

FACULTY OF ENGINEERING

B.E. 4/4 (Civil) I-Semester (New) (Main) Examination, December 2013

**Subject : Elements of Earthquake Engineering
(Electives - I)**

Time : 3 Hours

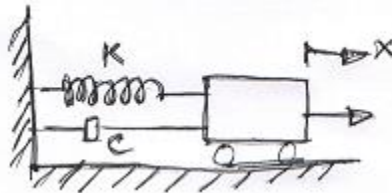
Max. Marks: 75

Note: Answer all questions of Part - A and answer any five questions from Part-B.**PART – A (25 Marks)**

1. Differentiate between 'Magnitude' and 'Intensity' of an earthquake, giving good examples. (3)
2. List out the characteristics of strong earthquakes. (2)
3. What are periods of interest? (3)
4. What is a 'Response Spectrum'? (2)
5. What is the basic criteria behind the earthquake resistant design of structures, as advocated by IS : 1893? (3)
6. Define the terms 'Over strength' and 'Ductility'. (2)
7. Explain the typical patterns of rural houses of seismic zones IV and V of India. (3)
8. List out the details of occurrence of any two severe earthquakes in India, in the last 20 years. (2)
9. Explain the concept of 'Base Isolation'. (3)
10. Under what circumstances 'Seismic Retrofitting' is needed for a building? (2)

PART – B (50 Marks)

11. Explain in detail the theories in vogue that are causative of earthquakes, mentioning appropriate examples in support of them. (10)
12. Determine free vibration response of a single degree of freedom system shown in figure below, at time = 0.20 sec, for the following data:
Natural circular frequency = 10 rad /s
Damping factors = 0.15
Initial velocity = 0.10 m/sec
Initial displacement = 0.05 m (10)



13. Picking up an example of a simple multi-storeyed building, explain in detail the determination of earthquake forces on the building structure. (10)
14. With the help of a neat sketch for a two-bay, two storeyed building frame, explain the provisions of IS: 13920 for the ductile detailing of an RC frame. (10)
15. Discuss the performance of Non-engineered rural buildings during earthquakes, clearly depicting their damage patterns. (10)
16. Explain the various seismic retrofitting strategies adopted for rural as well as urban buildings. (10)
17. Write short notes on the following: (10)
 - (a) Liquefaction
 - (b) Soft storeyed buildings
 - (c) Response Spectrum Analysis

FACULTY OF ENGINEERING**B.E. 4/4 (Civil) I-Semester (Old) Examination, December 2013****Subject : Surface and Groundwater Management
(Elective-I)****Time : 3 Hours****Max. Marks: 75****Note: Answer all questions of Part - A and answer any five questions from Part-B.****PART – A (10x2.5=25 Marks)**

1. What are common pitfalls in water resources planning?
2. Explain the effects of water logging.
3. Differentiate between water table and piezometric surface.
4. Give examples for linear and non linear systems.
5. Mention differential equation for global minimum and global maximum of single variable function.
6. List the Kuhn-Tucker conditions of an optimization problem.
7. What is mean by unbounded solution?
8. When dynamic programming is suitable?
9. List the components of simulation model.
10. What are various steps involved in groundwater basin investigation?

PART – B (50 Marks)

11. Discuss the methodology for optimization model of an irrigation system.
12. Using simplex method obtain the solution for the following:

$$\text{Max } Z = 4x_1 + 3x_2 + 5x_3$$
 Subject to $3x_1 + 2x_2 \leq 7$
 $4x_2 + 3x_3 \leq 9$
 $3x_1 + 2x_2 + 3x_3 \leq 12$
 $x_1, x_2, x_3 > 8$
13. Two crops are grown on a land of 200ha. The cost of raising crop 1 is 3 unit/ha, while crop 2 it is 1 unit/ha. The benefit from crop 1 is 5 unit/ha and from crop 2 is it is 2 unit / ha. A total of 200 units of money is available for raising both crops. How much area for crop 1 and crop 2 should be raised in order to maximize the total net benefits?
14. What are characteristics of dynamic programming technique? Explain its application on reservoir application problem.
15. The analysis of an irrigation water sample gives the following information. Electrical conductivity at 20°C = 2.065dS/m; pH=7.9 and

Constituents	Ca	Mg	Na	HCO ₃	CO ₃	SO ₄	Cl
Mg/l	52.1	38.9	340.4	518.6	18.0	205.7	273.8

Comment on suitability of water for irrigation.

