Register Number :

Name of the Candidate :

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B.E. DEGREE EXAMINATION, 2014

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

(FOURTH SEMESTER)

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

(New Regulations)

(For the candidates of 2011-12 batch and later)

November]   [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each unit.
USE of Statistical Table is permitted.
ALL questions carry EQUAL marks.

UNIT – I

1. (a) A discrete random variable x has the probability function given below :

x :	0	1	2	3	4	5	6	7
p(x):	0	a	2a	2a	3a	a^2	$2a^2$	$7a^2 + a$

Find :

(i) The value of a. (ii) Distribution function of x and (Iii) Mean and variance of x.

(8)

(b) Given the joint probability density function of (x , y) as

$$f_{xy} (x, y) = 8xy , \quad 0 < x < y < 1.$$
$$= 0, \quad \text{otherwise.}$$

Find the marginal and conditional probability density functions of x and y. Are x and y independent?

(7)

(OR)

2. (a) A continuous random variable has the probability density function f(x) given by $f_X(x) = C\,e^{-|x|}$, $-\infty, < x < \infty$. Find the value of (i) C. (ii) Moment generating function of x and also, mean and variance of x. (8)

(b) The joint probability density function of x and y is given by

$$f_{xy}\,(x,\,y) = e^{-(x+y)}, \quad x > 0,\ y > 0,$$

find the probability density of $U = \dfrac{x+y}{2}$. (7)

UNIT - II

3. (a) The random process $\{x(t)\}$ whose probability distribution under certain condition is given by

$$P\{x(t) = n\} = \frac{(at)^{n-1}}{(1+at)^{n+1}}, \quad n = 1, 2, 3, 4, \ldots$$

$$= \frac{at}{1+at}, \quad n = 0.$$

Show that $\{x(t)\}$ is not a stationary process. (8)

(b) A stationary random processs $x(t)$ with mean 2 has the autocorrelation function

$\Re_{XX}(\tau) = 4\,e^{-\left(\frac{T}{10}\right)}$, determine the mean and variance of $Y = \int_{0}^{1} x\,(t)\,dt.$ (7)

(OR)

4. (a) A stochastic process is described by $x(t) = A\sin t + B\cos t$ where A and B are independent random variables with zero means and equal standard deviations. Show that the process is stationary of second order. (7)

(b) Consider two random process $x(t) = 3\cos(\omega t + \theta)$ and $y(t) = 2\cos\left(\omega t + \theta - \dfrac{\pi}{2}\right)$ where θ is a random variable uniformly distributed in $(0, 2\pi)$. Prove that $\sqrt{\Re_{xx}(0) \cdot \Re_{yy}(0)} \geq |\Re_{yy}(\tau)|$. (8)

UNIT - III

5. (a) A factory is producing 50000 pairs of shoes daily. From a sample of 500 pairs, 2% were found to be sub-standard quality. Estimate the number of pairs that can be reasonably expected to be spoiled at 95% level of confidence. (7)

(b) Calculate the expected frequencies for the following data presuming that the two attributes namely conditon of home and condition of the child are independent :

condition of the child	condition of the home	
	clean	dirty
clean	70	80
fairly clean	80	20
dirty	35	40

Use χ^2-test of 5% level to state whether the two attributes are independent. (8)

(OR)

6. (a) A college conducts both day and night classes intended to be identical. A sample of 100 day-students yields examination result as $\bar{x} = 72$, $\sigma = 14\cdot8$ and a sample of 200 night-students as mean $\bar{x} = 73\cdot9$, and S.D. $\sigma = 17\cdot9$. Are the two means statistically equal at 10% level? (7)

(b) A group of five patients treated with medicine-A weigh 42, 39, 48, 60 and 41 kgs. A second group of seven patients from the same hospital treated with medicine-B weigh 38, 42, 56, 64, 68, 69 and 62 kgs. Do you agree with the claim that the medicine-B increases weight significantly? (8)

UNIT - IV

7. Perform a Two-way ANOVA on the data given :

		Treatment - I		
		(i)	(ii)	(iii)
	1	30	26	38
	2	24	29	28
Treatment-II	3	33	24	35
	4	36	31	30
	5	27	35	33

Use coding method, subtract 30 from the given numbers. (15)

(OR)

8. A farmer wishes to test the effects of four different fertilisers A, B, C, D on the yield of rice. In order to eliminate sources of error due to variability in soil fertility, he uses the fertilizers in a Latin square arrangement as given below, where the number indicate yields in bushels per unit area :

A 18	C 21	D 25	B 11
D 22	B 12	A 15	C 19
B 15	A 20	C 23	D 24
C 22	D 21	B 10	A 17

Perform an analysis of variance to determine if there is a significant difference between the fertilizers at 5% level of significance. (15)

UNIT - IV

9. The time to failure in operating hours of a critical solid-state power unit has the hazard rate function $\lambda(t) = 0.003 \left(\dfrac{t}{500} \right)^{0.5}$, 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 the reliability of 0.90 is desired.

