



ANJUMAN-I-ISLAM'S

AIKTC KALSEKAR TECHNICAL CAMPUS

INNOVATIVE TEACHING - EXUBERANT LEARNING

School of Architecture

School of Engineering & Technology

School of Pharmacy

Knowledge Resource & Relay Centre (KRRC)

AIKTC/KRRC/SoET/ACKN/QUES/2022-23/

Date: 25/01/23

School: SoET-REV. C-SCHEME Branch: CIVIL ENGG. SEM: IV

To,
Exam Controller,
AIKTC, New Panvel.

Dear Sir/Madam,

Received with thanks the following **Semester/Unit Test-I/Unit Test-II (Reg./ATKT)** question papers from your exam cell:

Sr. No.	Subject Name	Subject Code	Format		No. of Copies
			SC	HC	
1	Applied Mathematics- IV	CE-C401		✓	
2	Structural Analysis	CE-C402		✓	
3	Surveying	CE-C403		✓	
4	Building Materials & Concrete Technology	CE-C404		✓	
5	Fluid Mechanics-II	CE-C405		✓	
6	Hons: Concrete Consultant Practices			✓	

Note: SC – Softcopy, HC - Hardcopy

(Shaheen Ansari)
Librarian, AIKTC

(3 Hours)

[Total Marks: 80]

N.B.: 1) Question No. 1 is Compulsory.

2) Answer any THREE questions from Q.2 to Q.6.

3) Figures to the right indicate full marks.

Q.1 (a) What is the value of $\int_0^{1+i} (x - y + ix^2) dz$ along the line from $z = 0$ to $z = 1 + i$ (5)

(b) Find a and b such that $\vec{F} = (axy + z^3)i + x^2j + bz^2xk$ is irrotational (5)

(c) A random variable X has probability mass function $p(x) = kx^3$; $x=1,2,3,4$ then find the value of k, mean, variance. (5)

(d) Find the probability that at most 4 defective bulbs will be found in a box of 200 bulbs if it is known that 2% of the bulbs are defective. (5)

Q.2 (a) Find the rank correlation coefficient between X and Y; (6)

X	17	13	15	16	6	11	14	9	7	12
Y	36	46	35	24	12	18	27	22	2	8

(b) A random variable has the MGF $M_X(t) = \frac{3}{3-t}$. Find mean and Variance of X. (6)

(c) Obtain Laurent's series expansions of $f(z) = \frac{z-1}{z^2-2z-3}$; $|z| > 3$. (8)

Q.3 (a) A coin is tossed. If it turns up heads two balls are drawn from urn A otherwise two balls are drawn from urn B. Urn A contains 3 black and 5 white balls. Urn B contains 7 black and one white ball. What is the probability that urn A was used, given that both balls drawn are black? (6)

(b) Fit a straight line $y = a + bx$ into the given data. (6)

x:	10	20	30	40	50
y:	22	23	27	28	30

(c) Prove that $\vec{F} = (6xy^2 - 2z^3)i + (6x^2y + 2yz)j + (y^2 - 6z^2x)k$ is irrotational. Find scalar potential of \vec{F} . Hence find the work done of moving particle from (1,0,2) to (0,1,1). (8)

- Q.4 (a) Using Green's Theorem evaluate $\int_c (xy + y^2)dx + x^2dy$ and c is closed curve of the region bounded by $y = x$ and $y = x^2$. (6)
- (b) A machinist is expected to make engine parts with axle diameter of 1.75 cm. A random sample of 10 parts shows a mean diameter of 1.85 cm, with a S.D of 0.1 cm. Based on this sample, would you say that the work of the machinist is inferior? (6)
- (c) A random variable X follows a normal distribution with mean 14 and standard deviation 2.5 find (1) $P[X < 8]$ (2) $P[X > 18]$ (3) $P[12 < X < 15]$ Given: Area between $z=0$ and $z=2.4$ is 0.4918 ; Area between $z=0$ and $z=1.6$ is 0.4452 ; Area between $z=0$ and $z=0.8$ is 0.2882 ; Area between $z=0$ and $z=0.4$ is 0.1554. (8)

