 | 7 | 5 | 12 | 10 | 2 | 3 | 8 |

8. Patients arrive at a clinic according to a Poisson distribution at the rate of 30 patients per hour. The waiting room can not accommodate more than 13 patients not including the one that is examine? Examination time per patients is exponential with mean rate 20 per hour.

i) Find the effective arrival rate at the clinic.

**II B. Tech II Semester Regular Examinations August - 2014**  
**PROBABILITY AND STATISTICS**  
 (Com. to CE, CHEM, PE)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions  
 All Questions carry **Equal** Marks

1. a) Among 100 students 50 are studying Mathematics, 30 are studying Physics, and 20 are studying Mathematics and Physics. If a student is chosen at random find the probability that the student is
- i) studying Mathematics or Physics ii) studying neither Physics nor Mathematics.
- b) The probability that three men hit a target respectively are 1/5, 2/3 and 1/4. Find the probability that two shots hit the target. (8M+7M)

2. a) The cumulative distribution function for a continuous random variable  $X$  is

$$F(x) = \begin{cases} 1 - e^{-2x}, & x \geq 0 \\ 0, & x < 0 \end{cases}$$

Find: i) the density function  $f(x)$ , ii) mean and iii) variance of the density function.

- b) A sample of 3 items is selected at random from a box containing 10 items of which 4 are defective. Find the expected number of defective items? (8M+7M)

3. a) Prove that Poisson distribution is limiting case of binomial distribution.

- b) If an auditor selects 5 returns from among 15 returns of which 9 contain illegitimate deduction, what the probability that a majority of the selected returns contains illegitimate deductions? (7M+8M)

4. a) The average marks scored by 32 boys are 72 with a S.D of 8. While that for 36 girls is 70 with a S.D of 6. Does this indicate that the boys perform better than girls at level of significance 0.05?

- b) Out of 500 articles selected at random from a batch containing 10000 articles and 30 were found to be defective. How many defective articles would you reasonably expect to have in the whole batch? (7M+8M)

6. a) Among 900 people in a state 90 are found to be chapati eaters. Construct 99% confidence interval for the true proportion.
- b) In a random sample of 400 industrial accidents, it was found that 231 were due at least partially to unsafe working conditions construct a 99% confidence interval for the corresponding true proportion. (7M+8M)

7. Two random samples are drawn from two normal populations as follows:

|   |    |    |    |    |    |    |    |    |  |
|---|----|----|----|----|----|----|----|----|--|
| A | 17 | 27 | 18 | 25 | 27 | 29 | 13 | 17 |  |
| B | 16 | 16 | 20 | 27 | 26 | 25 | 21 |    |  |

Test whether the samples are drawn from the same normal population. Use a 0.05 level of significance. (15M)

8. Arrivals at a telephone booth are considered to be Poisson, with an average time of 10 between on arrival and the next. The length of a phone call assumed to be distributed exponentially with mean 3 minutes, then
- i) What is the probability that a person arriving at the booth will have to wait?
- ii) What is the average length of the queues that form from time to time?
- The telephone department will install a second booth when convinced that an arrival would expect to have waited at least three minutes for the phone. By how much must the flow of arrivals be increased in order to justify a second booth? (15M)

**II B. Tech II Semester Regular Examinations August - 2014**  
**STRENGTH OF MATERIALS**  
(Civil Engineering)

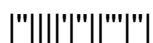
Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions  
All Questions carry **Equal** Marks

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1. A beam AB, span 8 m, simply supported at the ends is subjected to a point load W at C, which is 6 m from left support. Using area moment method, compute i) deflection at C, ii) slope at A, iii) slope at B, and iv) slope at C. Take $E = 2 \times 10^5 \text{ N/mm}^2$ and $I = 6 \times 10^8 \text{ mm}^4$?
2. Derive the Lames equations from the fundamentals in a thick cylindrical shell for the given radii (r_1 and r_2) and internal fluid pressure, p?
3. A circular shaft 100 mm diameter is subjected to combined bending and twisting of moments the B.M being 3 times the twisting moment. If the direct tensile yield point of the material is 350 N/mm^2 , and the factor of safety is 4, calculate the allowable twisting moment according to the following theories of failures. (a) Maximum principle stress theory, (b) Shear strain energy theory, if the simple shear is not to exceed 60 N/mm^2 ?
4. a) Explain about the maximum strain energy theory?
b) A solid steel shaft has to transmit 75 kW at 200 r.p.m., taking allowable shear stress as 70 N/mm^2 . Find the diameter of the shaft, if maximum torque transmitted at each revolution exceeds the mean by 30%?
5. A circular beam is supported on six equally spaced columns. Derive expressions for maximum bending moment and maximum twisting moment with usual notations?

