Hall Ticket Number :										

R-17

Code: 7GC41

II B.Tech. II Semester Supplementary Examinations May/June 2022

Environmental Science

(Common to CE & ME)

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)	What is the scope of environmental studies?	7M
	b)	Summarize the need for public awareness about environment.	7M
		OR	
2.	a)	Define environment. Explain the segments of an environment.	7M
	b)	Explain the multidisciplinary nature of environmental studies.	7M
		UNIT–II	
3.	a)	Describe the commercial and ecological uses of forest resources.	7M
	b)	What are renewable and non-renewable energy resources?	7M
		OR	
4.	a)	Define drought. Outline the effects of drought.	7M
	b)	Describe the soil conservation methods.	7M
		UNIT–III	
5.	a)	Explain the food chain with examples.	7M
	b)	Discuss the salient features of forest ecosystem.	7M
		OR	
6.	a)	Discuss the values of biodiversity.	7M
	b)	What are the various threats leading to loss of biodiversity?	7M
		UNIT–IV	
7.	a)	Outline the different causes of water pollution and suggest few measures to control it.	7M
	b)	Explain about the causes of soil pollution.	7M
		OR	
8.	a)	Identify the human activities contributing to large scale air pollution.	7M
	b)	What are the effects of noise pollution?	7M
		UNIT–V	
9.	a)	List out various causes for population explosion? Mention few measures to control population explosion.	7M
	b)	Discuss the advantages of rain water harvesting.	7M
		OR	
10.	a)	Examine the importance of value based environmental education in protection of environment.	7M
	b)	Discuss briefly the environment and its relation to human health.	7M

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Hall Ticket Number :										

R-17

Code: 7G643

II B.Tech. II Semester Supplementary Examinations May/June 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

$$\delta^*=\int_0^{\infty}\left(1-\frac{u}{U}\right)dy$$

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

OR

2. A thin plate is moving in still atmospheric air at a velocity of 5 m/s. The length of the plate is 0.6m and width 0.5m. Calculate (i) the thickness of the boundary layer at the end of the plate and (ii) drag force on one side of the plate. Take density of air as 1.24 kg/m^3 and kinematic viscosity=0.15 stokes

UNIT–II

3. Show that relation between the alternate depths y_1 and y_2 in a rectangular channel can be expressed by $\mathbf{2y_1^2y_2^2/(y_1+y_2)=y_c^3}$

OR

4. A rectangular channel carries a discharge of 2m^3/s per meter width. If the loss of energy in the hydraulic jump is found to be 2.75m. Determine the conjugate depth before and after the jump

UNIT–III

5. Show that the force exerted by the jet of water on the inclined plate moving in the direction of the jet $F_x=\rho a(V-u)^2\sin^2\theta$ and also find the work done per second by the jet on the plate

OR

6. A jet of water moving at 12 m/s impinges on vane shaped to deflect the jet through 120^0 when stationary. If the vane is moving at 5m/s. find the angle of the jet so that there is no shock at inlet. What is the absolute velocity of the jet at exit in magnitude and direction and the work done per second per unit weight of water striking per second?. Assume that the vane is smooth.

UNIT–IV

7. The penstock supplies water from a reservoir to the pelton wheel with a gross head of 500m. One third of the gross head is lost in friction in the penstock. The rate of flow through the nozzle fitted at the end of the penstock is 20 m^3/s. The angle of deflection of the jet is 165^o. Determine the power given by the water to the runner and also hydraulic efficiency of the pelton wheel. Take speed ratio=0.45 and C_v=1.0

OR

8. Explain clearly the following terms as they are applied to a pelton wheel:
   (i) Gross Head (ii) Net Head

UNIT–V

9. a) What is cavitation?
   b) What is priming?. Why is it necessary?

