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S.Y.B.Tech.(Civil) Sem IV
Structural Analysis - I.

Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

(A Government Aided Autonomous Institute)
Munshi Nagar, Andheri(West), Mumbai 400 058

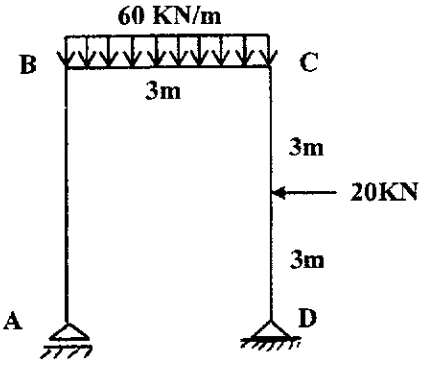
Re Examination
January 2016

Max. Marks : 100 | Duration : 3 Hours
Class: SY BTech | Semester: IV | Program: BTech in Civil Engineering
Name of the Course: **Structural Analysis - I** | Course Code : **CE 253**

Master file.

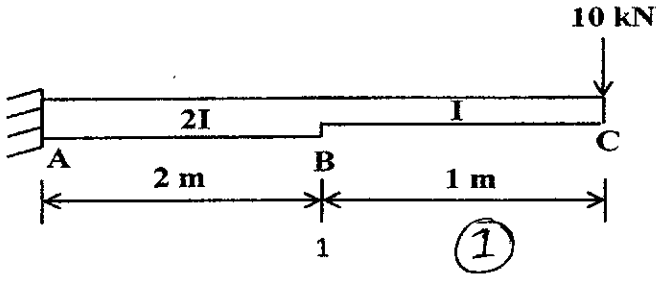
- Attempt any FIVE questions out of SEVEN questions.
- **Answers to all sub questions should be grouped together.**
- Figures to the right indicate full marks.
- Assume suitable data if necessary and state the same clearly.

Q.1 (a) For the frame loaded as shown in figure below (15)
a) Find the support reactions
b) Draw AFD, SFD & BMD



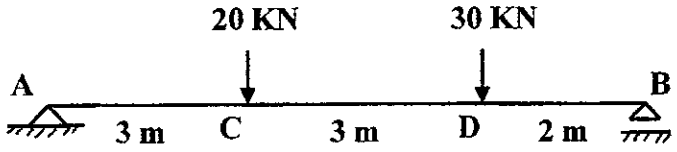
Q.1 (b) What are the advantages & disadvantages of an arch as compared to a beam of the same span? (05)

Q.2 (a) Find the slope and vertical deflection at B for the beam supported and loaded as shown in figure below. Use moment area method only. (08)

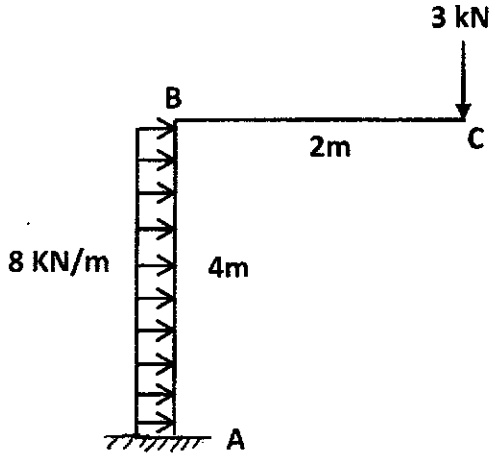


S.Y.B.Tech. (civil) sem IV
Structural Analysis-I - Dt. 06/01/16.

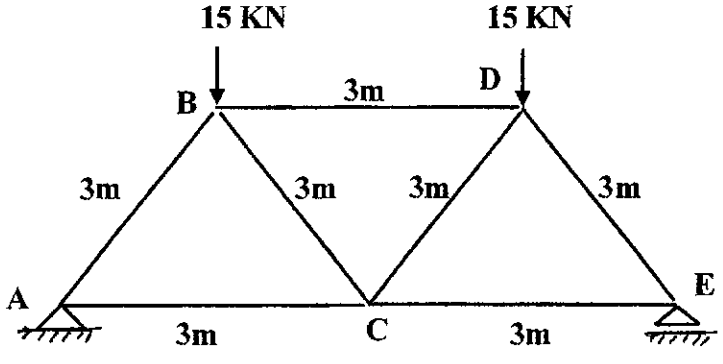
Q.2 (b) Find the slope at B and vertical deflection at D for the beam supported and loaded as shown in figure below. Use conjugate beam method only. (12)



Q.3 (a) Determine the vertical deflection at C of the rigid jointed frame loaded as shown in figure below. (10)



Q.3 (b) For the pin jointed frame loaded as shown in figure below, find the vertical deflection of joint C. (10)



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S.Y.B.Tech.(Civil) sem IV
Structural Analysis-I. 06/01/16.

