B.E. DEGREE EXAMINATION, 2016

[CIVIL ENGINEERING]

(FOURTH SEMESTER)

CLEC - 401 / CSEC - 401 / MEEC - 401 / MFEC - 401 / CHEC - 401 .
PROBABILITY AND STATISTICS / ENGINEERING MATHEMATICS - III

[Common to Civil and Structural, Mechanical, Manufacturing and Chemical Engineering]

November]   [Time : 3 Hours

Maximum : 75 Marks.

Answer any ONE FULL question from each unit.

Use of statistical table is permitted.

UNIT - I

1. The diameter of an electric cable x is a continuous RV with P.d.f. $f(x) = kx(1-x)$, $0 \leq x \leq 1$. Find :

    (a) Value of k (b) The c.d.f. of x (c) $p\left(x \leq \frac{1}{2} \quad \frac{1}{3} < x < \frac{2}{3} \right)$.

    (d) a number b such that $p(x < b) = p(x > b)$.   (15)

(OR)

2. Let X and Y be two random variables having the joint probability function $p(n, y) = k(x+2y)$ where x and y can assume only the integers 0, 1 and 2. Find marginal and conditional distributions and also, find the probability distribution of $(x+y)$.   (15)

UNIT - II

3. (a) If $\{x(t)\}$ is a wide sense stationary process with auto correlation $R(y) = Ae^{-\alpha|\tau|}$, determine the second order moment of RV $x(8) - x(5)$.   (7)

    (b) Verify whether the sine wave process $\{ x(t) \}$, where $x(t) = Y \cos \omega t$ where Y is uniformly distributed in (0, 1) is a SSS process.   (8)

(OR)

4. (a) A stationary process has an auto correlation function given by $R(\tau) = \dfrac{25\tau^2 + 36}{6\cdot25\tau^2 + 4}$. Find the mean and variable of the process. (7)

   (b) Show that $R_{x^1x^1}(t_1, t_2) = -\dfrac{\partial^2}{\partial t_1 \partial t_2} R_{xx}(t_1, t_2)$. (8)

UNIT - III

5. (a) In a simple sample of 600 men froma a large city, 400 are found to be car owners. If one of 900 from another large city, 450 are car owners. Do the data indicate that the cities are significantly different with respect to car owning among men? (8)

   (b) Two independent samples from normal populations with equal variances gave the following results. Test for the equality of means. (7)

sample	size	mean	S.D
1	16	23·4	2·5
2	12	24·9	2·8

(OR)

6. (a) Two samples of sizes 8 and 10 give the sum of squares of deviations from their respective means equal to 95 and 102 respectively. Can the samples be regarded as drawn from the same normal population having the same variance. (8)

   (b) A die is thrown 272 times with the following results, show that the die is biased. (7)

No. appeared on the die	1	2	3	4	5	6
Frequency	40	32	28	58	54	60

UNIT - IV

7. The following are the number of mistakes made in 5 successive days of 4 technicians working in a photographic labaratory: (15)

	Technician		
I	II	III	IV
6	14	10	9
14	9	12	12
10	12	7	8
8	10	15	10
11	14	11	11

Test at 1% level of significance whether the differences among the 4 sample means can be attribued to chance

(OR)

8. Five doctors, each test treatments for a certain disease and observe the number of days each takes to recover. The results are as follows: (Recovery time in days). (15)

Doctors	Treatments				
	1	2	3	4	5
A	10	14	23	19	20
B	11	15	24	17	21
C	9	12	20	16	19
D	8	13	17	17	20
E	12	15	19	15	22

Discuss the difference between doctors and treatments.

UNIT - V

9. The time to failure in operating hours of a critical solid state power unit has the hazard rate function $\lambda (t) = 0 \cdot 003 \left(\dfrac{t}{500} \right)^{0 \cdot 5}$, for $t \geq 0$.

   (a) What is the reliability if the power unit must operate continuously for 50 hours?

   (b) Determine the design life if a reliability of $0 \cdot 90$ is desired.

   (c) Compute the MTTF.

   (d) Given that the unit has operated for 50 hours.

   What is the probability that it will survive a second 50 hours of operations? (15)

(OR)

10. Six identical components with constant failure rates are connected in:

   (a) high level redundancy with 3 components in each sub systems.

