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R-17

Code: 7GC41

II B.Tech. II Semester Supplementary Examinations April 2023

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)

	Marks	CO	BL
UNIT-I			
1. a) Explain the need for studying environmental problems.	7M	CO1	L2
b) Categorize the methods to create environmental awareness among people.	7M	CO1	L4
OR			
2. a) Define environment. Discuss briefly the importance of environment.	7M	CO1	L1
b) List out different branches of science having close relationship with environmental studies.	7M	CO1	L1
UNIT-II			
3. Describe the advantages and problems associated with dams.	14M	CO2	L2
OR			
4. a) Explain the effects of floods.	7M	CO2	L2
b) Discuss the uses of forest.	7M	CO2	L2
UNIT-III			
5. Describe the various methods of conservation of biodiversity.	14M	CO3	L1
OR			
6. a) Explain with the help of a diagram the nitrogen cycle.	7M	CO3	L2
b) Categorize the types of ecological pyramids.	7M	CO3	L4
UNIT-IV			
7. Discuss the effects of noise pollution and its control.	14M	CO4	L2
OR			
8. a) Describe the sources of water pollution.	7M	CO4	L1
b) Summarize the effects of radiation pollution.	7M	CO4	L2
UNIT-V			
9. Explain the impact of acid rain and how can we control it.	14M	CO5	L2
OR			
10. Describe the environmental consequences of unethical behavior of human population.	14M	CO5	L1

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II B.Tech. II Semester Supplementary Examinations April 2023

Probability and 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)

Marks

UNIT-I

1. a) A card is drawn from a pack of 52 cards. Find the probability of getting a king or a heart or a red card. 6M
- b) A University bought 45% , 25% and 30% of computers from HCL, WIPRO and IBM respectively and 2%, 3% and 1% of these were found to be defective. Find the probability of a computer selected at random is found to be defective? 8M

OR

2. a) Define the following (i) Sample Space (ii) event (iii) Outcome (iv) Probability 8M
- b) If two dice are throw , Find the probability of getting a sum is10 6M

UNIT-II

3. a) The weekly wages of 1000 workmen are normally distributed around a mean of Rs.70 with a standard deviation of Rs.5. Estimate the number of workers whose weekly wages will be (i) Between Rs.69 and Rs.72 (ii) Less than Rs.69 (iii)More than Rs.72. 7M
- b) Out of 800 families with 5 children each, how many would you expect to have (i) 3 boys (ii) 5 girls (iii) either 2 or 3 boys? Assume equal probabilities for boys and girls. 7M

OR

4. a) A random variable x has the following probability function values of x.

x	-2	-1	0	1	2	3
P(x)	0.1	K	0.2	2k	0.3	k

Find the values K, $P(X \geq -1)$, $P(X \leq 2)$ 7M

- b) Fit a poisson distribution to the frequency distribution

x	0	1	2	3	4
f	46	38	22	9	1

7M

UNIT-III

5. a) 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
- b) Find 95% confidence limits for the mean of a normality distributed population from which the following sample was taken 15,17,10,18,16,9,7,11,13,14. 7M

OR

6. a) A random sample of size 81 was taken whose variance is 20.25 and mean is 32. Construct 98% confidence interval. 7M
- b) A random sample size 100 is taken from a population with $\sigma = 5.1$. Given that the sample mean $\bar{x} = 21.6$. Construct a 95%confidence interval for population mean. 7M

Important Note: 1. On completing your answers. Compulsorily draw diagonal cross line on the remaining blank pages. 2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8=50, will be treated as malpractice.

UNIT-IV

7. To examine the hypothesis that the husbands are more intelligent than the wives an investigator took a sample of 10 couples and administered them a test which measures the I.Q. The results are as follows

Husbands	117	105	97	105	123	109	86	78	103	107
Wives	106	98	87	104	116	95	90	69	108	85

Test the hypothesis with a reasonable test at the level of significance of 0.05. 14M

OR

8. a) In a sample of 1000 people in Karnataka, 540 are rice eaters and the rest are wheat eaters can we assume that both rice and wheat are equally popular in this state at 1% of level of significance. 7M
- b) Tests performed with a random sample of 40 engineers produced by a large manufacture. Show that they have a mean thermal effect of 31.45% with a standard deviation 1.6% at 0.01 level of significance. Test the null hypothesis $\mu = 32.3\%$, against the alternative hypothesis $\mu \neq 32.3\%$. 7M

UNIT-V

9. a) The time taken by workers in performing a job by method I and method II is given below

Method I	20	16	26	27	23	22	-
Method II	27	33	42	35	32	34	38

Do the data show that the variances of time distribution from population from which these samples are drawn do not differ significantly? 7M

- b) The following table gives the classification of 100 workers according to sex and nature of work. Test whether the nature of work is independent of the sex of the worker.