OR

10. Write about any two of the following
    (a) Load Factor (b) Utilization factor (c) Capacity Factor
    (d) Estimation of Hydropower Potential

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Hall Ticket Number :										

R-17

Code: 7GC42

II B.Tech. II Semester Supplementary Examinations May/June 2022

Probability and Statistics

(Common to CE, ME & 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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Marks

UNIT–I

1. a) Given P(A)=1/4, P(B)=1/3 and P P(AUB) =1/2 , then evaluate (i) P(A/B),(ii) P(B/A) , (iii) $P(A \cap B^c)$, (iv) $P(A^c/B^c)$ 8M

   b) A card is drawn from a pack of 52 playing cards. What is the probability of drawing black card. 6M

OR

2. a) A class consists of 6 girls and 10 boys. If a committee of 3 is chosen at random from the class, find the probability that (i) 3 boys are selected, (ii) exactly 2 girls are selected. 8M

   b) Two dice are thrown and their sum is 7. Find the probability that at least one of the dice shows up 2 6M

UNIT–II

3. a) A die is thrown 6 times. If getting an even number is a success, find the probabilities of (i) at least one success (ii) ≤ 3 successes (iii) 4 successes 7M

   b) A continuous random variable x has a probability density function

$$f(x)=\begin{cases}\frac{(x+1)}{2}, -1 \le x \le 1\\ 0 \text{ else where}\end{cases}$$

   represents the density of a random variable x, then find $P(X \le 0)$, mean and variance. 7M

OR

4. For the normal distribution with mean 2 and standard deviation 4, evaluate
   (i) $P(-6 < x < 3)$, (ii) $P(x \ge 5)$ and (iii) $P(-4 < x < 4)$ 14M

UNIT–III

5. a) The variance of population is 2. The size of the sample collected from the population is 169. What is the standard error of mean 7M

   b) A population consists of 5, 10, 14, 18, 13, 24. Consider all possible samples of size 2 which can be drawn without replacement from this population. Find the population mean and standard deviation, and mean and standard deviation of the sampling distribution of means. 7M

OR

6. a) A random sample of 100 teachers in a large metropolitan area revealed a mean weekly salary of Rs.487 with a standard deviation rs 48. With what degree of confidence can assert that the average weekly salary of all teachers in the metropolitan area is between 472 to 502? 7M

   b) What is the size of the smallest sample required to estimate an unknown proportion to within a maximum error of 0.06 with at least 95% confidence. 7M

UNIT–IV

7. In a random sample of 60 works, the average time taken by them to get work is 33.8min with a S.D of 6.1 min can we reject the null hypothesis « $=15150$ min in the favour of alternative hypothesis « >15150 at 0.05 level of significance. 14M

OR

8. A manufacturer of electronic equipment subjects sample of two completing brands of transistors to an accelerated performance test. If 45 of 180transistors of the first kind and 34 of 120 transistors of the second kind fail the test. What he conclude at the level of significance~ $=0.05$ about the difference between the corresponding sample proportions. 14M

UNIT–V

9. The following data give the number of air-craft accidents that occurred during the various days of a week

Day	Mon	Tue	Wed	Thu	Fri	sat
No.of accidents	15	29	13	12	16	15

Test whether the accidents are uniformly distributed over the week. 14M

OR

10. Two random sample drawn from two normal populations have the variable values as below

Sample1	19	17	16	28	22	23	19	24	26			
Sample2	28	32	40	37	30	35	40	28	41	45	30	36

Obtain the estimate of the variance of the population and f test whether the two population have the same variance. 14M

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Hall Ticket Number :										

R-17

Code: 7G644

II B.Tech. II Semester Supplementary Examinations May/June 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

UNIT–I

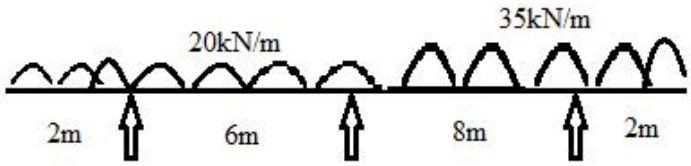
1. Derive the Equation for a Fixed beam carrying a Point load at the centre of the beam with neat sketch. 14M

OR

2. A Fixed beam AB of length 3m carries a point load of 45KN at a distance of 2m from A. If the flexural rigidity of the beam is $1*10^4$ KNm^2, determine
   a. Fixed end moments at A & B b. Deflection under the load
   c. Maximum Deflection d. Position of maximum deflection 14M

UNIT–II

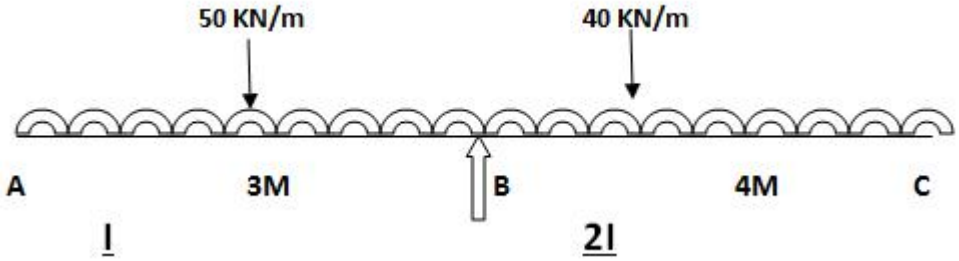
3. Determine the support moments and reactions as shown in fig below.