- 16.(a) Discuss the advantages and disadvantages of surface and surface reservoirs.
(b) Explain the concept of conjunctive use and the benefits occurred therein.
17. Write short notes on the following:
 - (a) Sand Tank models
 - (b) Membrane models
 - (c) Artificial recharge of groundwater

FACULTY OF ENGINEERING
B.E. 4/4 (Civil) I-Semester (New)(Main) Examination, December 2013

Subject : Pre-stressed Concrete (Electives - I)

Time : 3 Hours

Max. Marks: 75

Note: Answer all questions of Part - A and answer any five questions from Part-B.

PART – A (25 Marks)

1. Explain the importance of prestressed concrete. (3)
2. How do you estimate loss of stress in steel? Explain? (3)
3. Explain and obtain expression for eccentric tendon. (3)
4. Explain the load balancing concept with suitable example. (3)
5. Give the formula to determine maximum and minimum principal stresses developed in prestressed member. (3)
6. According to IS: 1343-1980, explain the criteria to obtain shear reinforcement. (2)
7. Differentiate between pre-tensioning and post tensioning. (2)
8. What is short time deflections of cracked members? (2)
9. Explain the advantages of end block. (2)
10. How do you obtain ultimate load in continuous beams? (2)

PART – B (50 Marks)

11. Discuss in detail the advantages of pre-tensioning and post tensioning methods with suitable sketches. (10)
12. A post tensioned cable of beam 10 m long is initially tensioned to a stress of 1000 N/mm² at one end. If the tendons are curved so that the slope is 1 in 24 at each end, with an area of 600mm², calculate the loss of prestress due to friction. Given data coefficient of friction between duct and cable is 0.55 friction coefficient for wave effect = 0.0015 per/m. During anchoring, if there is a slip of 3mm at the Jacking end, calculate the final force in the cable and the percentage loss of prestress due to friction and slip, $E_s=210 \text{ KN/mm}^2$. (10)
13. A rectangular concrete beam, 100mm x 250mm deep, spanning over 8m is prestressed by a straight cable carrying an effective prestressing force of 250 kN located at an eccentricity of 40mm. The beam supports a live load of 1.2 kN/m. (10)
 - (a) Calculate the resultant stress distribution for the central cross-section of the beam. Assume density of concrete 25 kN/m³.
 - (b) Find the magnitude of the prestressing force with an eccentricity of 40mm which can balance the stresses due to dead load and live loads at the bottom fibre of the central section of the beam.
14. A post-tensioned bridge girder with unbounded tendons is of box section of overall dimensions 1200mm wide by 1800mm deep with wall thickness of 150mm. The high tensile steel has an area of 4000 mm² and is located at an effective depth of 1600mm. The effective prestress in steel after all losses is 1000 N/mm², and the effective span of the girder is 24m. If $f_{ck} = 40 \text{ N/mm}^2$ and $f_p = 1600 \text{ N/mm}^2$, estimate the ultimate flexural strength of the section. (10)
15. A concrete beam having a rectangular section 100mm wide and 300mm deep is prestressed by a parabolic cable carrying an initial force of 240 kN. The cable has an eccentricity of 50mm at the centre of the span and is concentric at the supports. If the span of the beam is 10m and the live load is 2kN/m, estimate the short time deflection at the centre of the span. Assuming $E=38 \text{ N/mm}^2$ and creep coefficient, $\phi=2.0$, loss of stress = 20% of initial stress after 6 months. Estimate the long time deflection at the centre of span at this stage, assuming that the dead and live loads are simultaneously applied after the release of prestress. (10)
- 16.(a) Write the steps to design end block for Magnel's method and Guyon's method. (3)
 - (b) A prestressed beam having a rectangular cross section with a width of 120mm and a depth of 300mm is continuous over two spans, AB=BC=8mts. The cable with zero eccentricity at the ends and an eccentricity of 50mm towards the top fibers of the beam over the central support, carries an effective force of 500 kN.
 - (i) Calculate the secondary moment developed at B.
 - (ii) If the beam supports concentrated loads of 20 KN each at mid points of span, evaluate the resultant stresses at the central support section-B.
 - (iii) Locate also the position of the pressure line at section (7)
17. Write short notes on the following:
 - (a) Cracked and Uncracked sections (4)
 - (b) Need for design of shear in PSC (3)
 - (c) Concordant cable profiles. (3)