Q.4 (a) A symmetrical three hinged parabolic arch of span 50 m and central rise of 10 m is subjected to a udl of 25 kN/m on the entire horizontal span of the arch. In addition to this, two concentrated loads of 70 kN and 90 kN act on the arch at 15 m and 35 m respectively from the left support. (16)

Determine

(a) the support reactions

(b) radial shear, normal thrust and BM just to the left of 70 kN load

(c) radial shear, normal thrust and BM just to the left of 90 kN load

(c) draw BMD

Q.4 (b) Write the expressions for the strain energy stored in a member due to (04)

(i) axial force

(ii) shear force

(iii) bending moment

(iv) twisting moment

Q.5 (a) A suspension cable of span 50 m and a central dip of 6 m with supports at the same level is subjected to a udl of 30 KN/m on its horizontal span. Determine the maximum and minimum tension in the cable (14)

If the suspension cable passes over a smooth pulley on the top of a pier of height 10m and the anchor cable is at 60° to the horizontal, find the forces transmitted to the base of the pier.

Q.5 (b) Write a note on types of cable supports and the forces they transfer to the pier supporting them. (06)

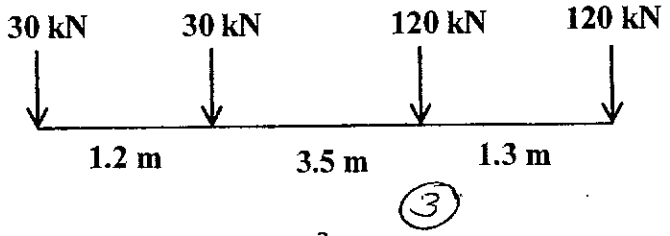
Q.6 (a) For a simply supported beam of span 16 m, draw influence diagrams for (10)

a) reaction at left support A

b) shear force at a section C, 4 m from left support A

c) bending moment at a section C, 4 m from left support A

Q.6 (b) The load system shown in figure below crosses a simply supported girder of span 10 m. Determine the value of maximum bending moment at a section 4m from the left support. (10)



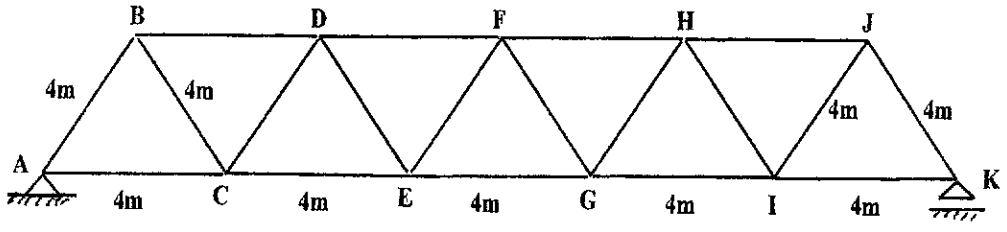
(3)

S.Y.B.Tech.(Civil) Sem IV

Structural Analysis - I - Dt. 06/01/16.

Q.7 (a) Compare the crippling loads given by Euler's and Rankine's formulae for a steel hollow circular column (strut) 5.0 m long and fixed at both ends. The cross section of the column is having an external diameter of 180 mm and an internal diameter of 60 mm. Take E = $2x10^5$ N/mm^2, f_c = 350 MPa and Rankine's constant as 1/7000. (10)

Q.7 (b) For the pin jointed frame shown in figure below draw influence diagram for axial force in members DE, DF and EG. (10)



S.E.(Civil) Sem IV - KT exam. Lib 04-01-16 - Re-Exam
Applied Mathematics - IV

Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

(An Autonomous Institution Affiliated to University of Mumbai)

Jan 2016

Duration: **3 Hours**

Total Marks: **100**

CLASS/SEM: **S.E (CIVIL)/IV** (KT-EXAMINATION) SUBJECT: **APPLIED MATHEMATICS IV** Probability & Statistics

- **Question no.I is compulsory.**
- Attempt any **FOUR** questions out of remaining **SIX** questions.
- Answers to all sub questions should be grouped together. Master file.
- Figures to the right indicate full marks.