   (b) low level redundancy with 2 components in each sub system.

   Determine the component MTTF in each case, necessary to provide a system reliability of $0 \cdot 90$ after 100 hours of operation. (15)

B.E. DEGREE EXAMINATION, 2016

(CIVIL ENGINEERING)

(FOURTH SEMESTER)

CLEC-402 / PCLEC-102. SURVEYING - I

(Common with Part-Time)

November]   [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit.

UNIT – I

1. Describe briefly about the measurement of large areas, using chain surveying by setting out baseline, checkline, tie lines and angles.   (15)

(OR)

2. (a) Describe the term closed and open traverse in chain survey.   (10)

   (b) State the instruments used in chain surveying.   (5)

UNIT - II

3. With neat sketch, explain briefly the components of a prismatic compass.   (15)

(OR)

4. (a) What is local attraction? How it is detected and eliminated?   (5)

   (b) Define the term : (2×5)

       (i) Thye bearing.   (ii) Reduced bearing. (iii) Magnetic bearing.

       (iv) Fore bearing.   (v) Back bearing.

UNIT - III

5. Describe briefly about the various methods of plane tabling.   (15)

(OR)

6. The following perpendicular offsets were taken at 10 metres intervals from a surveyline to an irregular boundary line :

   3·25, 5·60, 4·20, 6·65, 8·75, 6·20, 3·25, 4·20, and 5·65 metres.

   Calculate the area enclosed between the suvery line, the irregular boundary line and first and last offsets by the application of

   (a) Trapezoidal rule.   (b) Simpson's rule. $(8 + 7)$

UNIT - IV

7. Write short notes on : (15)

    (a) Permanent ajdustment of level.   (b) Connection for curvature and refraction.

(OR)

8. The following staff readings were observed with a level, the instrument have been moved after third, sixth and eighth readings :

    2·228, 1·606, 0·988, 2·090, 2·864, 1·262, 0·602, 1·982, 1·044, 2·684 metres.

Enter the above readings in the page at a level field book and calculate the R.L. of the points, if the first reading was taken with a staff held on a bench mark of 432·384 m. (15)

UNIT - V

9. Briefly explain the measurement of horizontal angles by repetition and reiteration methods in theodolite surveying. (15)

(OR)

10. Explain the temporary adjustments of a transit theodolite. (15)

B.E. DEGREE EXAMINATION, 2016

(CIVIL ENGINEERING)

(FOURTH SEMESTER)

CLEC-403. MECHANICS OF SOLIDS - II

November]

[Time : 3 Hours

Maximum : 75 Marks

Answer ONE FULL question from each unit.

Assume suitable data, if missing.

ALL questions carry EQUAL marks.

UNIT – I

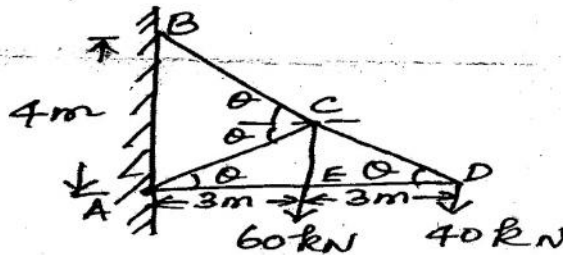1. Determine the forces developed in all members of truss shown in figure - 1. (All dimensions are in '*m*'.)

Figure-1

(OR)

2. Determine the horizontal displacement of roller end of D of portal frame shown in figure - 2. Assume EI = 8000 kNm^2 through out. (All dimensions are in '*m*'.)
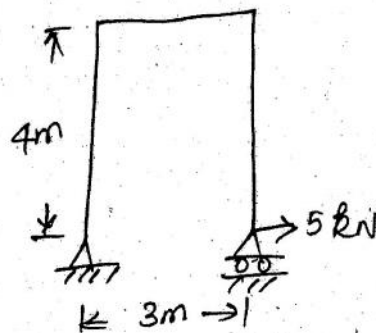
Figure-2.

UNIT - II

3. Determine the principal moment of inertia of unequal angle section shown in figure - 3.(All dimensions are in 'mm'.)
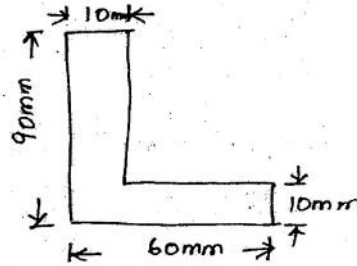

Figure-3.