FACULTY OF ENGINEERING**B.E. 4/4 (Civil) I-Semester (Old) Examination, December 2013****Subject : Pre-Stressed Concrete
(Elective-I)****Time : 3 Hours****Max. Marks: 75****Note: Answer all questions of Part - A and answer any five questions from Part-B.****PART – A (25 Marks)**

1. Define 'prestressing' of prestressed concrete members. (2)
2. Explain the term 'Creep loss'. (3)
3. Define 'distribution ratio'. (2)
4. What is meant by 'minimum section modulus'. (3)
5. What is the equation used to calculate the ultimate shear resistance capacity due to flexure? (3)
6. How do you calculate the tensile strength of concrete? (3)
7. Define 'equivalent prism'. (2)
8. Give the equation to calculate the deflection of sloping tendon. (3)
9. What is the necessity of end block distribution? (2)
10. State the difference between 'prestressing' and 'partial prestressing'. (2)

PART – B (50 Marks)

11. Explain the difference between pretensioning and post tensioning system? Also explain the post tensioning system using freyssinet cables?
12. A pre stressed concrete beam supports a level load of 5 kN/m over a simply supported span of 10m. The beam has an I section with an overall depth of 500mm. the width of the flanges is 200mm. The thickness of flange and web as 60 and 80mm. The beam is to be prestressed by an effective prestressing force of 250 kN at a suitable eccentricity such that the stress at the soffit of the beam at the centre of the span is zero. Find the eccentricity required for the force. Also draw the stress distribution diagram.
13. A prestressed concrete beam has a cross section of 300 x 600mm and it is post tensioned with 8 number of 25mm diameter strands in 4 cable derets 2 strands from each cable. 60mm duct is provided for each cable of 2 strands. Two cable ducts are located at a level of 100mm from soffit and two more cable ducts at 200mm from soffit. Each cable with 2 strands is prestressed at one stretch with a force of 2x160 kN. The bottom cables 1 & 2 are stressed first and then the second level cables 3 & 4 are stressed. The cable have straight profile. Evaluate the loss in force of prestress due to elastic shortening. Assume $m = 6$.
14. A prestressed concrete beam of rectangular section 90mm wide 200mm deep is to be designed to support two imposed loads of 4.2kN each located at one third points over a span of 6m. If the stress in concrete is not to exceed 15 N/mm^2 in compression and 1.5N/mm^2 in tension at any stage. Calculate the minimum prestressing force necessary and the corresponding eccentricity. Also check for the adequacy of the section provided. Assume 20% loss of prestress.

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15. A prestressed concrete T-beam has the following cross section details.
Top flange width and thickness = 500 mm x 250mm
Thickness of web = 100mm
Overall depth = 1000mm
The beam has an effective span of 20m. The tendons with a cross section of 2000 mm² are parabolic with an eccentricity of 250mm at the centre of the span. The effective prestress in the tendons is 1000N/mm² after all losses. If the tensile strength of concrete is 1.2 N/mm², Estimate the web shear resistance of the section?
16. A pretressed concrete beam has a rectangle cross section 38 x 25mm is prestressed by a cable carrying an effective prestressing of 1000n/mm². The span of the beam is 8m. The cable composed of 6 wires of 8mm diameter has a trapezoidal profile with an eccentricity of 20mm within the middle third of the span and varies linearly from the third span points to zero at the supports. Calculate the central deflection immediately after transfer, for the following cases.
(a) Self weight + prestress
(b) Self wt + prestress + live load of 1.5kN/m
17. Write short notes on the following:
(a) End block analysis using Genyom method
(b) Design of continuous beams according to IS specification

FACULTY OF ENGINEERING
B.E. 4/4 (Civil) I-Semester (New)(Main) Examination, December 2013

Subject : Operation Research (Electives - I)

Time : 3 Hours

Max. Marks: 75

Note: Answer all questions of Part - A and answer any five questions from Part-B.

