

QP Code : NP-19782

[REVISED COURSE]

(4 Hours)

[Total marks: 80]

NOTE:

- ix) Question No. 1 is compulsory.
- x) Attempt any three out of the remaining five questions.
- xi) Figure to the right indicates full marks
- xii) Assume any suitable data and clearly state the same.

- Q.1 It is proposed to construct a RCC Framed structure (G+1) Bungalow for a businessman with the following area requirements, same on each floor.
 Drawing Hall = 25 m², Master Bed Room = 25 m², Children's' Bed Room = 20 m², Guest Room = 20 m², Kitchen and Dining Room = 20 m².
 Provide verandah, staircase, passage and sanitary units as per bye laws.
- i) Draw the Ground Floor plan 14
 - ii) Draw the Front elevation 06
- Q.2 A) Draw the cross section passing through staircase, bath, WC of building drawn in Q. no.01 15
 B) Draw the site layout plan for building drawn in Q. no. 01 clearly indicating various services, open spaces etc. 05
- Q.3 A) Draw the foundation plan with dimensions for the building drawn in Q no. 01. Also draw the section of one footing. 10
 B) Suggest the type of pitched roof for a factory of size 8.5m x 20m. Draw the plan and section of the same showing all details. 10
- Q.4 A) Explain the 'principles of planning' used in planning of a residential building. 10
 B) Explain the zoning regulation and Building bye laws in detail. 10
- Q.5 A) Explain with the help of sketches, Load bearing structure, framed structure and composite structure 07
 B) Draw the plan, elevation and section of the half paneled and half glazed door. Assume the door size as 1.2m x 2.1m. 07
 C) Explain carpet area, built up area and FSI. 06
- Q.6 Write short notes on the followings (any four)
- i). Sun path diagram, ii). Wind rose (circulation) diagram. iii). Functional planning of a residential building, iv). Sun shading devices, v). orientation of building. 20

141

Sub: BDD-I
(OLD COURSE)
(4 Hours)

Date: 16/6/14

QP Code : MV-18969
[Total Marks : 100]

- Notes: 1. Q.No.1 is compulsory.
2. Attempt any four questions out of remaining six questions.
3. Assume any data suitably, if required.



Q.No.1. It is proposed to construct a residential apartment (Stilt +3) on a plot measuring 22 m x 19 m in the suburb of Thane District. There are two flats on each floor, Type A: 1 BHK, Type B: 2BHK. Provide Staircase, passage, etc as per bye laws.

Draw Typical Floor plan. [20]

Q.No. 2. Draw sectional elevation passing through staircase and sanitary unit, for the building given in Q.No.1 [20]

Q.No.3 (a) Draw front elevation of the building given in Q No.1. [10]

(b) Explain Principles of planning with neat sketches. [10]

Q.No.4 (a) Design a staircase for an office building having floor to floor height 3.6 mts. Draw plan and section. [10]

(b) Draw foundation plan of the building given in Q.No.1. [10]

Q.No.5. (a) Explain F.S.I., Carpet Area, Builtup Area. [10]

(b) Draw the plan and section of a hall measuring 10 m x 8 m, having pitched roof. [10]

Q.No.6. (a) Draw the site plan showing all details of the building given in Q.No.1 [10]

(b) Draw the roof terrace plan of the building given in Q.No.1. [10]

Q.No.7. (a) Draw cross section of a load bearing wall from footing level to parapet level. Assume any data if required. [10]

(b) Draw Stilt level plan of the building given in Q.No.1.. [10]

Civil



- N.B. :
- (1) Question No. 1 is compulsory.
 - (2) Solve any three questions out of remaining.
 - (3) Each question carries equal marks.
 - (4) Use of statistical tables is allowed.

1. (a) Find a, b, c if $\vec{F} = (axy + bz^3)\vec{i} + (3x^2 - cz)\vec{j} + (3xz^2 - y)\vec{k}$ is irrotational. 5
- (b) Find $A^5 - 4A^4 - 7A^3 + 11A^2 - A - 10I$ in terms of A using Cayley-Hamilton theorem

for $A = \begin{bmatrix} 1 & 4 \\ 2 & 3 \end{bmatrix}$

- (c) A continuous random variable X has the p.d.f. defined by $f(x) = A + Bx, 0 \leq x \leq 1$. 5

if the mean of the distribution is $\frac{1}{3}$ find A and B.

