Register Number :

Name of the Candidate :

0 1 8 0

B.E. DEGREE EXAMINATION, 2013

(CIVIL, CIVIL AND STRUCTURAL, MECHANICAL, MANUFACTURING, CHEMICAL ENGINEERING)

(FOURTH SEMESTER)

CLEC-401. MATHEMATICS - III
PROBABILITY AND STATISTICS

May] [Time : 3 Hours

Maximum : 75 Marks

(Maximum 60 Marks for the students who joined before 2011-12)

Answer any ONE FULL question from each unit.
ALL questions carry EQUAL marks.

Turn Over

UNIT – I

1. (a) A continuous r.v x has p.d.f.

$$f(x) = \begin{cases} \frac{x+1}{2} & ; -1 \le x \le 1. \\ 0, & \text{otherwise.} \end{cases}$$

find the first four central moments, mean and variance. (7½)

(b) Find the m.g.f. of

$$f(x) = \begin{cases} 2e^{-2x} & ; x \ge 0. \\ 0, & \text{otherwise.} \end{cases}$$

Also, find the mean and variance. (7½)

2. The joint p.d.f. of the r.v. x & y is

$$f(x, y) = K xy e^{-(x^2 + y^2)}$$

$x > 0, y > 0.$

(a) Find K.

(b) Prove that x, y are independent.

(c) Find the conditional density functions. (15)

UNIT – II

3. (a) Show that the

R.P. $X(t) = A \cos(\omega t + \theta)$,

A and W are constants, θ is uniformly distributed in $(0, 2\pi)$ is not stationary. (7½)

(b) Show that

(i) $R_{xx}(-\tau) = R_{xx}(\tau)$.

(ii) $R_{xx}(0) = E(x^2(t))$. (7½)

4. (a) Find the mean and variance of the stationary R.P. whose auto correlation function is

$$R_{xx}(\tau) = \frac{25\tau^2 + 36}{6.25\tau^2 + 4}$$

(7½)

(b) If x(t) and y(t) are two WSS processes, then show that

$$|R_{xy}(\tau)| \le \frac{1}{2}\left(R_{xx}(0) + R_{yy}(0)\right)$$

(7½)

Turn Over

UNIT - III

5. (a) A coin is tossed 900 times and heads appeared 490 times. Can you say that the coin is unbiased? (7½)

   (b) An experiment was conducted on nine rats. The experiment showed that due to smoking, the pulse rate is increased in the following order.

   5, 3, 4, –1, 2, –3, 4, 3, 1.

   Can you maintain that smoking leads to an increase in the pulse rate? (7½)

6. (a) Two sets of 100 students each were taught to read by two different methods. After the instructions over, a reading test given to them reveal

   $\overline{x_1} = 73{\cdot}4$, $\overline{x_2} = 70{\cdot}3$.

   $s_1 = 8$ and $s_2 = 10$.

   Test the hypothesis that $\mu_1 = \mu_2$. (7½)

(b) A die is thrown 132 times with the following results :

No. Turned up	1	2	3	4	5	6
Frequency	16	20	25	14	29	28

Test the hypothesis that the die is unbaised? (7½)

UNIT - IV

7. Three different machines are used for a production. On the basis of the outputs, set up one-way ANOVA table and test whether the machines are equally effective :

Machine - I	10	15	11	10
Machine - II	9	7	5	6
Machine - III	20	16	10	14

(7½)

8. Ten samples each of size 5 are drawn at regular intervals from a manufacturing process. The sample means ($\bar{x}$) and their ranges (R) are given below :

Sample No:	1	2	3	4	5
Mean ($\bar{x}$) :	49	45	48	53	39
Range (R):	7	5	7	9	5

6	7	8	9	10
47	46	39	51	45
8	8	6	7	6

Calculate the control limits in respect of $\bar{x}$ - chart and R-chart. (15)

UNIT - V

9. Given that

$$R(t) = \frac{1}{e^{\sqrt{0.001}\, t}}, \quad t \geq 0.$$

(a) Compute the realiability for a 50 hours mission.

(b) Show that the hazard rate is decreasing.

(c) Given a 10 hour wear-in period, compute the reliability for 50 hour mission.

