

Code: 7G641

II B.Tech. II Semester Supplementary Examinations February 2022

**Advanced Strength of Materials**

( Civil Engineering )

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks )

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Marks

**UNIT-I**

1. A closed-end copper tube of 72 mm internal diameter, 800 mm long and 2 mm thick is filled with water under pressure. Find the change in pressure if additional volume of 4000 mm<sup>3</sup> of water is pumped into the tube. Neglect any distortion of the end plates. Take  $E = 102 \text{ MPa}$ ,  $K = 2200 \text{ MPa}$  and Poisson's ratio 0.3. 14M

**OR**

2. a) Derive the expression for change in diameter and volume of a thin spherical shell due to internal pressure. 7M
- b) A cylindrical vessel 2 m long and 500 mm in diameter with 10 mm thick plate is subjected to an internal pressure of 3 MPa. Calculate the change in volume of the vessel. Take  $E = 200 \text{ GPa}$  and Poisson's ratio = 0.3. 7M

**UNIT-II**

3. a) Derive the expression for maximum torque transmitted by a solid circular shaft. 7M
- b) Derive the basic torsion equation  $T/J = f_s/R = c/L$  7M

**OR**

4. a) A solid shaft transmits 100 kW of power at 160 rpm. Find the diameter of the shaft if the permissible shear stress is 70 MPa. The maximum torque transmitted in each revolution exceeds mean by 20 %. 7M
- b) At a certain cross section of a shaft 100 mm in diameter, there is a bending moment of 5 kN/m and a twisting moment of 7.5 kN/m. Calculate the maximum direct stress induced in the section, and specify the position of the plane on which it acts 7M

**UNIT-III**

5. Derive Euler's critical load formula for long column with one end fixed and other end free 14M

**OR**

6. A hollow cast iron column 250 mm outside diameter and 200 mm inside diameter, 8 m long has both end fixed. It is subjected to an axial compressive load. Taking factor of safety as 6,  $c = 570 \text{ N/mm}^2$ ,  $a = 1/1600$ . Determine the safe Rankine load. 14M

**UNIT-IV**

7. A short column of rectangular cross-section 85 mm by 65 mm carries a load of 50 kN at a point 25 mm from the longer side and 40 mm from the shorter side. Determine the maximum compressive and tensile stress in the section. 14M

**OR**

8. A chimney is 45 m high. Its external diameter tapers from 4 m at the base to 2 m at the top. The internal diameter at the base is 2.5 m. The horizontal wind pressure is 2 kPa. Self-weight of the chimney is 2.5 MN. Determine the maximum and minimum stresses. 14M

**UNIT-V**

9. a) Derive the expression of shear centre for channel section. 7M
- b) How do you determine the deflection of a beam under unsymmetrical bending? Derive the expression for the same. 7M

**OR**

10. A cantilever beam of I-section with flange size 15cmx2cm, web size 15cmx2cm and length 2 m carries a load of 6 kN inclined at 30° to the Y- axis and passes through the centroid of the section. Calculate the maximum tensile stress, minimum compressive stress, position of neutral axis and deflection due to load 14M

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Code: 7G642

II B.Tech. II Semester Supplementary Examinations February 2022

**Building Planning & Drawing**

( Civil Engineering )

Max. Marks: 70

Time: 3 Hours

**PART-A**

Answer the following units by choosing one question from each unit ( 3 x 14 = 42 Marks )

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**UNIT-I**

1. a) Write briefly about Open Space Requirements of buildings. 7M  
 b) List the areas which have to be included and which have to be excluded while calculating plinth area 7M

**OR**

2. a) Describe the requirements of different rooms and their grouping in residential buildings 7M  
 b) What are the minimum standards for various parts of building as per national building code (NBC) and explain? 7M

**UNIT-II**

3. Write the importance and necessity in planning of educational institutes. 14M

**OR**

4. Describe the important departments and facilities to be provided in the layout of a industry 14M

**UNIT-III**

5. What are the stages of a construction project and construction management team explain by using flow charts? 14M

**OR**

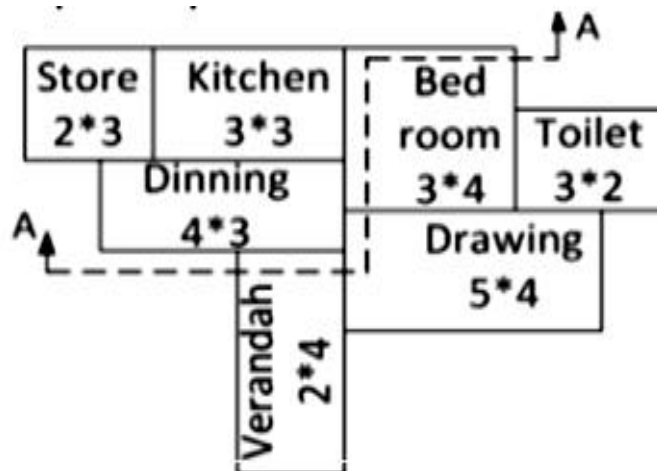
6. a) What are the features of network planning? Why do we use network planning? Explain in detail 7M  
 b) Differentiate between PERT and CPM network methods 7M