- (d) A sample of 50 pieces of certain type of string was tested. The mean breaking strength turned out to be 14.5 pounds. Test whether the sample is from a batch of a string having a mean breaking strength of 15.6 pound and S.D. of 2.2 pounds. 5

2. (a) Obtain the rank correlation coefficient from the following data :— 6

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

- (b) The marks of 1000 students of university are found to be normally distributed with mean 70 & SD 5. Estimate the number of students whose marks will be (i) between 60 & 75 (ii) more than 75. 6

- (c) Show that the matrix $A = \begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$ is diagonalisable. 8

Find the diagonal form and transforming matrix.

3. (a) A certain injection administered to 12 patients resulted in the following changes of blood pressure : 6

5, 2, 8, -1, 3, 0, 6, -2, 1, 5, 0, 4. Can it be concluded that the injection will be in general accompanied by an increase in blood pressure?

- (b) Optimize $Z = x_1^2 + x_2^2 + x_3^2 - 6x_1 - 8x_2 - 10x_3$ 6

- (c) Verify Green's theorem in the plane for 8

$$\oint (x^2 - y)dx + (2y^2 + x)dy$$

around the boundary of the region defined by $y = x^2$ and $y = 4$.

Civil

4. (a) A car hire firm has two cars which it hires out day by day. The number of demands for a car on each day is distributed as poisson variate with mean 1.5. Calculate the proportion of days on which (i) neither car is used (ii) some demand is refused. 6

- (b) Evaluate $\iint_S (\nabla \times \bar{F}) \cdot d\bar{s}$ where 6

$\bar{F} = (2x - y + z)\mathbf{i} + (x + y - z^2)\mathbf{j} + (3x - 2y + 4z)\mathbf{k}$ and S is the surface of the cylinder $x^2 + y^2 = 4$ bounded by the plane $Z = 9$ and open at the other end.

- (c) Table below shows the performances of students in Mathematics and Physics. Test the hypothesis that the performance in Mathematics is independent of performance in physics. 8

Grades in Physics	Grades in Maths		
	High	Medium	Low
High	56	71	12
Medium	47	165	38
Low	14	42	81

5. (a) The ratio of the probability of 3 successes in 5 independent trials to the probability of 2 successes in 5 independent trials is $\frac{1}{4}$. What is the probability of 4 successes in 6 independent trials? 6

- (b) Evaluate $\iint_S \bar{F} \cdot d\bar{s}$ where $\bar{F} = 4x\mathbf{i} - 2y^2\mathbf{j} + z^2\mathbf{k}$ and S is the region bounded by 6

$y^2 = 4x, x = 1, z = 0, z = 3.$

- (c) Find (i) the lines of regression (ii) coefficient of correlation for the following data. 8

X	65, 66, 67, 67, 68, 69, 70, 72
Y	67, 68, 65, 66, 72, 72, 69, 71

6. (a) A group of 10 rats fed on diet A and another group of 8 rats fed on different diet B, recorded the following increase in weight 6

Diet A : 5, 6, 8, 1, 12, 4, 3, 9, 6, 10gms

Diet B : 2, 3, 6, 8, 1, 10, 2, 8 gms

Find if the variances are significantly different?

- (b) If $A = \begin{bmatrix} -1 & 4 \\ 2 & 1 \end{bmatrix}$ then prove that $3 \tan A = A \tan 3$. 6

- (c) Using the kuhn-Tucker conditions solve the following N.L.P.P. 8

Maximize $Z = -x_1^2 - x_2^2 - x_3^2 + 4x_1 + 6x_2$

Subject to $x_1 + x_2 \leq 2$
 $2x_1 + 3x_2 \leq 12$
 $x_1, x_2 \geq 0$

civil

Sub: - AM - IV

Date: 19/5/14

QP Code: MV-18789

(OLD COURSE)

(3 Hours)

[Total Marks : 100

- N. B. : (1) Question No. 1 is compulsory.
 (2) Attempt any four questions out from Q. No. 2 to Q. No. 7.

1. (a) Write down the probability distribution of the sum of numbers appearing on the toss of two unbiased dice. 5
- (b) Evaluate $\int_c \log z \, dz$ where c is the unit circle in the z -plane. 5
- (c) Evaluate by Green's theorem $\int_c (e^{-x} \sin y \, dx + e^{-x} \cos y \, dy)$ where c is the rectangle whose vertices are $(0,0)$, $(\pi,0)$, $(\pi,\pi/2)$, $(0,\pi/2)$. 5
- (d) A sample of 400 students is taken from a large population their mean height is 171.38 cm. Can it be reasonably concluded that the sample is drawn from a population with mean height of 171.17 cm and S.D. of 3.3 cm. 5
2. (a) Prove that $\bar{F} = (y^2 \cos x + z^3) \bar{i} + (2y \sin x - 4) \bar{j} + (3xz^2 + 2) \bar{k}$ is a conservative field. Find :- 6
- (i) Scalar potential for \bar{F} .
- (ii) Work done in moving an object in this field from $(0,1,-1)$ to $(\pi/2, -1, 2)$.
- (b) Evaluate $\int_c \tan z \, dz$ where c is the circle $|z|=2$. 6
- (c) The following are the marks in statistics (x) and mathematics (y) of ten students :- 8