(d) What is the design life for a reliability of 0·95, given a 10 hour wear-in period? (15)

10. Compute the reliability of the system as shown in figure -1. (15)

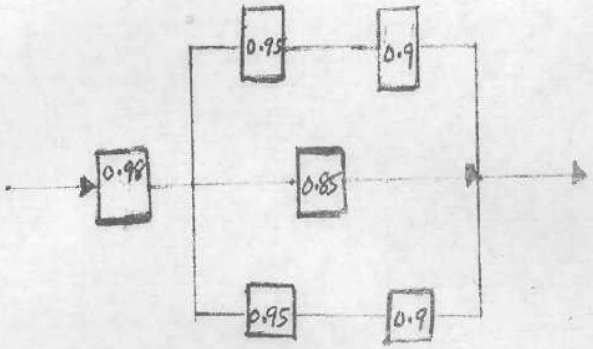

Figure -1

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B.E. DEGREE EXAMINATION, 2013

(CIVIL ENGINEERING)

(FOURTH SEMESTER)

CLEC-402 / PCLEC-102. SURVEYING - I

May] [Time : 3 Hours

Maximum : 75 Marks

(Maximum 60 Marks those who joined before 2011-12)

Answer any ONE FULL question from each unit.
ALL questions carry EQUAL marks.

UNIT – I

1. Explain how you would determine the constants of a tacheometer. List out the advantages of an anallactic lens used in a tacheometer.

(OR)

Turn Over

2. A theodolite has a tacheometric multiplying constant of 100 and and an additive constant of zero. The centre reading on a vertical staff held at point-B has 2·292 m when sighted from A. If the vertical angle was + 25° and the horizontal distance AB 190·326 m. Calculate the other staff readings and show that the two intercept invervals are not equal. Using these values, calculate the level of B if A is 37·950 m and the height of instrument is 1·35 m.

UNIT - II

3. What are the common difficulties in setting out simple curves? Describe briefly the method employed in overcoming them.

(OR)

4. A compound curve is to connect two straights having a deflection angle of 90°. As determined from the plan, the lengths of the two tangents are 350 m and 400 m respectively. Calcualte the lengths of the two arcs if the radius of the first curve is 300 m.

UNIT - III

5. (a) How do you determine the intervisibility of triangulation stations? (10)

   (b) Explain how you would extend a base line. (5)

(OR)

6. A steel tape 20 m long standardised at 55°F with a pull of 100 N was used for measuring a base line. Find the connection per tape length, if the temperature at the time of measurement was 80°F and the pull exerted 160 N,

   Mass of 1 cubic cm of steel = 7·86 g.

   Mass of tape = 0·8 kg.

   $E = 0{\cdot}21 \times 10^6$ N/mm^2.

   Co-efficient of expansion of tape per 1°F = $6{\cdot}2 \times 10^{-6}$.

UNIT - IV

7. Enumerate the principle of least squares. Show how this principle is used for determining two unknowns in linear equations.

(OR)

8. Angles were measured on a station and the observations were recorded as follows :

Angle	Value	Weight
A	45°30′10″	2
B	40°20′20″	3
A + B	85°50′10″	1

Find the most probable values of the angles A and B.

UNIT - V

9. Two triangulation stations A and B are 2,800 m apart. Observations were made for vertical angle of elevation from A to B and the mean angle observed from 1°28′32″. The height of

instrument was 1·38 m and the signal was 2·46 m high. If the reduced level of station A was 125 m and the co-efficient of refraction was 0·07, calculate the reduced level of B. The radius of the earth is 6,372 km.

(OR)

10. (a) Explain in detail the spherical trignometry. (10)

(b) Write a short note on Napier's rule. (5)

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B.E. DEGREE EXAMINATION, 2013

(CIVIL ENGINEERING)

(FOURTH SEMESTER)

CLEC-403. MECHANICS OF SOLIDS - II

May] [Time : 3 Hours

Maximum : 75 Marks

(Maximum 60 Marks for the students who joined before 2011-12)

Answer any ONE FULL question from each unit.
ALL questions carry EQUAL marks.

