

Code: 7G641

II B.Tech. II Semester Supplementary Examinations August 2021

**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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**UNIT-I**

1. a) A boiler shell is to be made of 20 mm thick plate having a limiting tensile stress of  $135 \text{ N/mm}^2$ . If the efficiency of the longitudinal joints and circumferential joints are 80 % and 40 % respectively, determine the maximum permissible diameter of the shell for an internal pressure of  $3 \text{ N/mm}^2$  7M
- b) A thin cylindrical shell of 90 cm diameter, 1 cm thick and 4 m long is subjected to an internal pressure of  $3 \text{ N/mm}^2$ . Determine the change in length, diameter and volume of the shell.  $E=2 \times 10^5 \text{ N/mm}^2$ , Poisson's ratio,  $\mu = 0.3$ . 7M

**OR**

2. A compound cylinder is formed by shrinking one cylinder on to another. The final dimensions are: Internal diameter = 15 cm, External diameter = 30 cm, and diameter at junction = 25 cm. The shrinkage pressure is 10 MPa. Calculate the shrinkage allowance. What is the minimum temperature to which the outer cylinder must be heated so that it can be slipped on? Take for material of outer cylinder =  $0.6 \times 10^{-5} / ^\circ\text{C}$ . 14M

**UNIT-II**

3. a) What are the assumptions made in the theory of pure torsion 7M
- b) Hollow shaft transmits 200 kW of power at 150 rpm. The total angle of twist in a length of 5m of the shaft is  $3^\circ$ . Find the inner and outer diameters of the shaft if the permissible shear stress is 60 MPa. Take  $G = 80 \text{ GPa}$ . 7M

**OR**

4. A leaf spring carries a central load of 2.5 kN. The leaf spring is to be made of 10 steel plates 6cm wide and 5 mm thick. If the bending stress is limited to  $100 \text{ N/mm}^2$ , determine length of the spring and deflection at the centre of the spring. Take  $E=2 \times 10^5 \text{ N/mm}^2$ . 14M

**UNIT-III**

5. A 2 m long column has a circular cross-section of 7 cm diameter. One of the ends of the column is fixed in direction and position and other end is free. Taking factor of safety as 4, calculate the safe load using Rankine's formula. Take  $c = 550 \text{ N/mm}^2$  and  $a = 1/1600$  for pinned ends 14M

**OR**

6. A simply supported beam of length 4.5 m is subjected to a uniformly distributed load of  $35 \text{ kN/m}$  over the hollow span and deflects 18 mm at the centre. Determine the crippling loads when this beam is used as a column with one end fixed and other end hinged. 14M

**UNIT-IV**

7. a) Find an expression for the maximum and minimum stresses when a rectangular column is subjected to a load, which is eccentric to Y-Y axis. 7M
- b) What is Core of a section? Derive the expression for a rectangular hollow section. 7M

**OR**

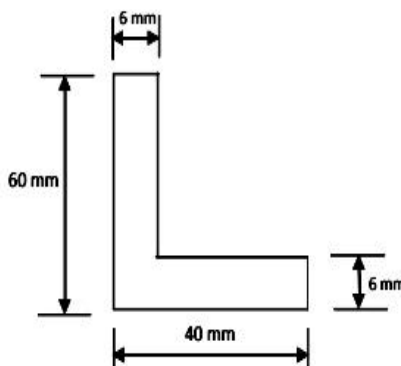
8. A hollow circular cast iron column of 25cm external diameter and 2cm thickness carries a load of 100 KN in the vertical plane at an eccentricity of 8cm. Determine the maximum and minimum stresses developed in the material. 14M

**UNIT-V**

9. Derive the expression of bending stress and inclination of neutral axis for a beam subjected to unsymmetrical bending 14M

**OR**

10. Determine the principal moment of inertia for unequal angle section  $60 \times 40 \times 6 \text{ mm}$  shown in figure below.



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14M

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<b>R-17</b>
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**Code: 7G642**

II B.Tech. II Semester Supplementary Examinations August 2021

**Building Planning & Drawing**

(Civil Engineering )

Max. Marks: 70

Time: 3 Hours

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**PART-A**

**Answer all Three units by choosing one question from each unit ( 3 x 14 = 42 Marks )**

- |  | Marks | CO  | Blooms Level |
|--|-------|-----|--------------|
| <b>UNIT-I</b>  |       |     |              |
| 1. a) Explain in detail the factors to be considered for selection of a site for a residential building? | 7M    | CO1 | L4           |
| b) On what considerations, the grouping of various units in residential buildings is made?               | 7M    | CO1 | L1           |
| <b>OR</b>  |       |     |              |
| 2. Classify the buildings based on occupancy and type of construction.                                   | 14M   | CO1 | L2           |