x	56	55	58	58	57	56	60	54	59	57
y	68	67	67	70	65	68	70	66	68	66

Calculate the coefficient of correlation and estimate marks in mathematics of a student who scored 62 marks in statistics.

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Civi

3. (a) A continuous RVX has a p.d.f. given by $f(x) = kx^2e^{-x}$ $x \geq 0$. 6
 Find k, mean and variance.
- (b) The following data represents the biological values of proteins from cow's milk and buffalo's milk at a certain level :- 6

Cow's milk	1.82	2.02	1.88	1.61	1.81	1.54
Buffalo's milk	2.00	1.83	1.86	2.03	2.19	1.88

Is the protein level differences in the two milks significant ?

- (c) The following table shows the heights of a sample of 12 fathers and their oldest adult son's. Find the coefficient of rank correlation :- 8

Height of father (inches)	65	63	67	64	68	62	70	66	68	67	69	71
Heights of sons (inches)	68	66	68	65	69	66	68	65	71	67	68	70

4. (a) If X denotes the outcome when a fair die is tossed. Find the moment generating function of X and hence find the mean and variance of X. 6
- (b) In a random sample of 1000 persons from town A it is found that 400 are consumers of wheat. In a random sample of 800 persons from town B 400 are consumers of wheat. Do their figure indicate that the consumption of wheat in town B is significantly higher in town A ! 6
- (c) Find all possible Laurent's expansions of the functions 8

$$f(z) = \frac{7z-2}{z(z-2)(z+1)} \text{ about } z = -1.$$

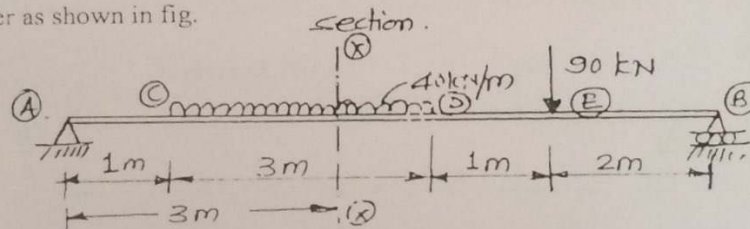
(3 Hours)

(Total Marks: 80)

- 1) Question No.1 is compulsory.
- 2) Attempt any three questions out of remaining four questions.
- 3) Assume suitable data wherever required and state it clearly.
- 4) Illustrate your answers with neat component sketches wherever required.
- 5) Answers should be written in the legible handwriting, stepwise and in the systematic manner.

1. Attempt any FOUR of the following:

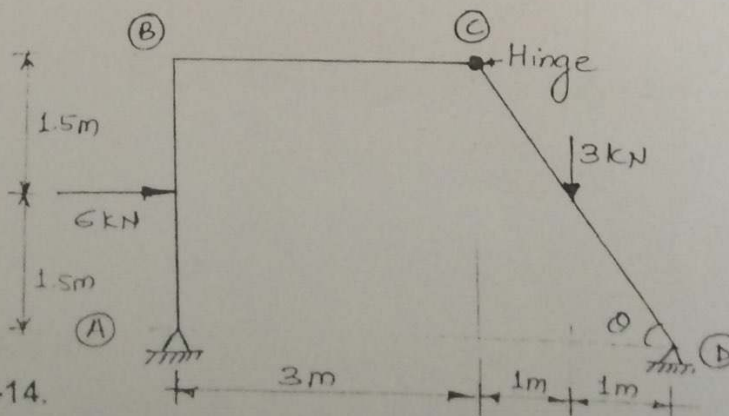
- (a) Explain the principle of superposition with examples. 05
- (b) For a three hinged parabolic arch of span L and rise h carries udl of intensity w per unit run over whole span. Show that horizontal thrust at each support of arch is $wl^2/8$ and bending moment at any section of arch is zero. 05
- (c) Using influence lines find out the shear force at any section for the loaded girder as shown in fig. 05