**PART-B**Answer any **One** Question from the following units ( 1 x 28 = 28 Marks )**UNIT-IV**

7. a) Draw plan and sectional elevation of a paneled door of size 1.2X2.1m. Indicate all features. 18M  
 b) Draw a detailed elevation of a king post truss of 5m clear span. Indicate all features. 10M

**OR****UNIT-V**

8. Figure in below shows the line drawing of a residential building, draw to a scale of the following (a) Plan (b) Sectional elevation along AA first Cement concrete base 300mm thick and 900mm wide is provided under main walls. Footings are brick wall in CM 1:6, 600mm wide and 300mm deep depth to which main walls are taken below the ground level is 1000mm. Superstructure: Main walls 300mm thick and other walls 200mm thick. Head room 3000mm, Assume suitable footings below verandah. Roofing: 1:2:4; RCC slab 120mm thick Any other data not furnished may be suitably assumed. 28M



Note: All dimensions are in mm

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R-17

Code: 7GC41

II B.Tech. II Semester Supplementary Examinations February 2021

## Environmental Science

( Common to CE & ME )

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 14 = 70 Marks )

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### UNIT-I

- a) Define Environment. With the help of diagram relate the interactions between different components of environment. 7M
- b) Enumerate multidisciplinary nature of environmental studies. 7M

OR

- a) Explain different methods to create environmental awareness in public. 7M
- b) Describe the importance of environmental studies. 7M

### UNIT-II

- a) Explain the common causes of deforestation around the world. 7M
- b) Discuss the impact of drought and floods. Explain control measures with suitable case study. 7M

OR

- a) What are solar cells? Draw a diagram and enumerate its applications. 7M
- b) Discuss the various types of land degradation with its causes and solutions. 7M

### UNIT-III

- a) With the help of neat diagram explain energy flow and material flow in the environment. 7M
- b) Draw neat diagram of Nitrogen cycle and explain the flow of different forms of nitrogen in environment. 7M

OR

- a) Identify major threats to biodiversity and explain In- Situ conservation techniques 7M
- b) Compare different biodiversity hot spots. 7M

### UNIT-IV

- a) List the major air pollutants and explain their effects on human beings. 7M
- b) Write short notes on –  
i. Eutrophication.    ii. Itai – itai.    iii. Blue baby syndrome. 7M

OR

- a) Give an account of noise generated during Diwali – the festival of lights. What would you suggest to reduce this menace? 7M
- b) Describe the human activities contributing to large scale thermal pollution. 7M

### UNIT-V

- a) With neat sketch explain different rain water harvesting techniques. 7M
- b) Enumerate causes, effects and control measures of acid rain. 7M

OR

- a) Write a note on Forest conservation act. 7M
- b) Discuss the effect of population explosion on environment. 7M

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**R-17**

**Code: 7G643**

II B.Tech. II Semester Supplementary Examinations February 2022

**Hydraulics and Hydraulic Machinery**

( Civil Engineering )

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks )

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Marks

**UNIT-I**

1. Prove that, Displacement thickness

$$\delta^* = \int_0^{\delta} \left(1 - \frac{u}{U}\right) dy \text{ and momentum thickness } = \theta = \int_0^{\delta} \frac{u}{U} \left(1 - \frac{u}{U}\right) dy$$

14M

**OR**

2. What do you mean by separation of boundary layer? What is the effect of pressure gradient on boundary layer separation?

14M

**UNIT-II**

3. Determine the most efficient section of a trapezoidal channel with side slopes 1V to 2H, carrying a discharge of 11.25 m<sup>3</sup>/s with a velocity of 0.75m/s. What should be the bed slope of the channel?. Take manning's n=0.025

14M

**OR**

4. A channel is 2m wide at bottom the length of each sloping side is 1.95m, the width of water surface is 5.5m the flow depth is 1.2m and bed slope is 1 in 5280. What is the discharge per minute?. The value of chezy's c for this channel for different values of hydraulic radius R as tabulated below

14M

**UNIT-III**

5. A jet of water of diameter 75mm moving with a velocity of 30 m/s, strikes a curved fixed plate tangentially at one end at an angle of 30° to the horizontal. The jet leaves the plate at an angle of 20° to the horizontal. Find the force exerted by the jet on the plate in the horizontal and vertical direction.