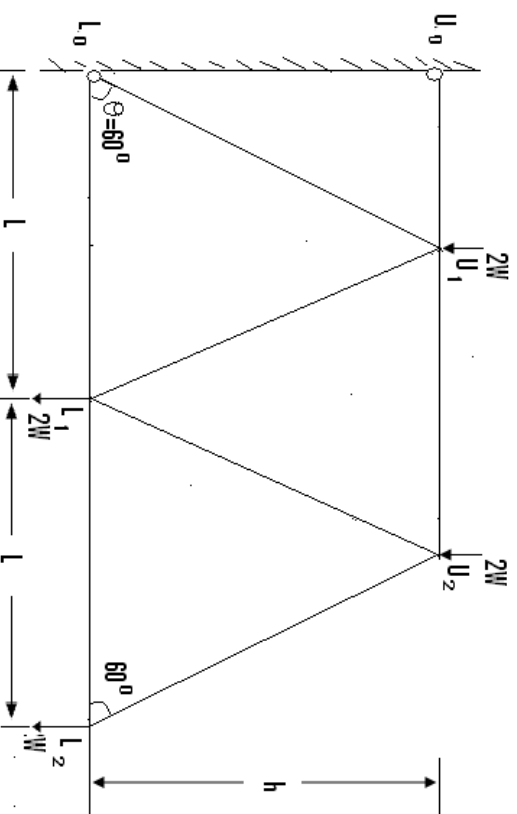


6. In an experimental determination of the buckling load for a rod 12 mm mild steel pin ended struts of various lengths, two of the values obtained were: (a) When the length is 50 cm load is 10 kN and (b) When the length is 20 cm load is 30 kN?

Make necessary calculations and state whether either of the values of the loads, confirm with Euler's formula for the critical load. Take $E = 2 \times 10^5 \text{ N/mm}^2$?

7. A short C.I column is hollow section 200 mm external dia. and of uniform thickness, 40 mm. A vertical compressive load acts at an eccentricity of 60 mm from the axis of the column. If the maximum permissible stresses are 70 N/mm^2 compression and 18 N/mm^2 tension respectively, find the greatest allowable load?

8. A truss is loaded as shown in Figure. Find the forces in the members of the truss using method of sections?



Code No: R22012

R10

SET - 2

II B. Tech II Semester Regular Examinations August - 2014
STRENGTH OF MATERIALS
(Civil Engineering)

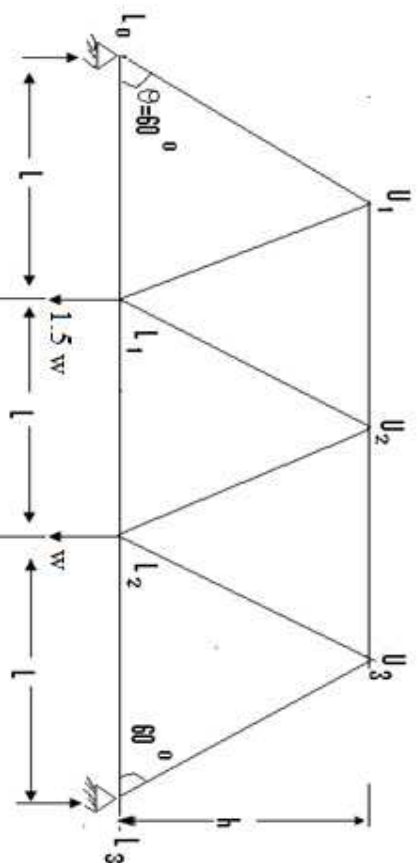
Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks

1. A simply supported beam of span 5 m, carrying a point load of 5 kN at a distance of 3 m from the left end. Find: i) slope at the left support, ii) deflection under the load and iii) maximum deflection. Take $E = 2 \times 10^5 \text{ N/mm}^2$ and $I = 1 \times 10^8 \text{ mm}^4$. Use double integration method?
2. a) Derive an expression for circumferential stress for a thin spherical shell of internal diameter d , wall thickness t , is subjected to an internal pressure p ?
b) A thin cylindrical shell 90 cm long, 20 cm internal diameter having thickness of metal as 8mm is filled with fluid at atmospheric pressure. If an additional 20 cm^3 of fluid is pumped into the cylinder; find: i) the pressure exerted by the fluid on the cylinder and ii) the hoop stresses induced. Take $E = 2.1 \times 10^5 \text{ N/mm}^2$ and Poisson's ratio = 0.30?
3. An element is subjected to tensile stresses of 60 N/mm^2 and 20 N/mm^2 acting on two perpendicular planes and is also accompanied by shear stress of 20 N/mm^2 on these planes. Draw the Mohr's circle of stresses and determine the magnitudes and directions of principal stresses and also the greatest shear stress?
4. a) Derive the torsion equation from fundamentals $T/J = q/r = N\theta/L$ with usual notation.
b) A solid steel shaft has to transmit 75 kW at 200 r.p.m., taking allowable shear stress as 70 N/mm^2 . Find the diameter for the shaft, if maximum torque transmitted at each revolution exceeds the mean by 30%?

5. a) Derive Euler's buckling load formula of a long column pinned at both ends.
b) A solid round bar 3 m long and 5 cm in diameter is used as a strut with one end is fixed and other is hinged. Determine the crippling load. Take $E = 2 \times 10^5 \text{ N/mm}^2$?
6. Calculate the normal stresses at the four outside corners of a horizontal section of short hollow piers 1.5 m square outside and 1 m square inside supporting a vertical point load of 500 kN on a diagonal and 0.8 m from the vertical axis of the pier. Neglect the axis of the pier?
7. A beam of rectangular section, 80 mm wide and 10 mm deep is subjected a bending moment of 12 kN-m. The trace of the plane of loading is included at 45° to the Y-Y axis of the section. Locate the neutral axis of the section and calculate the maximum bending stress induced in the section?
8. A truss is loaded as shown in figure. Find the forces in the members of the truss using method of joints?



II B. Tech II Semester Regular Examinations August - 2014
STRENGTH OF MATERIALS
(Civil Engineering)

Time: 3 hours

Max. Marks: 75

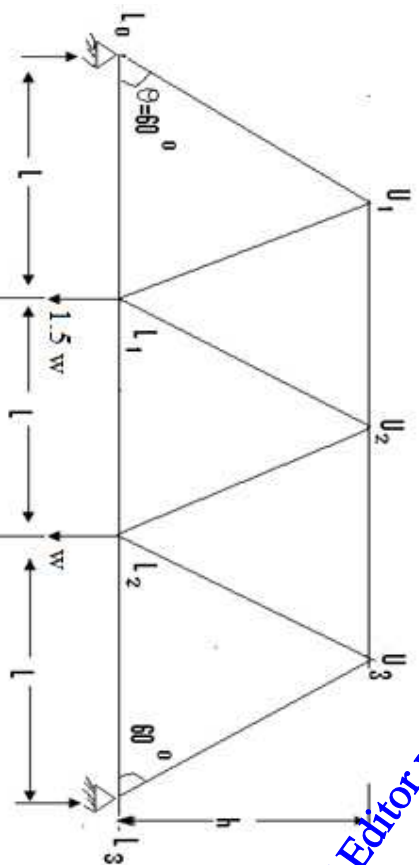
Answer any **FIVE** Questions
All Questions carry **Equal** Marks