	Stable	Unstable	Total
Males	40	20	60
Females	10	30	40
Total	50	50	100

7M

OR

10. The measurements of the output of two units have given the following results. Assuming that both samples have been obtained from the normal populations at 10% significant level, Test whether the two populations have the same variance

Unit-A	14.1	10.1	14.7	13.7	14.0
Unit-B	14.0	14.5	13.7	12.7	14.1

14M

Code: 7G644

II B.Tech. II Semester Supplementary Examinations April 2023

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)

Marks

UNIT-I

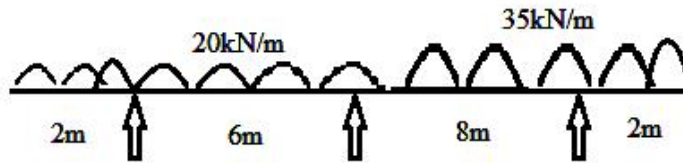
1. A fixed beam of length 20m, carries a UDL of 8kN/m on the left hand end, half together with a 120kN load at 15m from the left hand end. Find the
a. reactions b. fixing moments and c. magnitude and the position of the maximum deflection. Take $E=2 \times 10^8 \text{ KN/m}^2$ and $I= 4 \times 10^8 \text{ mm}^4$. 14M

OR

2. List and explain the different types of beams with neat sketches 14M

UNIT-II

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



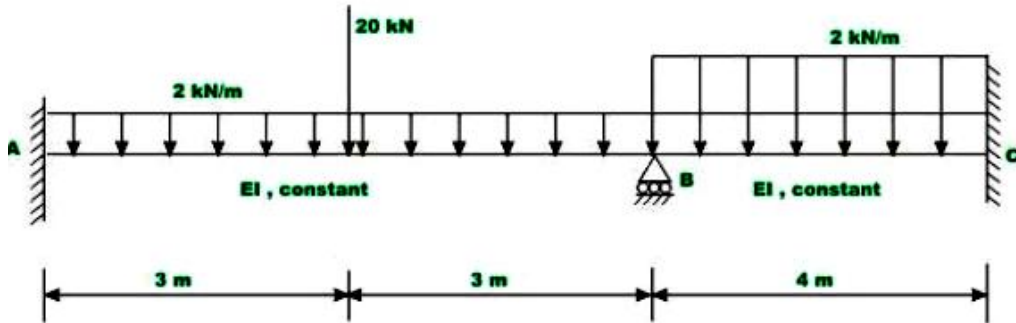
14M

OR

4. 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

UNIT-III

5. A continuous beam ABC is carrying uniformly distributed load of 2 kN/m in addition to a concentrated load of 20 kN as shown in Figure, Draw bending moment and shear force diagrams. Assume EI to be constant by using slope deflection method.



14M

OR

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

UNIT-IV

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

OR

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

UNIT-V

9. Derive the strain energy stored in the beam due to Axial load 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

Important Note: 1. On completing your answers. Compulsorily draw diagonal cross line on the remaining blank pages. 2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8=50, will be treated as malpractice.

Code: 7G641

II B.Tech. II Semester Supplementary Examinations April 2023

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)

Marks CO BL

UNIT-I

1. A Spherical shell of internal diameter 25cm, wall thickness 6cm is subjected to an internal pressure of 850N/mm². Calculate the values of maximum and minimum circumferential stresses and radial stresses. 14M 1 2

OR

2. a) Derive expressions for change in diameter, length and volume of a thin cylindrical shell subjected to internal pressure 7M 1 4
- b) A compound thick cylinder is formed by shrinking a hollow cylinder of 150 mm External Diameter over another hollow cylinder of 130 mm Internal Diameter. The common diameter after shrinking is 140 mm. If the radial pressure at the junction is 120 N/mm² and $E = 200 \text{ kN/mm}^2$, find the original difference in diameter of the two cylindrical shells before shrinking. 7M 1 2

UNIT-II

3. A weight of 250N is dropped on to a helical spring made of 20 mm wire, closely coiled to a mean diameter of 180mm with 25 coils. Determine the height of drop if the instantaneous compression is 70mm. $C = 90 \text{ GN/m}^2$. 14M 2 4

OR

4. a) Derive the elongation of close coiled helical spring subjected to axial pull of W, with a diameter d, number of coils n and modulus of rigidity c. 7M 2 4
- b) A close coiled helical spring is to be made out of 6mm diameter wire that is 3.0m long so that it deflects by 24mm under an axial load of 60KN. Determine the mean diameter of the coils. Take $C = 88 \text{ GN/m}^2$ 7M 4

UNIT-III

5. a) The connecting rod (CR) of a small petrol engine is made up of a mild steel tubular section 2.5 cm OD and 1 cm ID. Calculate the safe load on the CR if it is designed as a column with both ends pinned. Assume that the length of the CR is 60 cm. Safe buckling stress is 8 kN/cm². Factor of safety is 6. 10M 3 5
- b) Define: Euler's stress, slenderness ratio, equivalent length, buckling factor. 4M 3 2

OR

6. Derive the expression for maximum bending moment for a long column subjected to eccentric loading. 14M 3 3

UNIT-IV

7. a) Illustrate the bending stress and net stress for a trapezoidal section dams with vertical water face? 7M 4 2
- b) The theoretical profile of concrete straight gravity dam is a right angled triangle with the water face vertical. The depth of water retained is the same as the height of dam. Show that the resultant thrust to act with in the middle third, the base width should be H where H is the vertical height of the dam and s is the specific gravity of the concrete dam. 7M 4 4

OR

8. A short column of external diameter 45 cm and internal diameter 25 cm carries an eccentric load of 90 kN. Find the greatest eccentricity which the load can have without producing tension on the cross-section 14M 4 4

UNIT-V

9. Write the assumptions made for the analysis of beam subjected to unsymmetrical bending. Determine the stresses due to unsymmetrical bending and deflection? 14M 5 2

OR

10. a) Define flexural rigidity, section modulus, bending axis of a beam and shear centre of a section. 7M 5 2
- b) Determine the shear centre for a channel section having dimensions of 15 cm X 2cm for web and 8 cm X 2 cm for each flange 7M 5 3