14M

**OR**

6. Force exerted by the jet on the curved plate when the plate is moving in the direction of jet  $F_x = a(V-u)^2(1+\cos \theta)$  and also work done by the jet on the plate per second

14M

**UNIT-IV**

7. a) Describe briefly the function of various main components of pelton turbine with neat sketch. 7M  
b) What is cavitation? How can it be avoided in reaction turbine? 7M

**OR**

8. A pelton wheel is to be designed for a head of 60m when running at 200r.p.m. The pelton wheel develops 95.6475 KW shaft power. The velocity of the buckets=0.45 times the velocity of the jet, overall efficiency=0.85 and the co-efficient of the velocity is equal to 0.98

14M

**UNIT-V**

9. Explain briefly the following efficiencies of a centrifugal pump

- i) Manometric Efficiency      ii) Volumetric Efficiency  
iii) Mechanical Efficiency      iv) Overall Efficiency

14M

**OR**

10. Derive an expression for the work done by the centrifugal pump (or by impeller) on water

14M

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Code: 7GC42

II B.Tech. II Semester Supplementary Examinations February 2022

**Probability and Statistics**

( Common to CE, ME &amp; CSE )

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks )

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**UNIT-I**

1. a) If  $P(A) = \frac{1}{4}$ ,  $P(B) = \frac{1}{3}$  and  $P(A \cup B) = \frac{1}{2}$  then evaluate  $P(A/B)$ ,  $P(B/A)$ ,  $P(A \cap B')$  and  $P(A/B')$  8M

- b) State and prove Addition theorem on probability for three events. 6M

**OR**

2. a) State and prove Baye's theorem. 8M
- b) A card is drawn from a well shuffled deck of 52 playing cards. What is the probability of drawing a red king (ii) 3, 4, 5 or 6 (iii) black card. 6M

**UNIT-II**

3. a) Find the continuous probability function  $f(x) = k x^2 e^{-x}$  when  $x > 0$  find (i) k (ii) mean (iii) variance 7M

- b) A hospital switch board receives an average of 4 emergency calls in a 10 minute interval. What is the probability that
- (i) There are at most 2 emergency calls in a 10 minute interval 7M
- (ii) There are exactly 3 emergency calls in a 10 minute interval

**OR**

4. a) If a random variable has a poisson distribution such that  $P(1) = P(2)$  find (i) Mean of the distribution, (ii)  $P(4)$ , (iii)  $P(x = 1)$ , (iv)  $P(1 < x < 4)$  7M
- b) In a normal distribution, 7% are under 35 and 89% are under 63. Find the mean and the standard deviation of the distribution. 7M

**UNIT-III**

5. A random sample of size 81 taken whose variance is 20.25 and mean is 32, construct 98% confidence interval 14M

**OR**

6. A population consists of the five numbers 2, 3, 6, 8, 11. Consider all possible samples of size 2 which can be drawn with replacement from this population. Find the population mean and standard deviation, and mean and standard deviation of the sampling distribution of means. 14M

**UNIT-IV**

7. An ambulance services claims that it takes on the average less than 10min to reach its destination in emergency calls. A sample of 36 calls has a mean of 11 min and the variance of 16 min. test the significance 0.05 level. 14M

**OR**

8. A die is thrown 9000 times and of these 3220 yielded a die is thrown 9000 times and of these 3220 yielded a or 4. i.e., this is consistence with the hypothesis is that die was unbiased. 14M

**UNIT-V**

9. The number of automobile accidents per week in a certain community are as follows 12, 8, 20, 2, 14, 10, 15, 6, 9, and 4. Are these frequencies in agreement with the belief that accident conditions were the same during this 10 week period 14M

**OR**

10. 200 digits were choose at random from a set of tables. The frequencies of the digits are shown below

Digit	0	1	2	3	4	5	6	7	8	9
Frequency	18	19	23	21	16	25	22	20	21	15

Use the chi-square test to assess the correctness of the hypothesis that the digits were distributed in equal number in the tables from which these were chosen. 14M

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**R-17**

**Code: 7G644**

II B.Tech. II Semester Supplementary Examinations February 2022

**Structural Analysis-I**  
( Civil Engineering )

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks )

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Marks    CO    Blooms Level

**UNIT-I**

1. Derive the Equation for a Fixed beam carrying a Point load at the centre of the beam with neat sketch. 14M

**OR**

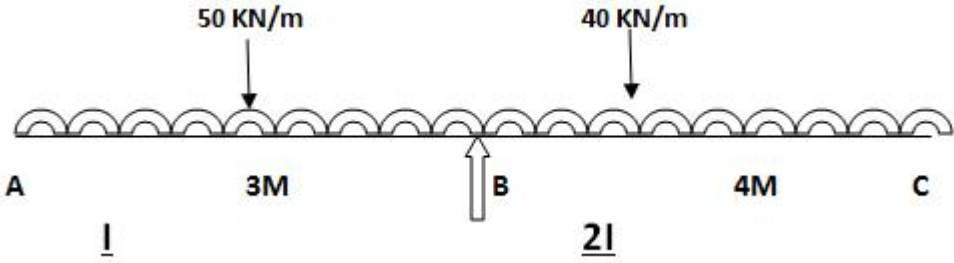
2. a) List out the different types of beams with neat sketches 7M  
 b) A fixed beam of length 5m carries a UDL of 9KN/m runs over entire span. If  $I = 4.5 \times 10^{-4} \text{ m}^4$  and  $E = 1 \times 10^7 \text{ KN/m}^2$ . Find the fixing moments at the ends and the deflection at the centre. 7M