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1. Explain moment area theorems. Find the slope and deflection of simply supported beam of span  $L$ , carrying (i) a point load  $P$  at the centre, (ii) a U.D.L of  $w$  kN/m over the entire span using the moment area method
2. a) Deduce the equation for hoop stress and longitudinal stress for the cylindrical shell subjected to internal pressure 'p'? Let the length of the cylinder  $l$ , thickness ' $t$ ' and diameter ' $d$ '.  
b) A spherical of internal diameter 0.9 m and of thickness 10 mm is subjected to an internal pressure of  $1.4 \text{ N/mm}^2$ . Determine the increase in diameter and increase in Volume.  
Take  $E = 2 \times 10^5 \text{ N/mm}^2$ ,  $1/m = 0.33$ ?
3. Derive an expression for the major and minor principal stresses on an oblique plane, when the body is subjected to direct stresses in two mutually perpendicular directions accompanied by a shear stress?

4. A 1.5 m long column has a circular cross section of 5 cm diameter, one of the ends of the column is fixed in direction and position, and the other end is free. Taking factor of safety as 3, calculate the safe load using: (i) Rankin's formula, take yield stress is  $560 \text{ N/mm}^2$  and  $a = 1/1600$  for pinned ends, (ii) Euler's formula, Young's Modulus for the material is  $1.2 \times 10^5 \text{ N/mm}^2$ ?

6. A hollow rectangular masonry pier 600 mm X 900 mm and 150 mm thick transmits a vertical load of 500 kN in a vertical plane bisecting the 900 mm side and at an eccentricity of 100 mm from the geometrical axes of the section. Determine the maximum and minimum stress intensities in the section?
7. Determine the principal moments of Inertia for an angle section 225×175×15 mm?
8. A truss is loaded as shown in Figure. Find the forces in the members of the truss using method of sections?