Turn Over

UNIT – I

1. Determine the forces in all the members of the truss shown in figure-1 by method of joints and indicate the magnitude and nature of forces on the diagram of the truss. (15)

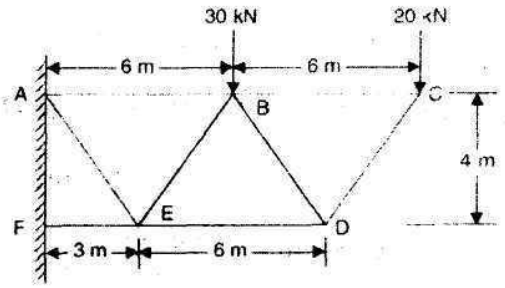

Figure - 1

2. Detemine the forces in all the members of the truss shown in figure-1 by method of sections and indicate the magnitude and nature of forces on the diagram of the truss. (15)

UNIT - II

3. A rectangular section beam 80 mm × 50 mm is arranged as a cantilever 1·3 m long and loaded at its free end with a load of 5 kN inclined at an angle of 30° to the vertical as shown in figure-2. Determine the position and magnitude of the greatest tensile stress in the section. What will be vertical deflection at the end? E = 210 GN/m^2. (15)

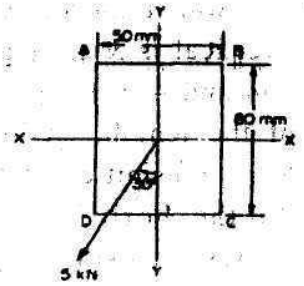

Figure -2

4. A cantilever of length 2 m is constructed from 150 × 100 mm by 12 mm angle and arranged with its 150 mm leg vertical. If a vertical load of 5 kN is applied at the free end passing through the shear centre of the section, determine the maximum tensile and compressive stresses set up across the section. (15)

Turn Over

UNIT - III

5. An unequal angle section 60 mm × 40 mm × 6 mm is used as a strut for a length of 3m. The strut may be considered as hinged at top and fixed at bottom. Using Euler's formula, calculate the safe load the column can carry, at a factor of safety of 2.

   Take E as 2×10^5 N/mm^2. (15)

6. A masonary wall trapezoidal in section with one face vertical is 3 m long, 8 m high, 1 m wide at top and 4 m wide at bottom. In the middle of the length, an inclined thrust of 141·4 kN is transmitted at the top at angle of 45° to the horizontal. Calculate the extreme stesss intensities at the base, if the masonary weighs 20 kN/m^3. (15)

UNIT - IV

7. A cylindrical shell is 3 m long, 1 m internal diameter and 15 mm metal thickness. Calculate the maximum intensity of shear stress induced and also, the changes in the dimensions of the thin shell if it is subjected to an internal pressure of 1·5 N/mm^2. Take E as $0{\cdot}204 \times 10^6$ N/mm^2 and Poisson's ratio as 0·3. (15)

8. A steel cylinder of outer diameter of 305 mm and inside diameter 254 mm is shrunk on to one having diameter 254 and 203 mm, the interference fit being such that under internal pressure p, the inner tensile stress in both cylinders is 86 N/mm^2. Find the initial difference in nominal 254 mm diameter and the value of p is E = $2{\cdot}11 \times 10^5$ N/mm^2.(15)

UNIT - V

9. A horizontal flat steel strip 12 mm wide and 6 mm thick is clamped at one end with 12mm side horizontal and carries a weight of 5 N at the free end. Find the distance of the weight from the fixed end if the frequency of natural vibrations of the strip is 50 /sec. Take E as $2{\cdot}1 \times 10^5$ N/mm^2. (15)

10. A beam of length L is fixed at the ends and weight W per unit length. Obtain an expression for the natural frequency of vibrations if it carries a central point load W. (15)

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B.E. DEGREE EXAMINATION, 2013

(CIVIL ENGINEERING)

(FOURTH SEMESTER)

CLEC-405.ESTIMATION AND VALUATION

May] [Time : 3 Hours

Maximum : 75 Marks

(Maximum 60 Marks for the students who joined before 2011-12)

Questions in Unit-I and II are compulsory.

Answer any ONE FULL question from Units III, IV and V.

Assume any other data, if necesssary.

ALL questions carry EQUAL marks.

Turn Over

UNIT – I

1. Prepare a detailed estimation of a single room building having a front verandah from the given drawings Enclosed (Figure-1). General specifications are as follows : (15)

   Foundation and plinth - First class brickwork in 1 : 6 cement and local sand mortar over lime concrete, 2 cm D.P.C. of 1 : 2 cement mortar mixed with standard water proofing material.