- Q.5 (a) The standard deviation from two random samples of sizes 9 and 13 are 1.99 and 1.9. Can the samples be regarded as drawn from normal population with same standard deviation? ($F_{(8,12)}(0.025) = 3.51, F_{(12,8)}(0.025) = 4.20$) (6)
- (b) Use Gauss's Divergence Theorem to evaluate $\iint_S \bar{N} \cdot \bar{F} ds$, where $\bar{F} = 4xi - 2y^2j + z^2k$ and S is region bounded by $x^2 + y^2 = 4, z = 0, z = 4$. (6)
- (c) Obtain both Line of regressions for the data given below (8)
Given $\sum X = 250 ; \sum Y = 300 ; \sum XY = 7900 ; \sum X^2 = 6500 ; \sum Y^2 = 10000$ and $n = 10$ (in usual notation)

- Q.6 (a) Evaluate Value of $\int_C \frac{\sin 2z dz}{(z + \pi/3)^4}$ where $C: |z| = 2$ (6)
- (b) The following data find the correlation coefficient to marks obtained by 11 students in 2 tests, one held at the beginning of the year and the other at the end of the year after intensive coaching: (6)

Test 1	19	23	16	24	17	18	20	18	21	19	20
Test 2	17	24	20	24	20	22	20	20	18	22	19

- (c) A die was thrown 132 times and the following frequencies were observed. (6)

No. obtained	1	2	3	4	5	6	Total
Frequency	15	20	25	15	29	28	132

Test the hypothesis that the die is unbiased at 5% level of significance.

(Given: Table value of χ^2 at 5% level of significance and 5 degree of freedom is 11.07)

50 pm

CE-R-19 - SA.

12/12/22

Sem-IV - CBCS - KT

(3 Hours)

[Total Marks: 80]

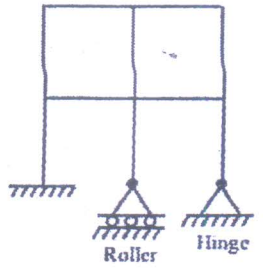
NOTE:

- Question No. 1 is compulsory.
- Attempt any Three out of the remaining five questions.
- Figure to the right indicates full marks. Draw neat sketches wherever necessary.
- Assume suitable data wherever required.

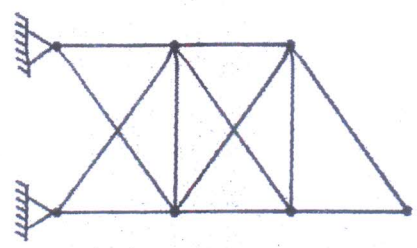
Q.1 Answer any four from the following. 20

(a) Find the static and kinematic indeterminacy of the structures given below.

i)



ii)



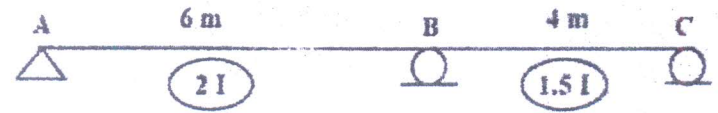
05

(b) State the assumptions in plastic theory. 05

(c) A three hinged parabolic arch of span L and rise h carries a uniformly distributed load of 'w' per unit over the whole span. Show that the arch is not subjected to any bending moment at any section. 05

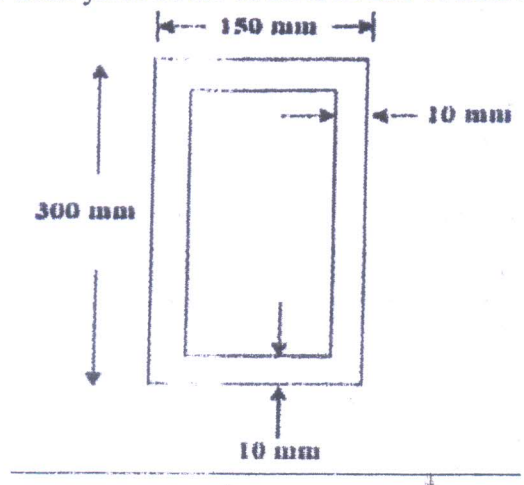
(e) Two-wheel loads 70kN and 120kN spaced at 5m apart move on a girder of span 20m. Find the maximum positive and negative shear force at a section 8m from the left end. Any wheel load can lead the other. 05