- |  |    |     |       |
|--|----|-----|-------|
| <b>UNIT-II</b>   |    |     |       |
| 3. a) List out different purposes of rooms in a residential building?  | 7M | CO2 | L1,L4 |
| b) Give the standard dimensions for the following rooms of a residential building<br>(i) Veranda (ii) Bed room (iii) Sick room | 7M | CO2 | L1,L2 |
| <b>OR</b>  |    |     |       |
| 4. a) Write the importance and necessity in planning of industrial buildings?  | 7M | CO2 | L1,L2 |
| b) Explain the principle of planning a hospital.   | 7M | CO2 | L2    |

- |  |     |     |    |
|--|-----|-----|----|
| <b>UNIT-III</b>  |     |     |    |
| 5. Distinguish between PERT and CPM in detail.   | 14M | CO3 | L4 |
| <b>OR</b>  |     |     |    |
| 6. A project consists of 9 activities, the details are given below.  |     |     |    |
| (i) Draw network diagram.  |     |     |    |
| (ii) Find out the critical path and project duration.  |     |     |    |
| (iii) Compute earliest occurrence time and finish time, latest occurrence and finish time. Also calculate total float, free float and independent float. |     |     |    |

Activity	A	B	C	D	E	F	G	H	I
Predecessor	-	A	A	B,C	A	D,E	C	F,G	H
Duration(in days)	5	9	7	4	8	14	12	6	8

14M CO3 L3 ,L4

**PART-B**

Answer any one question from the following units ( 1 x 28 = 28 Marks )

**UNIT-IV**

7. a) Draw plans of Flemish bond with all the details. 14M CO4 L3  
 b) Draw elevation and sectional plan of 0.partly panelled and partly glazed door of size 1200X2000 mm. size. 14M CO4 L3

OR

**UNIT-V**

8. The line sketch of the plan of a residential building is shown in figure below. Draw:

- (a) A neat dimensioned plan.  
 (b) Sectional elevation along AB, to a suitable scale, using the following specification.

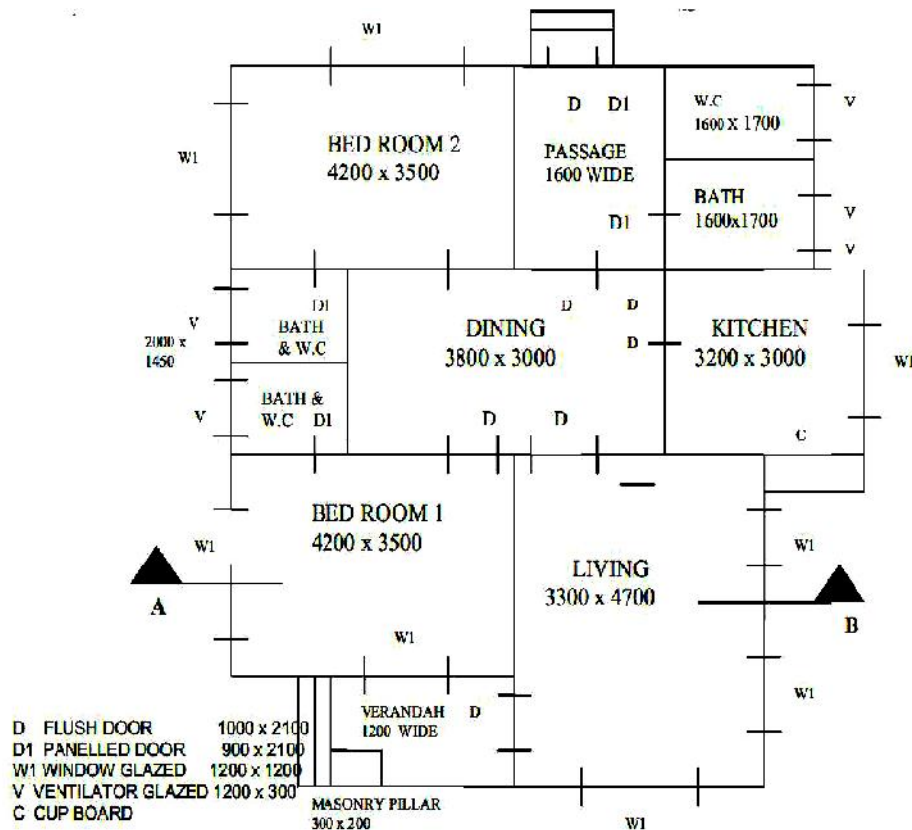
Specifications: Foundations: C.C 1:4:8 800 mm wide and 300 mm thick.