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.



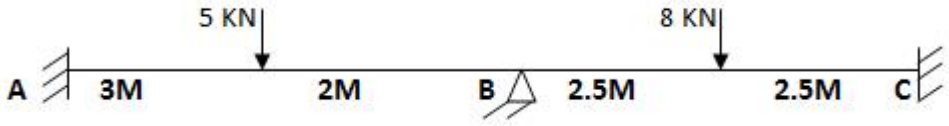
14M

UNIT–III

5. Differentiate between Slope deflection method and Moment distribution method. 14M

OR

6. A Beam ABC 10m long fixed at the ends A and B is continuous over joint B and loaded as shown in figure. using slope deflection method, compute the end moments and plot B.M diagram



14M

UNIT–IV

7. a) Derive the Maximum and minimum shear force when single concentrated load acting on the beam. 7M

   b) Derive the maximum bending moment acting on the beam when concentrated load acting on the beam. 7M

OR

8. Derive the maximum shear forces and Bending moments in a beam when Uniformly distributed load is longer than the span with neat sketch. 14M

UNIT–V

9. Find the deflection of the free end of a cantilever beam carrying a concentrated load P at the free end. 14M

OR

10. Derive the strain energy stored in a beam subjected to uniform bending moment. 14M

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Hall Ticket Number :										

R-17

Code: 7G641

II B.Tech. II Semester Supplementary Examinations May / June 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. Calculate the thickness of the metal necessary for a cylindrical shell of internal diameter 80mm to with stand an internal pressure of 25 N/mm^2, maximum permissible tensile stresses is 125 N/mm^2 14M

OR

2. The Maximum allowable stresses in a cylinder of 500 mm inner diameter and 100 mm thickness is 12.6 MPa. Determine the maximum allowable internal & external pressure on the cylinder, when applied separately. 14M

UNIT–II

3. a) Define: (**i**) stiffness (**ii**) spring index (**iii**) Helix angle (**iv**) Solid length w.r.to helical springs. 6M

   b) A closely coiled helical spring of round steel wire 8 mm in diameter having 10 complete turns with a mean diameter of 10cm is subjected to an axial load of 250N. Determine (**i**) the deflection of the spring (**ii**) maximum shear stress in the wire and (**iii**) stiffness of the spring. Take C= 8 × 10^4 N/mm^2. 8M

OR

4. A solid shaft of 200 mm diameter has the same cross-sectional area as a hollow shaft of the same material with the inside diameter of 150 mm. Find the ratio of: (i) Powers transmitted by both the shafts at the same angular velocity. (ii) Angle of twist in equal lengths of those shafts, when stressed to the same intensity. 14M

UNIT–III

5. Derive an Euler's load expression for the column with one end fixed and the other end hinged. 14M

OR

6. Determine the ratio of buckling strengths of two columns one hollow and the other side is solid. Both are made of same material and have the same length, cross-sectional area and end conditions. The internal diameter of hollow column is half of its external diameter. 14M

UNIT–IV

7. A hollow steel column of square section of side 450mm and thickness of the section is 25mm .The column carries an eccentric load 'P' at an eccentricity of 'e'. If the extreme compressive stress induced in the section is 25 N/mm^2 at one end and 75 N/mm^2 at the other end, determine the value of 'P' and 'e'. 14M

OR

8. Compare the crippling loads given by Rankine's and Euler's formulae for tubular strut 225cm long having outer and inner diameters of 37.5 mm and 32.5 mm respectively and loaded through pin joints at both ends. Take yield stress = 315 MPa, E= 200 GPa and a = 1 / 7500. 14M

UNIT–V

9. a) Determine the direction of neutral axis for an unsymmetrical section. 7M

   b) Determine the deflection of beams due to unsymmetrical bending 7M

OR

10. Draw the B.M. and Torsion diagrams for a semi-circular beam AB of radius 'R'. The cross section of the material is circular with radius 'r'. It is loaded with a load at the mid-point C of the semi circle. The ends A and B are fixed. 14M

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