(f) Develop the stiffness matrix for the structure given below:

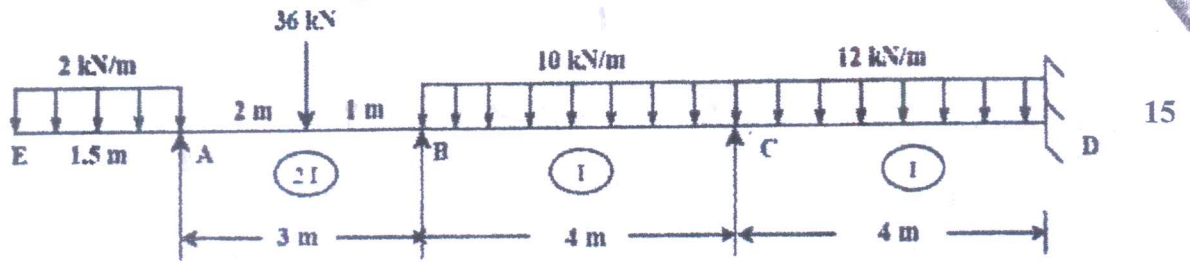


05

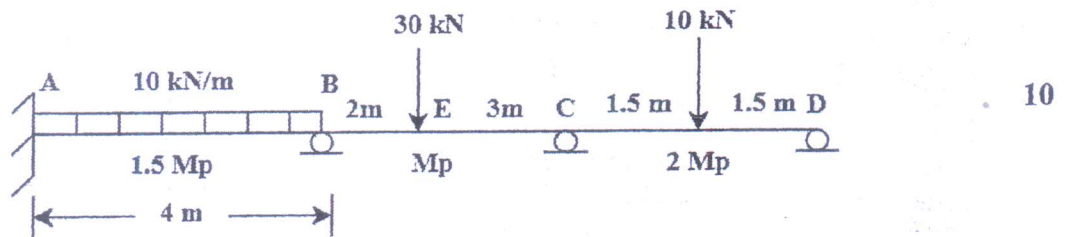
Q.2 (a) Determine the shape factor for the steel beam section given below. Also find the plastic moment of resistance. Take yield stress of steel as 250 N/mm^2 . 05



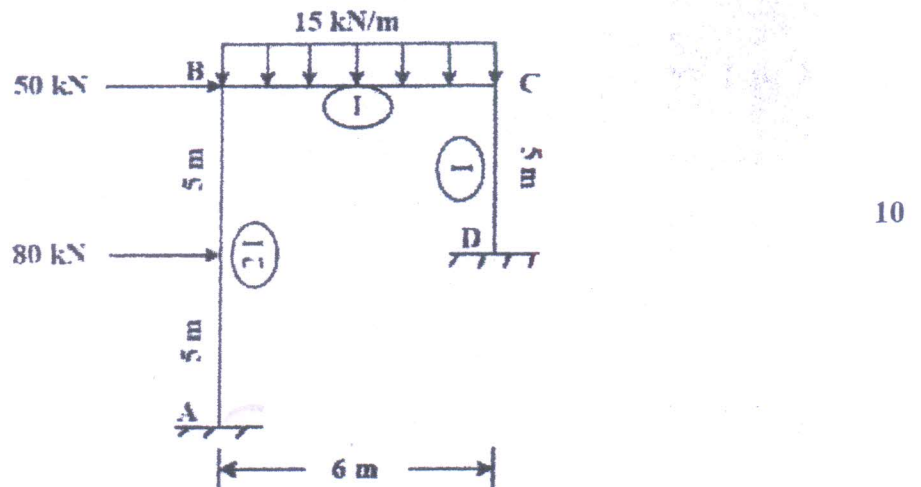
- (b) Analyse the beam given below using **moment distribution method**. Draw the bending moment and shear force diagram.