(OR)

4. The cross-section of a T-beam (shown in figure-4) and is carrying a load acting in a plane 20° to vertical. Determine the stresses developed at corners A, B and C, if it is used as a simply supported beam of span 1 m and carrying a central concentrated load of 10 kN. (All dimensions are in 'mm.')
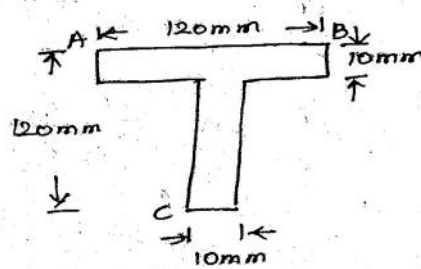

Figure-4

UNIT - III

5. Discuss in detail about the various theories of failures.

(OR)

6. Compare the crippling loads given by Euler and Rankine-Gordon formula for a pin jointed cylindrical structure with 1·75 m long and 50 mm diameter. Assume $\sigma_y = 315 MN/m^2$,

$a = \dfrac{1}{7500}$, $E = 200 GN/m^2$.

UNIT - IV

7. Determine the hoop and longitudinal stresses set up in a thin boiler shell of circular cross-section 5 m long and of 1·3 m internal diameter when the internal pressure reaches a value of 240 kN/m². What will then be the change in diameter? The wall thickness of the boiler is 25mm. (Consider $E = 210$ GN/m² and $\mu = 0.30$.)

(OR)

8. An external pressure of 10 MN/m^2 is applied to a thick cylinder of internal diameter 160 mm and external diameter 320 mm. If the maximum hoop stress permitted on the inside wall of the cylinder is limited to 30 MN/m^2. What maximum internal pressure can be applied assuming the cylinder has closed ends? What will be the change in outside diameter when this pressure is applied? (Assume E = 207 GN/m^2, $\mu = 0.29$.)

UNIT - V

9. Analyse the beam shown in figure - 5; and draw the SFD and BMD. (All dimensions are in 'm'.)
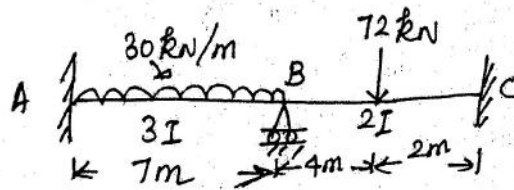

Figure-5.

(OR)

10. Analyse the beam shown in figure - 6; draw the SFD and BMD. Assume EI is constant throughout. (All dimensions are in 'm'.)
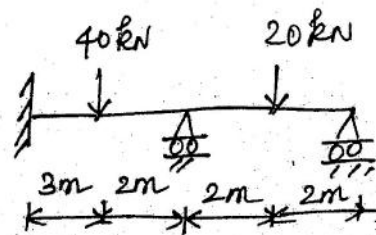

Figure-6.

B.E. DEGREE EXAMINATION, 2016

(CIVIL ENGINEERING)

(FOURTH SEMESTER)

CLEC-404 / PCLEC-204. STRUCTURAL ENGINEERING - I

(Common with Part-Time)

November]   [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit.
IS - 456, IS-800 and SP-16 codes are permitted.
Assume suitable data wherever necessary.
ALL questions carry EQUAL marks.

$(5 \times 15 = 75)$

UNIT – I

1. Design a singly reinforced beam to carry a load of 15 kN/m. The clear span of the beam is 5·5 m. The bearing at each end is 300 mm. Use M20 concrete and Fe415 steel.

(OR)

2. Design a cantilever 3·5 m long carrying a superimposed load of 12 kN/m. Use M20 concrete and Fe415 steel.

UNIT - II

3. Design a RC slab for an office floor to carry a load of 8 kN/m^2 inclusive of its own weight over an effective span of 3·5 m simply supported at its ends. Materials used are M20 concrete and Fe415 steel bars. Use working stress method of design.

(OR)

4. Design a two way slab for a room of 4 m × 5 m with discontinuous and simply supported edges on all the sides with corners prevented from lifting. The slab has to support a live load of 3·5 kN/m^2. Materials used are M25 grade of concrete and Fe415 steel bars.