Footings: Rubble stone masonry: 600 mm x 500 mm.

Basement: Coursed rubble masonry: 400 mm wide and 700 mm high.

Superstructure: Brickwork in C.M 1.5:300 mm wide and 300 mm high.

R.O.C roofing: 100mm thick.



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28M CO5 L3

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**R-17**

**Code: 7GC41**

II B.Tech. II Semester Supplementary Examinations August 2021

**Environmental Science**

( Common to CE and ME )

Max. Marks: 70

Time: 3 Hours

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

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**UNIT-I**

1. a) Enumerate four conceptual spheres in the earth's environment.
- b) Explain briefly the importance of Environmental studies and need for public awareness?

**OR**

2. a) Define and explain scope of environmental studies?
- b) Explain role of an individual in promoting environmentalism?

**UNIT-II**

3. a) Explain the importance of forests in maintaining ecological balance and in providing economical and commercial services?
- b) Explain the food problems of India and World

**OR**

4. a) Write a note on possible conflicts over water, giving examples of Indian and Global context.
- b) Explain role of an individual in conservation of natural resources

**UNIT-III**

5. a) What are the three different types of ecological Pyramids? Explain
- b) Define and explain "River" ecosystem?

**OR**

6. a) Explain the concept of "food chain" and "food web"?
- b) Comment on Indian biodiversity with special reference as a mega diversity nation?

**UNIT-IV**

7. a) Explain the major water pollutants and their effect on the Environment?
- b) Briefly describe sources, effects and control of Noise pollution?

**OR**

8. a) Discuss briefly any two Global effects of Air Pollution.
- b) Describe various effects and control measures of Thermal pollution?

**UNIT-V**

9. a) Enumerate and Explain rainwater harvesting methods
- b) Explain the evolution of family welfare programmes in India?

**OR**

10. a) Explain environmental consequences of unethical behavior of human population?
- b) Discuss objectives and elements of value education?

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**R-17**

**Code: 7G643**

II B.Tech. II Semester Supplementary Examinations August 2021

**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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**UNIT-I**

1. Define

- (a) Laminar Boundary Layer ( $\delta_{lam}$ )      (b) Turbulent Boundary Layer ( $\delta_{tur}$ )  
(c) Laminar sub-layer( $\delta^1$ )                      (d) Boundary Layer Thickness

**OR**

2. Find the displacement thickness, the momentum thickness and energy thickness for the velocity distribution in the boundary layer given by  $u/U = 2(y/\delta) - (y/\delta)^2$

**UNIT-II**

3. Prove that  $B+2zy/2=y \sqrt{1+z^2}$  is the required condition for a trapezoidal section to be most economical or most efficient (where side slope is 1:z, Depth=y, B=Bottom width of the channel)

**OR**

4. What do you understand by

- a) Steady and Unsteady flow                      b) Uniform and Non Uniform flow  
c) Laminar flow and Turbulent flow              d) Sub-critical flow, critical flow and super critical flow

**UNIT-III**

5. 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

**OR**

6. Find the force exerted by a jet of water on an unsymmetrical moving curved plate when jet strikes tangentially at one of the tips.

**UNIT-IV**

7. a) What do you mean by gross head, net head and efficiency of turbine? Explain the different type of efficiency of a turbine?

b) Explain clearly the following terms as they are applied to a pelton wheel:

- (i) Gross Head (ii) Net Head

**OR**

8. a) Explain draft tube theory?

b) Define efficiency of draft tube?

**UNIT-V**

9. Explain briefly with neat sketches, any two of the following types of casing

- (i) Volute casing  
(ii) Vortex casing  
(iii) Casing with guide blades/vanes

**OR**

10. a) How are hydropower plants classified? Explain any one of the type of classification

b) Write about surge tank? Explain why a surge tank is needed in a hydropower plant set up?