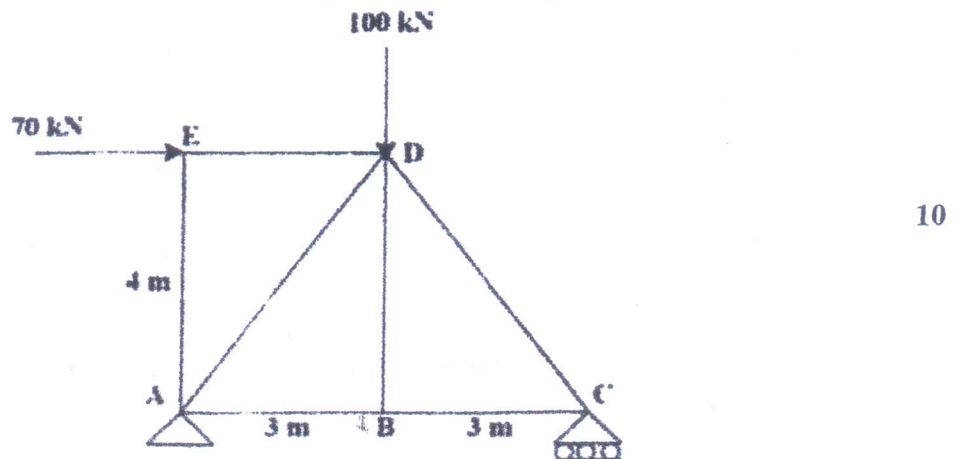
- Q.3 (a) Find the Plastic Moment ' M_p ' for the continuous beam given below.



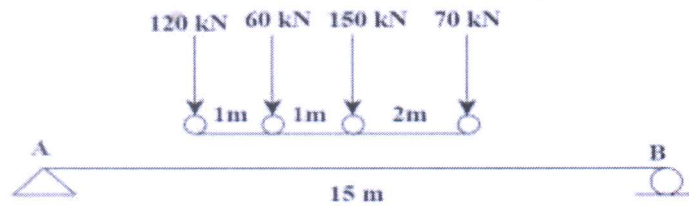
- (b) Using **Stiffness matrix method**, analyze the given portal frame. Draw the Bending moment Diagram.



- Q.4 (a) Find the forces in the members of the truss given below using the method of joints.



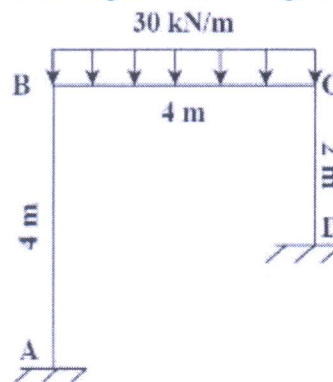
- (b) Find the absolute maximum bending moment on the girder with 70 kN load leading & moving from left to right.



10

- Q.5 (a) A three hinged parabolic arch (same level) has a span of 30m and a rise of 10m. The arch carries a UDL of 60 kN/m on the left half of its span. It also carries two concentrated loads of 160kN and 100kN at 5m and 10m from the right end respectively. Determine the Horizontal Thrust and Bending Moment under 160kN load. The portal frame ABCD is loaded and supported as shown below. Use **flexibility method** for analysis, draw the bending moment diagram. Consider $EI = \text{Constant}$.

05

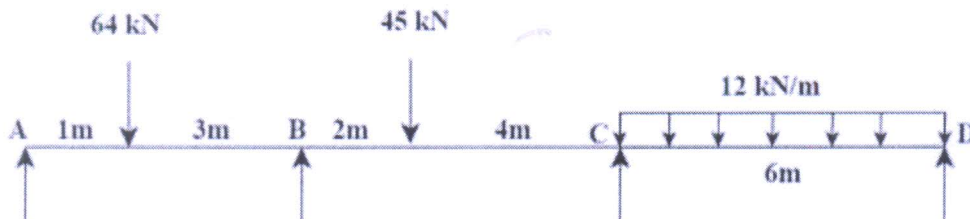


(b)