**II B. Tech II Semester Regular Examinations August - 2014**  
**STRENGTH OF MATERIALS**  
(Civil Engineering)

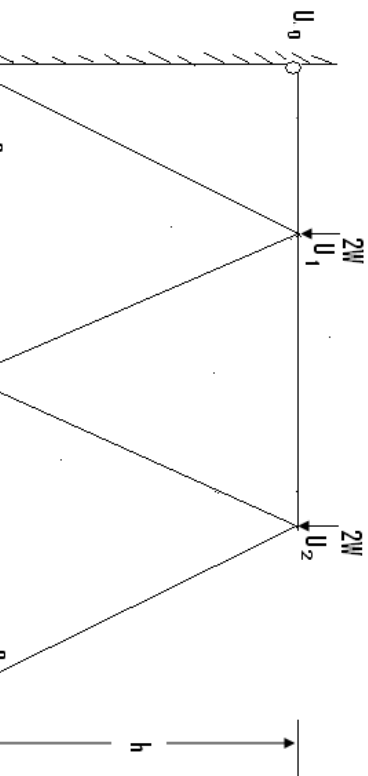
Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions  
All Questions carry **Equal** Marks

- ~~~~~
1. A horizontal beam AB is freely supported at A and B, 8 m span, and carries a UDL of 15 kN/m (including its own weight). A clockwise moment of 160 kN-m is applied to the beam at a point C, 3 m from the left hand support A. Calculate the slope of the beam at C, if  $EI=40 \text{ MN-m}^2$ ?
  2. A compound cylinder is made by shrinking a cylindrical of external diameter 300 mm and internal diameter of 250 mm over an another cylindrical of external diameter 250 mm and internal diameter 200 mm. The radial pressure at the junction after shrinking is 8 N/mm<sup>2</sup>. Find the final stresses sent up across the section, when the compound cylinder is subjected an internal fluid pressure of 84.5 N/mm<sup>2</sup>?
  3. Direct stresses of 120 N/mm<sup>2</sup> (tensile) and 90 N/mm<sup>2</sup> (compressive) exist on two perpendicular planes at a certain point in a body. They are also accompanied by shear stress on the planes. The greatest principal stress at the point due to these is 150 N/mm<sup>2</sup>?
    - a) What must be the magnitude of the shearing stresses on the two planes?
    - b) What will be the maximum shearing stress at the point?
  4. A hollow rectangular column of external depth 1 m and external width 1 m is 10 cm thick. Calculate the maximum and minimum stress in the section of the column, if vertical load of 200 kN is acting with an eccentricity of 20 cm?

5. a) Derive the maximum shear stress induced, in the wire of a closed-coiled helical spring which carries an axial load  $W$ . Assume mean radius of spring coil is  $R$  and diameter of spring wire is  $d$ .
- b) A leaf spring carries a central load of 3000 N. The leaf spring has to be made of 10 steel plates 5 cm wide and 6 mm thick, if the bending stress is limited to  $150 \text{ N/mm}^2$ . Determine:
- length of the spring and
  - deflection at the centre of the spring. Take  $E = 2 \times 10^5 \text{ N/mm}^2$ ?
6. A beam carries a UDL of  $50 \text{ kN/m}$  over a span of 2 m length, with an axial compressive load of  $50 \text{ kN}$ . The beam section is rectangular, having depth equal to  $240 \text{ mm}$  and width equal to  $120 \text{ mm}$ . Compute i) maximum fibre stress, ii) fibre stress at a point  $0.5 \text{ m}$  from the left end of the beam and  $80 \text{ mm}$  below the N.A?
7. A semi-circular beam is supported on three equally spaced columns. Derive expressions for maximum bending moment and maximum twisting moment with usual notation?
8. A truss is loaded as shown in Figure. Find the forces in the members of the truss using method of joints?