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**Code: 7GC42**

II B.Tech. II Semester Supplementary Examinations August 2021

**Probability & Statistics**

( Common to CE, ME and 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) Define the following (i) Sample Space (ii) event (iii) Outcome (iv) Probability 8M  
b) 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. 6M

**OR**

2. a) State and prove Addition theorem on probability for two events. 8M  
b) If two dice are throw , Find the probability of getting a sum is 10 6M

**UNIT-II**

3. A random variable X has the following probability function

X	0	1	3	4	5	6	7
P(X)	0	K	2K	2K	3K	K <sup>2</sup>	7K <sup>2</sup> +K

Find the value of K , (ii) Evaluate  $p(0 < x < 5)$ , (iii) Evaluate  $p(x < 5)$  14M

**OR**

4. The mean and variance of a binomial variable X with parameters n and p are 16 and 8. Find  $P(x = 1)$  and  $P(x > 2)$  14M

**UNIT-III**

5. A population consists of the four numbers 3, 7, 11, 15. 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

**OR**

6. It is desired to estimate the mean number of hours of continuous use until a certain computer will first require repairs. If it can be assumed that  $\mu = 48$  hours, how large a sample is needed so that one will be able to assert with 90% confidence that the sample mean is off by at most 10 hours. 14M

**UNIT-IV**

7. a) A sample of 64 students has a mean weight of 70 kg. can this be regarded as a sample from a population with mean weight 56kg. and standard deviation is 25 kg. 7M  
b) In a big city, 325 men out of 600 men were found to be smokers. Thus this information supports the conclusion that the majority of men in the city are smokers. 7M

**OR**

8. According to the norms established for a mechanical aptitude test, persons who are 18 years old have an average height 73.2 ( $\mu = 73.2$ ) with standard deviation of 8.6 ( $\sigma = 8.6$ ). If 45 ( $n = 45$ ) members randomly selected of that age average 76.7 ( $\bar{x} = 76.7$ ). Test the null hypothesis  $\mu = 73.2$ , against the alternative hypothesis  $\mu > 73.2$  at the 0.01 level of significance. 14M

**UNIT-V**

9. In an investigation on the machine performance, the following results are obtained

	No. of units inspected	No. of defectives
Machine I	375	17
Machine II	450	22

Test whether there is any significant performance of two machines at  $\alpha = 0.05$  14M

**OR**

10. 4 coins were tossed 160 times and the following results were obtained,

No, of Heads	0	1	2	3	4
Frequency	17	52	54	31	6

Under the assumption that coins are unbiased, find the expected frequencies of 0,1,2,3,4 heads and test the goodness of fit for  $\alpha = 0.05$  14M

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Code: 7G644

II B.Tech. II Semester Supplementary Examinations August 2021

**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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**UNIT-I**

1. Derive the equation for a Fixed beam carrying UDL over the entire span with neat sketch. 14M

**OR**

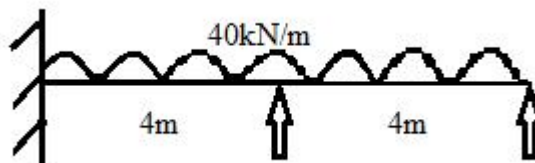
2. A fixed beam AB of length 6m carries a point loads of 160kN and 120kN at a distance of 2m and 4m from the left end of A. Find the Fixed end moments and the reactions at the supports. Draw B.M and S.F diagrams. 14M

**UNIT-II**

3. A Continuous beam ABC covers two consecutive span AB and BC of lengths 4m and 6m , carrying UDL of 6kN/m and 10kN/m respectively. If the ends A & C are simply supported, find the supports moments at A, B & C. 14M

**OR**

4. A continuous beam ABC consists of a two consecutive spans AB and BC 4m each and carrying a distributed load of 40kN/m. the end A is fixed and the end C simply supported. Find the support moments and reactions.



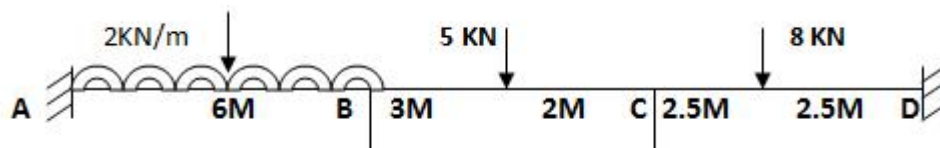
14M

**UNIT-III**

5. Explain step by step procedure of Moment Distribution method with suitable example. 14M

**OR**

6. A continuous beam ABCD consists of three span, and loaded as shown in figure. End A & D are fixed. Determine the bending moments at the supports.



14M

**UNIT-IV**

7. a) What are influence lines? 4M  
b) Derive the influence line diagram for an simply supported beam with neat sketch 10M

**OR**

8. In a simply supported beam AB of span 20m, determine the maximum bending moment and shear forces at a section 5m from A, due to the passage of a UDL of intensity 20kN/m, longer than the span. 14M

**UNIT-V**

9. Derive Castigliano's first theorem with neat sketch. 14M

**OR**

10. Find the deflection at the free end of a cantilever of length L carrying a uniform distributed load of W per unit run over the whole span. Assume uniform flexural rigidity. 14M

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