15

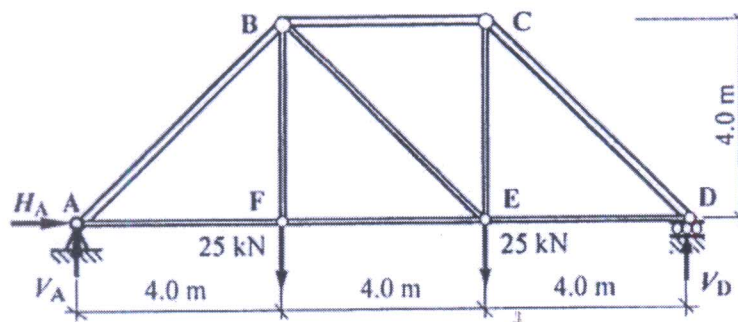
- Q.6 (a) Analyse the continuous beam by Clapeyron's Theorem. Draw the bending moment diagram. Consider I to be constant throughout the beam.

08



- (b) Find the vertical deflection at F (Δ_{VF}) using unit load method. $AE = \text{Constant}$.

12



3:30pm

Sem-IV-CBCS-KT

CE (R-19)

Time: 3 Hours

Total marks: 80

NOTE:

- Question No. 1 is compulsory.
- Attempt any three out of the remaining five questions.
- Figure to the right indicates full marks.
- Assume suitable data if required.

Q.1 Write notes on **any four** of the following questions. 20

- Differentiate Prismatic and Surveyor compass
- Characteristics of contour lines
- Radial contouring.
- Types of curves.
- Zero circle.

Q.2 A) The following consecutive readings were taken with a level and 4m levelling staff on a continuously sloping ground at common intervals of 30m. 10

0.905(on A), 1.745, 2.345, 3.125, 3.725, 0.545, 1.390, 2.055, 2.955, 3.455, 0.595, 1.015, 1.850, 2.655 and 2.945(on B)

The RL of A was 395.500. Calculate the RLs of different points and find the gradient of the line AB.

B) What are the difficulties faced in levelling? Explain. 10

Q.3 A) An incomplete traverse stable is given below 10

Line	Length(m)	Bearing
AB	100.0	?
BC	80.5	140° 30'
CD	60.0	220° 30'
DA	?	310° 15'

Calculate the length of DA and bearing of AB.

B). Explain the working procedure of repetition and reiteration methods. 10

Q.4 A) A tacheometer fitted with an analytic lens and having a multiplying constant of 100 was set up at R, which is an intermediate point on a traverse leg AB. The following reading were taken with the staff held vertically. 10

Staff station	Bearing	Vertical angle	Intercept (m)	Axial hair reading(m)
A	40° 35'	-4° 24'	2.21	1.99
B	22° 35'	-5° 12'	2.02	1.90

Calculate the length AB and the level difference between A and B

B) Explain the principle and applications of EDM. 10

Q.5 A) the following perpendicular offsets were taken from a chain line to a hedge 10

Distance (m)	0	5	10	15	20	30	40	50	65	80
Offset(m)	3.40	4.25	2.60	3.70	2.90	1.80	3.20	4.50	3.70	2.80

Calculate the area by Trapezoidal rule and Simpson's rule.

B) Explain the principle of Plane table surveying. Discuss about its merits and demerits? 10

Q.6 A) two straight lines AC and CB to be connected by a 3 deg curve, intersect at a chainage of 2,760 m. the WCBs of AC and CB are $45^{\circ}30'$ and $75^{\circ}30'$ respectively. Calculate all necessary data for setting out the curve by method of offsets from the long chord 10

B) What is bearing? Describe the types bearing with necessary diagram. 5

C) What is ranging? Explain the types of ranging. 5

16/12/22

30 pm

Sem - IV - CBC - KT

CE - (R-19)

(03 HOURS)

MARKS: 80

- Instructions:** (1) Question No.1 is compulsory
 (2) Answer any **Three Questions** from the remaining questions.
 (3) Draw neat sketches wherever essential.