   Super structure :

   Assume necessary data, if necessary.

UNIT - II

2. Prepare the detailed data for the following items and calculate the rates : (15)

   (a) RCC work in CC 1 : 1½ : 3 for beam 1 m^3.

   (b) Ceiling with CM.1 : 3 - 18 mm thick - 10 m^2.

UNIT - III

3. What are the items to be included in tender documents and explain with tender procedure. (15)

4. Write a technical specification of cement concrete (1 : 2 : 4) works. (15)

UNIT - IV

5. What are the documents should attached to the contract agreement or bond before the work is given out on contract? (15)

6. Briefly discuss the mode of payment in the public works accounts. (15)

UNIT - V

7. How valuation is done and rent is fixed for government building? (15)

8. A three storied building is standing on a plot of land measuring 800 m^2. The plinth area of each storey is 400 m^2. The building is of RCC framed structure and the future life may

be taken as 70 years. The building fetches a gross rent of ₹1,500 per month. Work out the capitalized value of the property on the basis of 6% net yield. For sinking fund 3%, compound interest may be assumed. Cost of land may be taken as ₹ 40 /m^2. Other data required may be assumed suitably. (15)

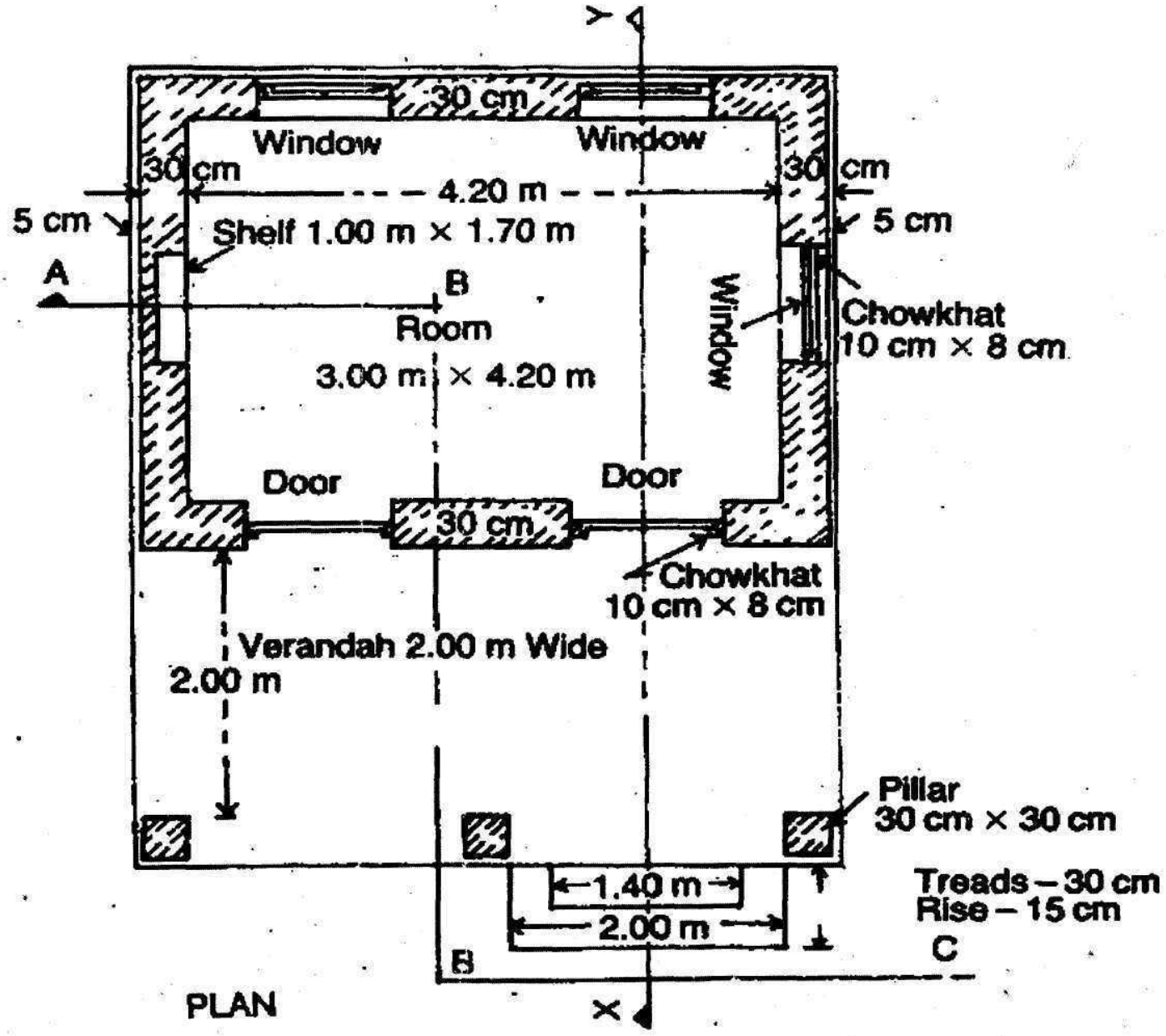
Y
30 cm
Window
Window
30 cm
30 cm
4.20 m
5 cm
5 cm
Shelf 1.00 m × 1.70 m
A
B
Room
3.00 m × 4.20 m
Window
Chowkhat
10 cm × 8 cm
Door
Door
30 cm
Chowkhat
10 cm × 8 cm
Verandah 2.00 m Wide
2.00 m
Pillar
30 cm × 30 cm
1.40 m
2.00 m
Treads – 30 cm
Rise – 15 cm
C
B
PLAN
X