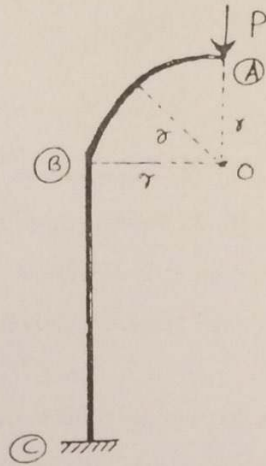
- (d) A rod, 2 m long and rectangular in cross section $88 \text{ mm} \times 44 \text{ mm}$ is subjected horizontally through pin joints. It carries a vertical load of 3.3 kN/m length and axial thrust of 110 kN . If $E = 208 \text{ kN/mm}^2$, calculate the maximum stress induced. 05
- (e) What is strain energy? Write the expression for the strain energy stored due to shear force, bending moment. 05

2. (a) Draw SFD, BMD and AFD for the frame as shown below.

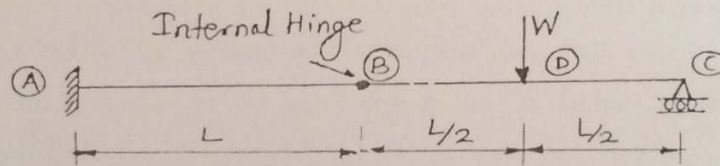
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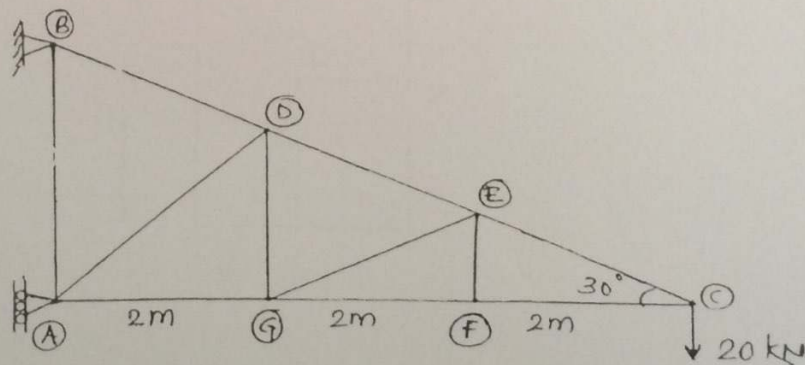
- (b) Find out the vertical and horizontal deflection of point A of the lamp post shown in fig. Use strain energy concept. 07



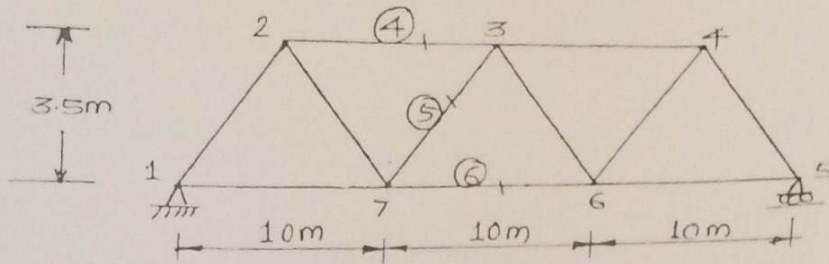
3. (a) A beam ABC is fixed at A and has roller support at end C. It is also provide with an internal hinge at B. Determine the slope and deflection at hinge B, when loaded with point load W. Use conjugate beam method. 10



- (b) Determine the horizontal and vertical deflection at joint C of a cantilever truss as shown in fig. For all members have equal area of 2000 mm^2 and $E = 200 \text{ Gpa}$. 10



4. (a) Draw influence line diagram for member 4, 5 and 6 of truss shown in fig. 10
Assume that the load moves along the bottom chord.



- (b) A three hinged parabolic arch of 20 m span and 3 m rise is carrying a point load of 100 kN at a section 7.5 m from left support. Find the values of horizontal thrust and BM at a point from right support. 10
5. (a) A cable of suspension bridge of span 60 m is suspended from piers which are 7.5 m and 1.5 m respectively above the lower point of cable. The load carried by each cable is 20 kN/m. Find out the 10
(a) Horizontal tension in the cable
(b) Maximum tension in cable at pier.
- (b) A wooden cantilever beam of rectangular cross section supported at an inclined load P at its free end. Calculate maximum tensile stress and maximum deflection of the beam due to load P. Details of beam are as follows: 10
 $B = 75 \text{ mm}$, $h = 150 \text{ mm}$, $L = 1.5 \text{ m}$, $P = 800 \text{ N}$, $\theta = 29.52^\circ$