**II B. Tech II Semester Regular Examinations, August – 2014**  
**STRUCTURAL ANALYSIS – I**  
 (Civil Engineering)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions  
 All Questions carry **Equal** Marks

1. A cantilever of length 'L' carries a concentrated load 'W' at its mid-span. If the free end is supported by a prop, find the reaction at the prop and also draw the S.F. and B.M. diagrams.
2. Solve the fixed beam shown in Figure 1, Draw BM & SF diagrams.

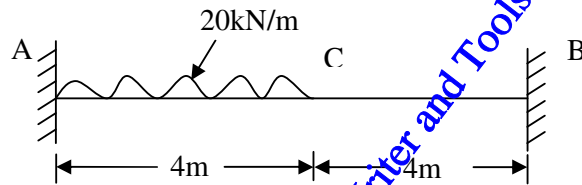


Figure 1

3. Analyze the continuous beam shown in Figure 2, using three-moment equation. Draw S.F and B.M diagrams.

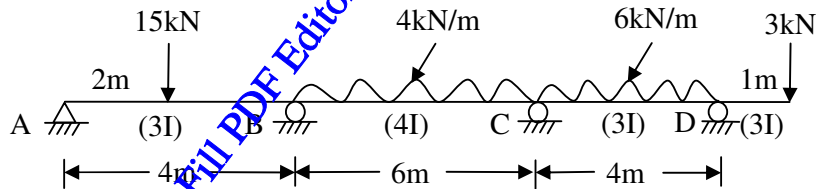


Figure 2

4. Determine the Reaction at A and the moment at B as shown in Figure 3. Use Strain Energy method.

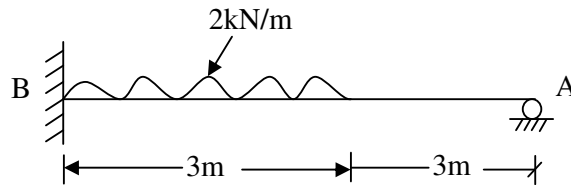
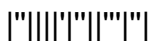


Figure 3





5. Analyze the beam ABCD shown in Figure 4 by Slope-Deflection method and draw bending moment diagram.

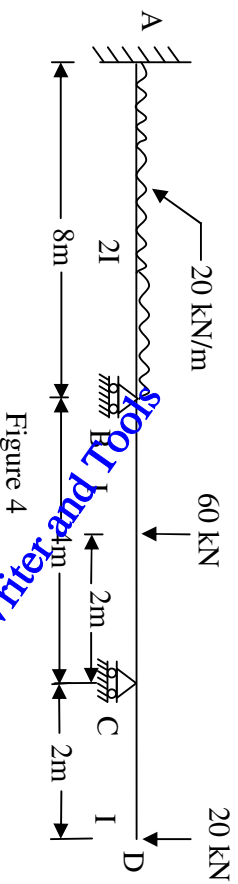
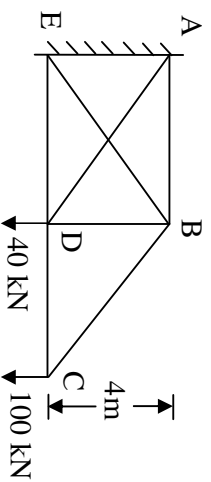


Figure 4

6. A simply supported girder has a span of 25m. Draw the influence line for shearing force at a section 10m from one end, and using the diagram determine the maximum shearing force due to the passage of a knife-edge load of 5kN, followed immediately by a uniformly distributed load of 2.4 kN per meter extending over a length of 5m. The loads may cross in either direction.

7. Two point loads of 8 kN and 4 kN spaced 3 m apart cross a girder of 15 m span, the smaller load leading from left to right. Construct the maximum S.F. and B.M. diagrams, stating the positive and amount of absolute maximum bending moment.

8. Find the force in the member BE of the frame shown in Figure 5. Take AE is constant for all the members.



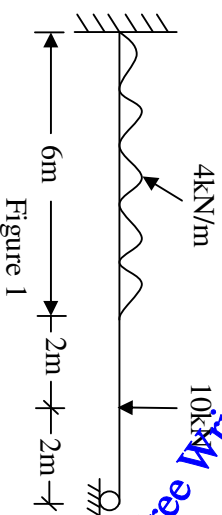
**II B. Tech II Semester Regular Examinations, August – 2014**  
**STRUCTURAL ANALYSIS – I**  
 (Civil Engineering)

Time: 3 hours

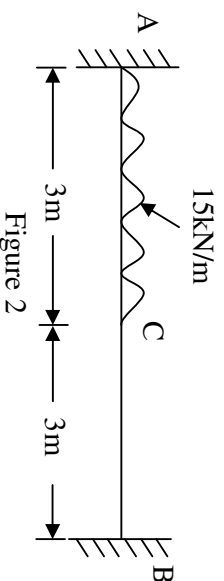
Max. Marks: 75

Answer any **FIVE** Questions  
 All Questions carry **Equal** Marks

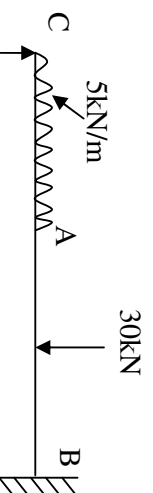
1. A propped cantilever beam is shown in Figure 1. Calculate the prop Reaction and also draw the BM & SF diagrams.



2. Solve the fixed beam shown in Figure 2, Draw BM & SF diagrams.



3. Draw the Shear force and bending moment diagram for the beam shown in Figure 3. Use Clapeyron's theorem of three moments.  $EI=1 \times 10^5 \text{ N/mm}^2$ .



5. A continuous beam is shown in Figure 4, analyze the beam and draw the SF and BM diagram, Use slope deflection method.

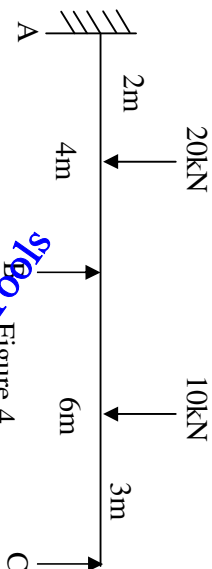


Figure 4

6. Determine the vertical deflection of Joint 'E' for the truss shown in Figure 5. Take  $A=500 \times 10^{-6} \text{ m}^2$ ,  $E=200 \times 10^6 \text{ kN/m}^2$  are constant for all members. Use Strain Energy method.