Q1.a) Evaluate $\oint_c \frac{e^z}{z+1} dz$ where c is the circle 06

i) $|z| = 2$

ii) $|z| = \frac{1}{2}$

Q1.b) A drug is given to 10 patients and increments in their blood pressure were recorded to be 3, 6, -2, 4, -3, 4, 0, 0, 2,6. 06
Is it reasonable to believe that the drug has no effect on change of blood pressure?

Q1.c) A furniture maker has 6 units of wood & 28 hours of free time, in which he will make decorative screens. Two models have sold well in the past, so he will restrict himself to those two. He estimates that model I requires 2 units of wood and 1 hour of time, while model II requires 1 unit of wood & 8 hours of time. The prices of the models are $ 120 & $ 80 respectively. How many screens of each model should the furniture maker assemble if he wishes to maximize his sales revenue. Formulate the above problem as an LPP & solve it by graphical method 08

Q2.a) If the mean of a binomial distribution is 3 and the variance is $3/2$, find the probability of obtaining atleast 4 success. 06

Q2.b) The following data gives the heights in inches(X) and weights in lbs(Y) of a random sample of 10 students 06

X	61	68	68	64	65	70	63	62	64	67
Y	112	123	130	115	110	125	100	113	116	126

Estimate the weight of a student with height 59 inches.

Q2.c) Prices of shares of a company on different days in a month were found to be 66, 65, 69, 70, 69, 71, 70, 63, 64 and 68. 08
Discuss whether the price of shares to be 65.

Q3.a) Evaluate $\int_0^{2+i} (\bar{z})^2$ along (1) 06

S.E.(Civil) Sem IV - KT exam.

Applied Mathematics-IV - Dt. 04/01/16.

The real axis to 2 and then vertically to 2 + i.

Q3.b) A radioactive source emits particles at a rate of 10 per minute in accordance with Poisson law. Each particle emitted has a probability of $\frac{2}{5}$ being recorded. Find the probability that atleast 4 particles are recorded in a 2 minute period. 06

Q3.c) Solve the following LPP using Simplex method 08

Maximize $Z = x_1 + 3x_2$

Subject to $x_1 + 2x_2 \le 10$

$0 \le x_1 \le 5$

$0 \le x_2 \le 4$

Q4.a) Evaluate using Cauchy integral formula $\oint_c \frac{\sin^2 z}{\left(z-\frac{\pi}{6}\right)^3} dz$ where c is the circle $|z| = 1$ 06

Q4.b) Evaluate using residue theorem $\oint_c \frac{2z-1}{z(z+1)(z-3)} dz$ where C is the circle $|z| = 2$ 06

Q4.c) A crv X has PDF defined as $f(x) = \begin{cases} A + Bx, 0 \le x \le 1 \\ 0, elsewhere \end{cases}$ 08

If the mean of the distribution is 1/3. Find A & B.

Q5.a) Compute spearman's rank coorelation coefficient for the following data 06

X	10	12	18	18	15	40
Y	12	18	25	25	50	25

Q5.b) Use residue calculus to evaluate the following integral $\int_0^{2\pi} \frac{d\theta}{2+\cos\theta}$. 06

Q5.c) The mean weight of 500 male students at a certain college is 151 lb and standard deviation is 15lbs. Assuming that the weights are normally distributed, find how many students weigh 08

i)Between 120 & 155 lb ii) More than 185 lb

Q6.a) The heights of six randomly chosen sailors are in inches;63,65,68,69,71 & 72.The heights of ten randomly chosen soldiers are;61,62,65,66,69,69,70,71,72&73.Discuss in the light of this data that the soldiers on an average are taller than sailors 06

Q6.b) Evaluate $\int_{-\infty}^{\infty} \frac{dx}{(x^2+1)(x^2+4)}$ using residue theorem. 06

Q6.c) Find the correlation coefficient for the following 08

X	165	160	170	163	173	158	178	168	173	170	175	180

(Height of Fathers)												
Y (Height of Sons)	173	168	173	165	175	168	173	168	180	170	173	178

Q7.a) Fit a binomial distribution for the following data and compare the theoretical frequencies with the actual ones: 06

