Hall Ticket Number :										

R-13

Code: 1GC42

II B.Tech. II Semester Supplementary Examinations March 2021

Probability & Statistics

(Common to CE, ME, CSE & IT)

Max. Marks: 70 Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (**14 Marks** each)

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1. a) Find the mean, median, mode and standard deviation for the following distribution.

x	1	2	3	4	5	6	7	8
y	4	9	6	25	22	18	7	3

10M

b) Find the coefficient of the correlation for the following

x	0	5	10	15	20
y	1	15	20	35	40

4M

2. a) State and prove Bayes' theorem 7M

b) Three urns contain: 3 red, 4 white and 1 blue balls; 1 red, 2 white and 3 blue balls; 4 red, 3 white, and 2 blue balls. One urn is chosen at random and a ball is withdrawn. If happen to be red, what is the probability that it came from urn II. 7M

3. a) 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^2	$7K^2+K$

Find K and P(0<X<5) 7M

b) If X is a continuous random variable and Y=aX+b, prove that

E(Y)=aE(X)+b and Var (Y)= a^2 Var(X), where a and b are constants. 7M

4. a) Determine the Binomial distribution for which the mean is 4 and variance 3 6M

b) Fit a Poisson distribution for the following data and calculate the expected frequencies

x	0	1	2	3	4
f(x)	109	65	22	3	1

8M

5. A population consists of six numbers 4,8,12,16,20,24. Consider all samples of size two which can be drawn without replacement from this population. Find

   i. Population mean
   ii. Population S.D
   iii. Mean of the sampling distribution of means
   iv. S.D of the sampling distribution of means. 14M

6. a) A random sample of size 100 has a standard deviation of 5. What can you say about the maximum error with 95% confidence? 7M

b) A sample of 11 rats from a central population had an average blood viscosity of 3.92 with a standard deviation of 0.61. Estimate the 95% confidence limits for the mean blood viscosity of the population. 7M

7. Two horses A and B were tested according to the time (in seconds) to run a particular track with the following results.

Horse A	28	30	32	33	33	29	34
Horse B	29	30	30	24	27	29	--

Test whether the two horses have the same running capacity. 14M

8. Four methods are under development for making discs of a super conducting material. Fifty discs are made by each method and they are checked for super conductivity when cooled with liquid.

	1st Method	2ndMethod	3rdMethod	4thMethod
Super Conductors	31	42	22	25
Failures	19	8	28	25

Test the significant difference between the proportions of conductors at 0.05 level. 14M

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Hall Ticket Number :										

R-13

Code: 1G643

II B.Tech. II Semester Supplementary Examinations March 2021

Structural Analysis-I

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (**14 Marks** each)

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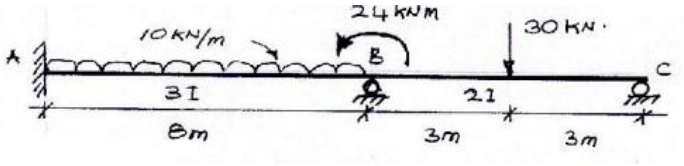
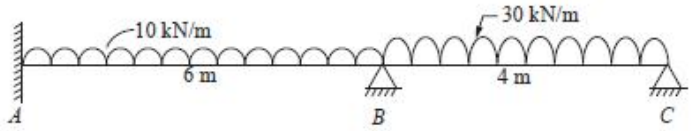
1. A fixed beam of span 5 metres carries a concentrated load of 20 t at 3 meters from the left end. If the right end sinks by 1 cm, find the fixing moments at the supports. For the beam section take I=30,000 cm4 and E=2x103 t/cm2 . Find also the reaction at the supports.

2. What is the Clapeyron's theorem of three moments? Derive an expression for Clapeyron's theorem for three moments.

3. Analyse the continuous beam shown using slope deflection method. Then draw bending moment and shear force diagram.



4. Analyse the continuous beam shown in Fig. by the moment distribution method. Draw the bending moment diagram and shear force diagram. The beam is of uniform section.



5. A steel rod has a square cross section of 10mm x 10mm and a length of 2m.calculate strain energy when a stress of 400 Mpa is produced by stretching it. Take E=200Gpa.

6. a) What is the absolute maximum bending moment due to a moving UDL shorter than the span of a simply supported beam?
   b) What do you understand by the term reversal of stresses?

7. A UDL of intensity 10kN/m and 4m long crosses a simply supported girder of 12m span. Sketch the I.L diagrams for S.F and B.M at the section. find also the absolute maximum S.F and B.M.

8. a) Explain the terms Static Indeterminacy, Kinematic Indeterminacy and Degree if Indeterminacy.
   b) Write short notes on Statistical redundancy criterion for space frame.

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Hall Ticket Number :										

R-13

Code: 1G641

II B.Tech. II Semester Supplementary Examinations March 2021

Strength of Materials-II

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (**14 Marks** each)

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1. A cylindrical shell with rigid end plates has an internal diameter of 230mm, has 5mm thick walls and is 1.0m long. Its internal volume is found to change by $12x10^{-6}$ m^3 when filled with a liquid at a pressure f. Determine values of hoop and longitudinal stresses. Take E=200GN/m^2 and 1/m=0.25.

2. Derive the expression for Lame's theory.

3. A propeller shaft of 20 cm external diameter and 15cm internal diameter has to transmit 1125KW power at 100 R.P.M. It is additionally subjected to a bending moment of 10KNm and end thrust of 200KN. Find the principal stresses in their planes and maximum shear stress.

4. Determine the stiffness of carriage spring pinned at its two ends, with a span Land width b, depth d. Let W be the load and n be the number of leaves?

5. a) Determine the intensity of load for short column by Rankine's formula

   b) Calculate the buckling load for a strut of T section, width being 100mm, overall depth being 80mm, and the flange and stem being 10mm thick. The strut is 3m long and hinged at both ends. E=200GN/m^2.

6. A 25m high square chimney has an opening of 1.2m by 1.2m inside. Find the necessary thickness of the brick work at the base if the maximum permissible stress in brick masonry is limited to 750KN/m^2. The horizontal intensity of wind pressure is 1400N/m2 and the masonry weighs 21KN/m^3.

7. A timber beam 250mm wide by 300 mm deep is used as a simply supported beam on a span of 5m. It is subjected to a concentrated load of 30KN at the midsection of the span. If the plane of load makes an angle of 45^0 with the vertical plane of symmetry find the direction of neutral and the maximum stress in the beam.

8. A curved bar of circular cross section 80mm in diameter has a radius of curvature of 30mm at the inner fibers. The bending moment on the bar causes a tensile stress of 18Mpa in the inner fibers. Calculate the stress in the outer fibers.

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