**UNIT-II**

3. A continuous beam ABCD of length 15m rests on four supports covering 3 equal spans and carries a UDL of 1.5KN/m length. Calculate the moments and reactions at the supports. 14M

**OR**

4. A Continuous beam ABC consists of span AB & BC of lengths 3m and 4m respectively, the ends , the ends A & C being simply supported. If the spans AB & BC carrying UDL of 50KN/m & 40KN/m respectively. Determine the support moments at A, B, C . Draw S.F & B.M. The Moment of Inertia for AB & BC are I & 2I respectively.



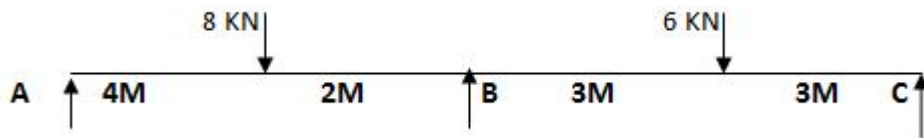
14M

**UNIT-III**

5. Explain step by step procedure of Slope Deflection method with suitable example. 14M

**OR**

6. A Beam ABC 12m long Simply supported at the ends A and C and loaded as shown in figure, using slope deflection method, compute the end moments and plot B.M diagram.



14M

**UNIT-IV**

7. a) Two wheel loads 80kN and 200kN spaced apart and they move on a girder of span 16m. Find the maximum positive and negative shear force at a section 4m from the left end. Any wheel load can lead the other. 7M
- b) Two wheel loads of 60kN and 200kN spaced 4m apart move on the span of a girder AB from the left to right. Let any of the two wheel loads could lead the other. Find the vertical reaction at B. 7M

**OR**

8. Derive the Influence line diagram for reactions and bending moment at any section of a simply supported beam, using the influence line diagram determine the support reactions and find bending moment at 2.5m, 4.5m and 6.5m for simply supported beam of span 9m subjected to three point loads of 15kN, 25kN and 5kN placed at 1m, 4.5m and 6.5m respectively. 14M

**UNIT-V**

9. Derive the strain energy stored in the beam due to Axial load with neat sketch. 14M
- OR**
10. A Simply supported beam carries a point load P eccentrically on the span. Find the deflection under the load. Assume uniform flexural rigidity. 14M

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<b>R-17</b>
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**Code: 7G634**

II B.Tech. I Semester Supplementary Examinations February 2022

**Surveying**  
( Civil Engineering )

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks )

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	Marks	CO	Blooms Level
<b>UNIT-I</b>			
1. Describe the different types of chains used in survey indicate the relative advantages of each.	14M		
<b>OR</b>			
2. a) What is closing error' in a traverse?	7M		
b) Describe, with a sketch, how such an error is adjusted.	7M		
<b>UNIT-II</b>			
3. The following perpendicular offsets were taken from a chain line to an irregular boundary line: Chainage (m) - 0.00 – 6.50 – 16.20 – 27.20 – 39.60 Offset (m) –3.50 – 4.75 – 5.20 – 6.30 – 7.36. Calculate the area between the chain line and the boundary.	14M		
<b>OR</b>			
4. What does the term sensitiveness mean in the context of a bubble? How the sensitiveness of a bubble is is determined?	14M		
<b>UNIT-III</b>			
5. a) Describe the process of measuring the horizontal angle.	7M		
b) Describe how you would measure vertical angles.	7M		
<b>OR</b>			
6. a) Describe the process of permanent adjustment of a transit theodolite.	7M		
b) How can the height of a tower be determined when it is inaccessible?	7M		
<b>UNIT-IV</b>			
7. a) Discuss the methods of tacheometry.	7M		
b) Explain the theory of stadia tacheometry.	7M		
<b>OR</b>			
8. a) Describe the procedure of setting up the plane table over a station.	7M		
b) What is orientation? What are the methods of orientation? Describe the methods with a sketch.	7M		
<b>UNIT-V</b>			
9. What are the different types of curves? Draw neat sketches of each.	14M		
<b>OR</b>			
10. a. Explain why superelevation is required in roads and railways.			
b. What is a transition curve?			
c. Why and where are transition curves provided?	14M		

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