X	0	1	2	3	4	5
f(x)	2	14	20	34	22	8

Q7.b) Using Simplex method solve the following LPP 06

Maximize

$Z = 3x_1 + 5x_2 + 4x_3$

Subject to the constraints

$2x_1 + 3x_2 \leq 8$

$2x_2 + 5x_3 \leq 10$

$3x_1 + 2x_2 + 4x_3 \leq 15$

$(x_1, x_2, x_3 \geq 0)$

Q7.c) In an experiment on pea – breading mendel obtained the following frequencies of seeds. 08

315 Round and Yellow

101 Wrinkled and Yellow

108 Round and Green

32 Wrinkled and Green

According to his theory of heredity the numbers should be in population 9:3:3:1. Is there any evidence to doubt the theory at 5% Los?

(3)

Lib – Re Exam
05-01-16

S.Y.B.Tech.(Civil) sem IV
Surveying -II · Dt. 05/01/16.

Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)
Munshi Nagar, Andheri (West), Mumbai – 400058.
End Semester (KT) Exam
December 2015

Max. Marks: 100 | Duration: 3 hour
Class: S.Y.B.Tech. | Semester: IV | Program: Civil
Name of the Course: Surveying-II | Course Code : BTC-227

Master file.

Instructions:

1. Question No 1 is compulsory.
2. Attempt any four questions out of remaining six.
3. Draw neat diagrams
4. Assume suitable data if necessary

Question No		Answer the following questions	Maximum Marks
Q1	a	Explain the use of tacheometric tables in field work with suitable example.	05
	b	Differentiate between compound and composite curve.	05
	c	Discuss the significance of modern surveying software for preparing contour maps.	05
	d	How will you check the verticality of high rise structures?	05

Question No **Answer the following questions**

Q2 a The following observations were made with a tacheometer fitted with analytic lens from stations P and Q on points R and S lying northward. 14

Station	HI, Meter	Staff at	Vert. angle	Staff intercept	Central wire reading	RL, m
P	1.25	R	7° 24'	1.880	2.105	300.85
		S	9° 36'	2.425	1.835	
Q	1.35	R	3° 55'	2.075	1.675	311.41
		S	7° 16'	2.180	1.750	

Latitude and Departure of P and Q are as below:

Station	Latitude	Departure
P	3580	5320
Q	3670	5440

Calculate the distance and gradient of RS and coordinate of R and S?

b Describe in detail the field work for setting out a simple curve by chain and Theodolite method. 06

S.Y.B.Tech. (civil) Sem IV
Surveying - II. Dt. 05/01/16.

Question No		Answer the following questions	
Q3	a	What do you understand by project surveying? How would you conduct project survey for a canal?	10
	b	Highway curve having a deflection angle of 75^0 is to be desire for a maximum speed of 135 km/hr, a maximum centrifugal ratio of ¼ and a minimum rate of change of radial acceleration of 0.3 m/sec^2/sec. the combined curve consist of two cubic spirals and a circular curve. Calculate (i) The radius of the circular curve, (ii) The length of the cubic spiral (iii) The total length of the combined curve and (iv) The chain ages of all salient points if the chain age of the point of intersection is 3500m	10

Question No		Answer the following questions	
Q4	a	Prepare the data required for setting a simple curve by two Theodolite method from following data: Degree of curve = 3°, arc length = 30 m, Deflection angle = 40°, length of normal chord = 20 m, chainage of point of intersection = 1850 m.	10
	b	Discuss the method of precise levelling. How it differ from ordinary levelling?	10

Question No		Answer the following questions	
Q5	a	A gradient of – 1.5 % meets a gradient of -2.0 % at a chainage of 1500 m and elevation of 220 m. A vertical curve of length 200 m is to be set out with pegs at 20 m interval. Calculate the elevation of pegs by chord gradient method.	10
	b	Describe the method of setting out culvert with neat sketch.	10

Question No		Answer the following questions	
6	a	Explain how would you carry out tacheometric plane tabling in undulating terrain?	06
	b	Describe the step by step procedure for carrying out field work of Triangulation.	08
	c	Discuss the application of GIS in Surveying	06

Question No		Answer the following questions	
7	a	Explain in detail the procedure to determine the constants of a tacheometer.	06
	b	Differentiate Geodimemter and Tellurometer	04
	c	State the advantages of Electronic Theodolite over conventional Theodolite.	04
	d	Discuss different type of transition curves with neat sketches.	06