PART – A (25 Marks)

1. Give the standard form of Linear programming problem. (2)
2. Mention the scope of Operation Research. (3)
3. What is duality principle? (2)
4. Construct dual for the following LP Model (3)
 $\text{Max } Z = -5X + 2Y$
 Subject to $X - Y \geq 2$
 $2X + 3Y \leq 5$ and $X, Y \geq 0$
5. What is Maximin - Minimax principle? (2)
6. Mention the limitations of Game theory. (3)
7. Mention the application areas of Assignment problem. (2)
8. What is degeneracy in transportation problem? (2)
9. What is the importance of replacement analysis? (3)
10. Briefly describe various types of queues. (3)

PART – B (50 Marks)

11. Using Simplex method, solve the following LP problem (10)
 $\text{Max } Z = 5X_1 + 4X_2$
 Subject to $4X_1 + X_2 \geq 0$
 $2X_1 + 3X_2 \geq 90$
 and $X_1, X_2 \geq 0$
12. Use dual simplex method to solve the following LP problem
 Minimize $x Z = 3X + Y$
 Subject to $2X + 2Y \geq 2$
 $4X + 6Y \geq 4$ and $X, Y \geq 0$

13. Solve the travelling salesmen problem with the following distance Matrix. (10)

From To	1	2	3	4	5
1	∞	14	10	24	41
2	6	∞	10	12	10
3	7	13	∞	8	15
4	11	14	30	∞	17
5	6	8	12	16	∞

- 14.(a) Briefly discuss the replacement procedure for the items that deteriorate with change in money value. (5)
- (b) Solve the following game of two players A and B. (5)

Player B

	1	2	3	4
1	6	2	4	8
2	2	-1	1	12
3	2	3	3	9
4	5	2	6	10

Player A

15. Vehicles pass through a toll gate at a rate of 90 / hr. The average time to pass through the gate is 36 sec. The arrival and service follow Poisson distribution. The authorities are willing to install one more gate to reduce the average time to pass through the toll gate to 30 sec, if the idle time of toll gate is less than 10% and average queue length is more than 5 vehicles. Determine whether the installation of second gate is justified. (10)
16. Determine the optimum sequence that minimizes total elapsed time for the following sequencing model. (10)

Job		1	2	3	4	5	6
Processing Time (hrs)	M/C-A	3	8	7	5	4	2
	M/C-B	3	4	2	1	3	5
	M/C-C	5	8	10	7	9	6

17. Write short note on the following:
 - (a) Advantages and limitations of LP Models
 - (b) Principle of dominance in games
 - (c) Group replacement policy

FACULTY OF ENGINEERING**B.E. 4/4 (Civil) I – Semester (Old) Examination, December 2013****Subject: Operation Research in Civil Engineering (Elective – I)****Time: 3 Hours****Max.Marks: 75****Note: Answer all questions from Part A. Answer any five questions from Part B.****PART – A (25 Marks)**

1. Mention different phases in Operation Research. (2)
2. Mention the Engineering applications of optimization. (3)
3. What is the standard form of linear programming problem? (3)
4. What are restricted variables? (2)
5. What is Separable programming? (2)
6. What is Quadratic programming? (2)
7. Mention the advantages of LP models. (3)
8. What are the advantages of duality? (3)
9. What is dynamic programming? (2)
10. Mention the advantages of Simulation. (3)

PART – B (50 Marks)

- 11.(a) Give brief narration on the historical development of operation research. (5)
(b) Briefly describe various optimization techniques. (5)
12. Solve the following LP problem using simplex algorithm. (10)
Minimize
 $Z = 4X_1 + 3X_2$
Subject to
 $200 X_1 + 100 X_2 \geq 4000$
 $X_1 + 2X_2 \geq 50$
and $X_1, X_2 \geq 0$
13. Use dual simplex method to solve the following LP model. (10)
Minimize
 $Z = 3X + Y$
Subject to
 $2X + 2Y \geq 2$
 $4X + 6Y \geq 4$
and $X, Y \geq 0$
- 14.(a) Write a short note on Non-linear programming. (5)
(b) Enumerate the advantages of Quadratic programming. (5)
- 15.(a) Mention the application areas of dynamic programming. (5)
(b) Discuss about multistage decision process. (5)
- 16.(a) Mention the limitations and applications of simulation techniques. (5)
(b) Discuss about statistical aspects of simulation. (5)
17. Write short notes on: (10)
i) Simplex method – Application to Civil Engineering.
ii) Degeneracy
iii) Monte Carlo method

FACULTY OF ENGINEERING**B.E. 4/4 (Civil) I-Semester (New)(Main) Examination, December 2013****Subject : Geographical Information Systems
(Electives - I)****Time : 3 Hours****Max. Marks: 75****Note: Answer all questions of Part - A and answer any five questions from Part-B.****PART – A (25 Marks)**