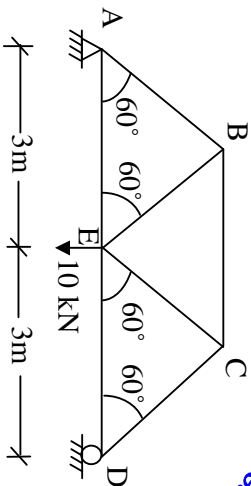
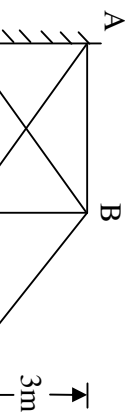


Figure 5

7. Four wheel loads of 6, 4, 8 and 5 kN cross a girder of 20 m span, from left to right followed by U.D.L. of 4 kN/m and 4m long with the 6 kN load leading. The spacing between the loads in the same order is 3m, 2m and 2m. The head of the U.D.L. is at 2m from the last 5 kN load. Using influence lines, calculate the S.F. and B.M. at a section 8m from the left support when the 4 kN load is at centre of the span.

8. Find the force in the member BE of the frame shown in Figure 6. Take AE is constant for all the members.



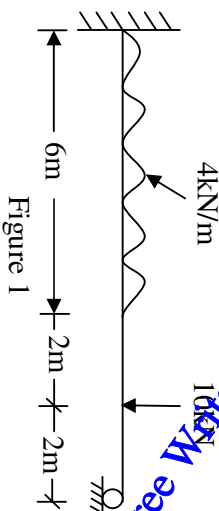
**II B. Tech II Semester Regular Examinations, August – 2014**  
**STRUCTURAL ANALYSIS – I**  
 (Civil Engineering)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions  
 All Questions carry **Equal** Marks

1. A propped cantilever beam is shown in Figure 1. Calculate the prop reaction and also draw the BM & SF diagrams.



2. A fixed beam of 6 meters span carries a uniformly distributed load of 12 kN/m throughout the whole span. The level of right hand support sinks by 8 mm below that the left hand end. Take  $E=2.10 \times 10^8$  kN/m<sup>2</sup> and  $I=4.50 \times 10^5$  m<sup>4</sup>. Find: i) Support moments, ii) Support reactions, and iii) Deflection at the centre.

3. A continuous beam ABC consists of two spans AB of length 4m, and BC of length 3m. The span AB carries a point load of 100 kN at its middle point. The span BC carries a point load of 120 kN at 1m from C. The end A is fixed and the end C is simply supported. Find: a) the moments at the supports, b) the reactions at the supports and c) Draw the B.M diagram. Use Clapeyron's theorem of three moments.

4. Four wheel loads of 6, 4, 8 and 5 kN cross a girder of 20 m span, from left to right followed by U.D.L. of 4kN/m and 4m long with the 6 kN load leading. The spacing between the loads in the same order are 3m, 2m and 2m. The head of the U.D.L. is at 2m from the last 5kN load.

Using influence lines calculate the S.F. and B.M. at a section 8m from the left support when

5. A continuous beam ABCD 12 m long is fixed at A and D, and is loaded as shown in Figure 2. Analyze the beam completely if the following moments take place simultaneously i) the end A yields, turning through  $1/250$  radians in a clock-wise direction ii) end B sinks 30 mm in downward direction, iii) end C sinks 20 mm in downward direction. The beam has constant  $I=33.20 \times 10^5 \text{ mm}^4$  and  $E=2 \times 10^5 \text{ N/mm}^2$ . Use slope-deflection method.

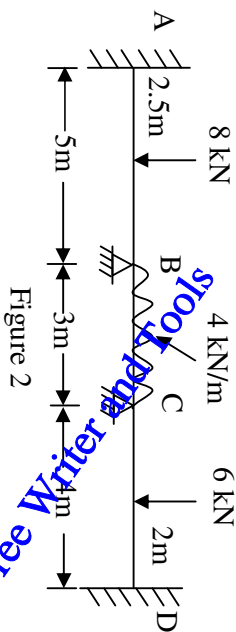


Figure 2

6. Determine the horizontal and vertical component of deflection at the point 'C' of the frame shown in Figure 3. Take  $E=200 \times 10^3 \text{ N/mm}^2$  and  $I=6 \times 10^7 \text{ mm}^4$ . Use Strain Energy method.