Figure - 1

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B.E. DEGREE EXAMINATION, 2013

(CIVIL ENGINEERING)

(FOURTH SEMESTER)

CLEC-406. TRANSPORTATION ENGINEERING - I

May] [Time : 3 Hours

Maximum : 75 Marks

(Maximum 60 marks those who joined before 2011 - 12)

Answer any ONE FULL question from each unit.
ALL question carry EQUAL marks.

UNIT – I

1. List out the classification of roads in India and explain them in detail. (15)

(OR)

Turn Over

2 Explain briefly super elevation, camber and sight distance. (15)

UNIT – II

3. Name the usual tests employed for evaluating road aggregates. Explain how abrasion test is carried out on aggregate sample in Laboratory. (15)

(OR)

4. Describe the construction procedure of Bituminous concrete roads. (15)

UNIT – III

5. List the various types of traffic signals and mention their advantages and disadvantages. (15)

(OR)

6. Discuss briefly the various design elements that are to be considered in rotary intersection design. (15)

UNIT – IV

7. How Land use and city planning controls shall be effectively implemented. (15)

(OR)

8. Comment on the adverse effects of traffic on the environment. (15)

UNIT – V

9. Draw a typical layout of an airport with two non-intersecting runways showing all the important elements. Explain the functions of each elements. (15)

(OR)

10. Describe the importance of runway lighting . Explain threshold lighting with the help of sketches. (15)

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B.E. DEGREE EXAMINATION, 2013

(CIVIL ENGINEERING)

(FOURTH SEMESTER)

CSEC-403 / PCSEC - 105. SURVEYING

(For Candidates of 2010-11 batch and later)

May] [Time : 3 Hours

Maximum : 75 Marks

Maximum 60 Marks those who joined before 2011-12)

Answer any ONE FULL question from each unit. ALL questions carry EQUAL marks.

UNIT – I

1. Explain the procedure of chaining. How will you record the measurements of chain survey?

(OR)

Turn Over

2. Explain the three point problem and the different methods of solving it.

UNIT - II

3. (a) Bring out the differences between a dumpy level and a tilting level.

   (b) Explain the principle of direct levelling.

(OR)

4. An observer at sea was just able to see the top of a lighthouse when 60 km away from it. Find the height of the lighthouse.

UNIT - III

5. Draw a neat sketch of a vernier theodolite. Describe its main parts and their functions.

(OR)

6. Find the length of BC and bearing of EA from the data given below :

Line	AB	BC	CD	DE	EA
Length(m)	282·2	---	324·7	381·6	359·6
Bearing	61°30′	151°24′	201°02′	280°14′	--

UNIT - IV

7. State the tachometric formula for horizontal and inclined lines of sight and explain what each term depicts.

(OR)

8. Explain the principle of working of a sextant. How is it different from an optical square?

UNIT - V

9. Explain the objective and basic principle of triangulation.

(OR)

10. Describe briefly the connections to be made to field measurements with a tape.