1. List out different components of a Map. (3)
2. Write any two standard packages of GIS. (2)
3. Bring out the major difference between hierarchical and network models. (3)
4. State the significance of manual digitizing in GIS. (2)
5. Explain registration by relative position in GIS. (3)
6. Explain conflation. (2)
7. Discuss about sampling techniques in GIS. (3)
8. What are different components of data quality? (2)
9. What is the difference between active sensors and passive sensors? (3)
10. Define Remote sensing. (2)

PART – B (50 Marks)

11. Explain various types of projections used in GIS. (10)
12. Discuss about different compression techniques used in GIS operations. (10)
- 13.(a) Explain the role of DBMS in GIS. (7)
(b) What are the requirements of a good digitizer? (3)
- 14.(a) Explain the concepts of point in polygon and line in polygons with suitable examples. (5)
(b) Explain the use of edge matching in GIS. (5)
- 15.(a) Discuss about different output functions used in GIS. (5)
(b) What are the different sources of errors in GIS? Explain briefly. (5)
- 16.(a) Explain the behaviour of electromagnetic radiation on water bodies. (5)
(b) Discuss about the role of spectral reflecting curves. (5)
17. Write short notes on any two of the following: (10)
(a) Format transformation
(b) Retrieval classification and measurement functions
(c) GIS applications in environmental engineering

FACULTY OF ENGINEERING

B.E. 4/4 (Common to All) I-Semester (New) (Main) Examination, December 2013

**Subject : Entrepreneurship
(Electives - I)**

Time : 3 Hours

Max. Marks: 75

Note: Answer all questions of Part - A and answer any five questions from Part-B.

PART – A (25 Marks)

1. What is meant by intrapreneur? How is an intrapreneur different from an entrepreneur?
2. Give different concepts of entrepreneurs.
3. State the significance of collaborative interaction for technology development.
4. What do you understand by marketing mix?
5. Define a project report.
6. Distinguish between PERT and CPM.
7. What is working capital?
8. What is selective control of inventory ? Why is it needed?
9. How is a project formulated?
10. What is microenterprise?

PART – B (50 Marks)

11. Explain linkages between small, medium and large industries.
- 12.(a) Explain about first generation entrepreneur.
(b) Explain about women entrepreneur.
- 13.(a) Write an essay on the growth of entrepreneurship in India.
(b) How are Competence, Opportunities and Challenges related to each other?
14. What do you understand by project identification? Discuss with examples, the process involved in project identification.
- 15.(a) How is a project formulated? Give an overview.
(b) What do you understand by project appraisal ? Why it is done?
- 16.(a) What are various factors motivating people to become entrepreneurs?
(b) Discuss the advantages and limitations of PERT and CPM with suitable examples.
17. Write short notes on the following:
 - (a) Technical Feasibility
 - (b) Market Assessment
 - (c) Working Capital

FACULTY OF ENGINEERING

B.E. 4/4 I – Semester (Old) Examination, December 2013

Subject: Entrepreneurship (Elective – I)

Time: 3 Hours

Max.Marks: 75

Note: Answer all questions from Part A. Answer any five questions from Part B.

PART – A (25 Marks)

1. Enumerate at least three advantages of SSI units over large units.
2. List the advantages and disadvantages of Private Limited Company over 'Sole Trader'.
3. Explain the factors to be considered while deciding on the choice of technology.
4. What is break-even analysis? Explain its use in financial analysis of a project.
5. What are the sources of short-term funds?
6. How do you carry out business opportunity survey?
7. When do you use PERT? Give two examples.
8. Explain any two qualities of Leadership.
9. Describe the need for achievement, need for affiliation and need for power.
10. What is working capital? How do you estimate it?

PART – B (50 Marks)

- 11.(a) Define leadership. Justify the statement "The essence of leadership is followership".
(b) What are the theories of leadership? Explain.
12. What Time Management Techniques are available that ensure a project being completed on time.
- 13.(a) Bring out the relationship between economic growth and entrepreneurship.
(b) What is CPM? Explain its use in planning a project execution for a SSI.
- 14.(a) What are the risks faced and rewards gained by entrepreneurs while setting up a SSI?
(b) What is business opportunity survey? Explain how do you carryout the same.
- 15.(a) What are the problems and risks faced by women entrepreneurs?
(b) What is margin money? What are the sources of finance for starting a SSI?
16. What are the issues considered in Technical and Financial analysis of a project? Explain how you will carryout the same.
17. For any project known to you, show a detailed project report.