Q1. Attempt any four out of six.**5 Marks Each**

- A) Enlist building construction materials and write their roles in construction
 B) Explain the seasoning of stones.
 C) State physical properties of OPC as per IS code and explain 'Normal Consistency' of cement.
 D) Define workability of fresh concrete and explain factors affecting of it
 E) What are the objectives in mix design?
 F) Enlist advantages of RMC.

Q2. A) Explain any five properties of CA and their influence on properties of concrete (10M)

B) Enlist the ingredients of mortar and its applications. (05M)

C) What is admixture? State the various functions of admixture. (05M)

Q3. A) What is the name of IS code to measure the workability of fresh concrete? Explain any one method to measure workability of fresh concrete. (10M)

B) Explain the dry process of manufacturing of cement. (06M)

C) Draw a neat labeled sketch of Modular burnt clay brick with dimensions. (04M)

Q4. A) Enlist the various components of RMC plant and draw a neat layout sketch of RMC plant (10M)

B) Enlist the methods of determining compressive strength of accelerated cured concrete test specimens as per IS 9013 – 2004. Explain any one of them. (10M)

Q5. A) Explain types of concrete mixes as per IS 456. (06M)

B) Explain Step-by-step procedure to determine Standard Consistency of a cement sample in the laboratory by mentioning IS code of it. (08M)

C) What are the various methods of NDT? Describe any one with sketch. (06M)

Q6. A) Explain demerits of distemper as compared to paints. (05M)

B) Draw a cross-section of a 'Trunk' of a tree and labeled it. (05M)

C) Write a note on quality of water for concrete. (05M)

D) Classify concrete based on their grades as per IS 456. (05M)

b) A crude oil of viscosity 0.97 poise and relative density is 0.9 flowing through a horizontal circular pipe of diameter 100 mm and oil length 10m. Calculate the difference of pressure at the two ends of the pipe. If 100 kg of the oil is collected in a tank in 30 seconds. (10)

Q.6 a) Derive Prandtl's Universal velocity distribution equation for turbulent flow in pipes what do you understand velocity defects. (10)

b) The pressure difference Δp in a pipe of diameter D and the length l due to turbulent flow depends on the velocity V viscosity μ density ρ and roughness K using Buckingham's π theorem obtain an expression for Δp . (10)

Sem - ~~IV~~ V - CBCS - Reg.CE
HONS.

3 Hours

[Max Marks: 80]

- N.B.: (1) Question No 1 is **Compulsory**.
 (2) Attempt any **three** questions out of the remaining five.
 (3) All questions carry equal marks.

- 1 Briefly explain the following (attempt any FOUR)
 - a Soundness test on cement (5 M)
 - b Segregation and bleeding (5 M)
 - c Super plasticizers and their effect on concrete (5 M)
 - d Rapid Chloride Penetration Test (5 M)
 - e Ready Mix Concrete and its merits (5 M)
- 2 a Enlist the various types of cement and briefly discuss their applications (10 M)
 - b Explain retarders and accelerators (5 M)
 - c Differentiate between Nominal Mix and Design Mix of concrete (5 M)
- 3 a Enlist the different shapes of aggregates. How do these shapes influence the workability of concrete? (10 M)
 - b List out the common quality problems observed while using ready mix concrete (5 M)
 - c Briefly discuss the effect of w/c ratio on strength and durability of concrete (5 M)
- 4 a Explain the mix design procedure of concrete as per IS Code method. (10 M)
 - b Define creep of concrete. What are the factors affecting creep of concrete (5 M)
 - c Explain the properties of GGBS. What are its advantages? (5 M)
- 5 a Describe briefly the procedure for determination of split tensile strength of concrete (10 M)
 - b Explain bulking of sand (5 M)
 - c What are the factors affecting proportioning of a concrete mix? (5 M)
- 6 a Mention the various non-destructive tests on concrete. Explain Rebound Hammer test (10 M)
 - b Explain compaction factor test (5 M)
 - c Discuss the use of silica fume in concrete (5 M)