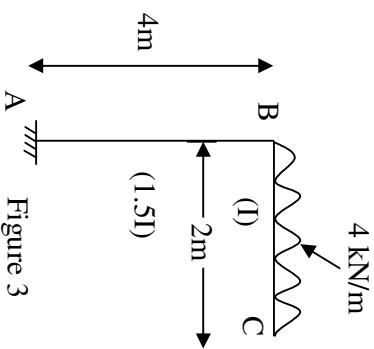


Figure 3

7. A uniformly distributed load of 1 kN per meter run, 6 m long crosses a girder of 16 m span. Construct the maximum S.F. and B.M. diagram and calculate the values at section 3 m, 5 m and 8 m from the left hand support.
8. A frame is shown in Figure 4, take EB as redundant. Take AE is constant for all the members. Find all member forces. Use Strain Energy method.

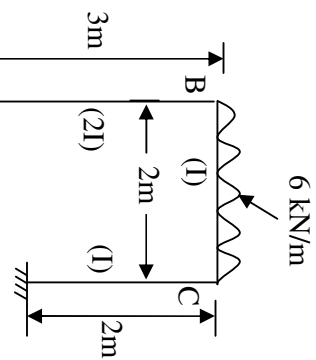
**II B. Tech II Semester Regular Examinations, August – 2014**  
**STRUCTURAL ANALYSIS – I**  
 (Civil Engineering)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions  
 All Questions carry **Equal** Marks

1. A cantilever of length 6 m carries a U.D.L. of 2 kN/m over a length of 4 m starting from the fixed end. The cantilever is propped rigidly at the free end. If the value of  $E=2 \times 10^5 \text{ N/mm}^2$  and  $I=10^8 \text{ mm}^4$ , then determine i) Reaction at the rigid prop, ii) The deflection at the center of the cantilever, and iii) Magnitude and position of maximum deflection
2. A fixed beam of span 6 m is subjected to a UDL of 5 kN/m on the left half of the span and a point load of 15 kN at the middle of the right half of the span. Draw the S.F. and B.M. diagrams.
3. A continuous beam ABC consists of two spans AB of length 4 m, and BC of length 3 m. The span AB carries a point load of 100 kN at its mid point. The span BC carries a point load of 120 kN at 1m from C. The end A is fixed and the end C is simply supported. Use Clapeyron's theorem of three moments, Find: i) moments at the supports, ii) reactions at the supports and iii) Draw the B.M diagram
4. By the slope deflection method, plot B.M diagram of a portal frame ABCD as shown in Figure 1. The ends A and D are fixed.



5. Determine the vertical deflection of Joint 'E' for the truss shown in Figure 2. Take  $A=5000 \times 10^6 \text{ m}^2$ ,  $E=200 \times 10^6 \text{ kN/m}^2$  are constant for all members. Use Strain Energy method.

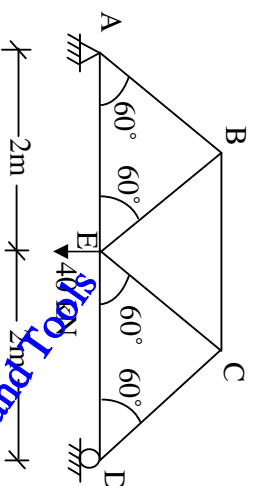


Figure 2

6. Four point loads, 8, 15, 15 and 10 kN have centre to centre spacing of 2 m between consecutive loads and they traverse a girder of 30 m span, from left to right with 10 kN load leading. Calculate the maximum bending moment and shear force at 8 m from the left support.
7. Draw the Influence line diagram for reactions of a simply supported beam of 12 m span. Also draw the influence line diagrams for Shear force and bending moments at quarter span and mid-span sections

8. An indeterminate frame is shown in Figure 3. Take AE is constant for all the members. Find the final forces in all members. Use Energy theorem.

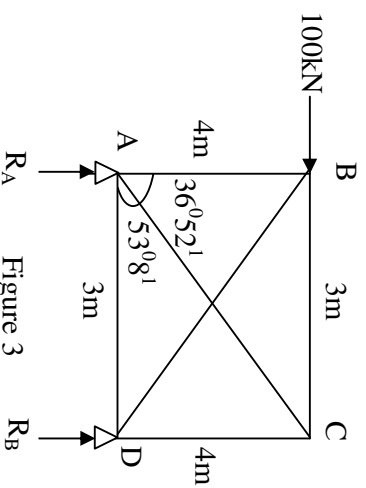


Figure 3