UNIT - III

5. Design a short rectangular RC column to carry an axial load of 800 kN and moment of M_x = 60 kN·m and M_y = 10 kN·m acting about an axes, bisecting the depth and width of the column respectively. The effective length about XX-axis is 4·8 m and about Y-axis is 3·5 m. The unsupported length about both axes is 4 m. Use M20 and Fe415.

(OR)

6. Design an isolated rectangular sloped footing for the column of size 230 mm × 530 mm, reinforced with 6 bars of 20 mm diameter and carrying an axial load of 910 kN. The bearing capacity of the soil is 300 kN/m^2. Use M20 concrete and Fe415 steel. Effective cover for bottom steel is 60 mm. Take offset from the face of the column equal to 50 mm.

UNIT - IV

7. A tie member consisting of angle section 80 mm × 60 mm × 8 mm is welded to a 8 mm gusset plate. Design the weld to transmit a load equal to the full strength of the member.

(OR)

8. A bridge truss diagonal carrries an axial pull of 250 kN. Two plates of 200 mm × 10 mm and 200 mm × 18 mm of the diagonal member are required to be joined together. Design a suitable splice. Adopt 20 mm diameter bolts.

UNIT - V

9. Design a tension member to carry a load of 300 kN. Two angles placed back to back with long leg outstanding are desirable. The length of the member is 3 m.

(OR)

10. Design a column with single lacing system to carry a factored axial load of 1500 kN. The effective height of the column is 4·2 m. Use two channels placed toe to toe.

3073

B.E. DEGREE EXAMINATION, 2016

(CIVIL ENGINEERING)

(FOURTH SEMESTER)

CLEC-405: ESTIMATION AND VALUATION

November]   [Time: 3 Hours

Maximum: 75 Marks

Answer any ONE FULL question from each unit

UNIT – I

1. a) Estimate water tank for 5 members in a family.   (8)

   b) Write short note on approximate and detailed estimates.   (7)

2. Calculate the quantity of earthwork for 200 metre length for apportion of a road in   (15)
   an uniform ground the heights of banks at the two ends being 1m and 1.6m. The
   formation width is 10m and side slope is 2:1 (horizontal: Vertical).Assume that
   there is no transverse slope.

UNIT – II

3. Discuss in detail the schedule of rates for materials and labourers.   (15)

4. How will you prepare data for different items of construction work?   (15)

UNIT – III

5. List out the types of specification and state the need for writing technical   (15)
   specifications.

6. Describe in detail the procedure for tender.   (15)

UNIT – IV

7. Explain in detail the essentials of contract conditions.   (15)

8. What is meant by arbitration? Explain in detail.   (15)

UNIT – V

9. How will you evaluate the valuation for lands and buildings and mention the   (15)
   methods followed for depreciation.

10. Write short notes on: (15)
    a)Capital gain tax
    b) Fixation of rent
    c) Leasehold properties.

******

B.E. DEGREE EXAMINATION, 2016

(CIVIL ENGINEERING)

(FOURTH SEMESTER)

CLEC-406. TRANSPORTATION ENGINEERING - I

November] [Time : 3 Hours

Maximum : 75 Marks

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

UNIT – I

1. Explain the different stages of ground surveys which are to be conducted for the construction of highways.

(OR)

2. Calculate the absolute minimum sight distance required to avoid a head on collision of two cars approaching from the opposite directions at 875 km/hr. Assume a reaction time of 2·5 sec. and co-efficient of friction of 0·85.

UNIT - II

3. Enumerate the steps in the construction of cement concrete pavement. Explain with sketch.

(OR)

4. Explain with sketch, the following testing methods : Penetration test and Softening point test on Bitumen.

UNIT - III

5. Write briefly about the acceleration and braking characteristics of vehicles observed on Indian roads.

(OR)

6. Explain the necessity of traffic sign and various types of traffic signs with signals at road intersection.

UNIT - IV

7. Discuss in detail the various methods of promoting public transport in our country.

(OR)

8. Write in detail the major reasons for air-pollution due to vehicles on the road and the methods of reducing the air-pollution.

UNIT - V

9. What is a wind rose diagram? Explain the different types of wind rose diagrams.

(OR)

10. What are the functions of airport drainage system?