   (c) Compute the mean time to failure (MTTF).

   (d) Given that the unit has operated for 50 hours, what is the probability that it will survive a second 50 hours of operation? (15)

(OR)

10. (a) For a system having a Weibull failure distribution with a shape parameter of 1.4 and a scale parameter of 550 days, compute :

   (i) The reliability for a 100 days.

   (ii) The standard deviation and   (iii) The design life for a reliability of 0.90.

   (8)

(OR)

   (b) If two identical components having a guaranteed life of 2 months and a constant failure rate of 0.15 per year are connected in parallel, what is the system reliability for 10000 hours of continuous operation? (7)

Register Number :

Name of the Candidate :

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B.E. DEGREE EXAMINATION, 2014

(CIVIL ENGINEERING)

(FOURTH SEMESTER)

CLEC-402 / PCLEC-102. SURVEYING - I

November]
[Time : 3 Hours

Maximum : 75 Marks

(For the candidates of 2011-12 batch and later)

Answer any ONE FULL question from each unit.
Assume suitable data, if necessary.
ALL questions carry EQUAL marks.

UNIT – I

1. To find out the width of a river, flowing West-East two points P and Q are fixed along a bank 400 m apart. The bearings of a pole R on the other bank of the river as observed from P and Q are 30° and 315°. Determine the width of the river. (15)

(OR)

2. (a) What are the sources of cummulative errors in a long chain line? (8)

   (b) Differentiate between check lines and tie lines. (7)

UNIT - II

3. Find the back bearings of the following lines from the observed fore bearings :

   (a) LM =320° 24'.

   (b) PQ = 250° 50'.

   (c) RS = 156° 09'.

   (d) AB = 49° 20'. (15)

(OR)

4. Differentiate between Prismatic compass and Surveyor's compass. (15)

UNIT - III

5. (a) State the advantages and disadvantages of plane table surveying. (8)

   (b) Write short note on contouring. (7)

<p align="center">(OR)</p>

6. The following perpendicular offsets were taken at 22·86 m intervals from a chain line to an irregular boundary :

   2·995 m; 2·195 m; 1·410 m; 2·540 m; 3·040 m, 3·145 m and 2·440 m.

Calculate the area in square metres enclosed between the chain line, the irregular boundary by (a) Average ordinate rule. (b) Trapezoidal rule. (c) Simpson's rule. (15)

UNIT - IV

7. Differentiate between permanent and temporary adjustments in levelling. (15)

<p align="center">(OR)</p>

8. Derive an expression for calculating curvature and refraction effects in precise levelling. Assume diameter of earth as 12742 km. (15)

UNIT - V

9. The lengths and bearings of a closed traverse PQRS as follows :

Line	Length (m)	WCB
PQ	255	140° 42′.
QR	656	35° 00′.
RS	120	338° 42′.
SP	?	?

Calculate the length and bearing of line SP. (15)

<p align="center">(OR)</p>

10. Name the fundamental lines of a transit theodolite with their relationships. Which of these relationships come to play during temporary adjustment when the theodolite is used as a level? (15)

B.E. DEGREE EXAMINATION, 2014

(CIVIL ENGINEERING)

(FOURTH SEMESTER)

PCLEC-402: MANAGEMENT SCIENCE

November]   [Time : 3 Hours

Maximum : 75 Marks
(For the candidates of 2011-12 batch and later)

Answer One Full Question from each Unit.

UNIT – I

1. (a) Describe the salient features of different types of organization forms. (8)
   (b) How will you carryout project planning? Explain briefly various steps involved. (7)

(OR)

2. Objective of a firm is to maximize profit by producing Product A and/or Product B, both of which have to be processed on machines 1 and 2. Product A requires 2 hours on both machines 1 and 2, while Product B needs 3 hours on machine 1 and only 1 hour on machine 2. There are only 12 and 8 hours available on machine 1 and 2 respectively. The profit per unit is estimated at Rs. 600/- and Rs. 700/- in case of A and B respectively. Find the number of Product A and B, should produce to maximize the profit. (15)

UNIT – II

3. (a) Define marketing. Discuss the principles and functions of marketing. (8)
   (b) How appraisal of projects are classified? Explain the basic principle of each method. (7)

(OR)

4. (a) Compare cost accounting and financial accounting. (8)
   (b) Brief the factors affecting the working capital. (7)

UNIT – III

5. (a) What are the different methods of purchasing generally followed by construction firms? Explain the steps involved in the procurement cycle. (8)
   (b) Bring out the importance and objectives of material management (7)

(OR)

6. (a) What is vendor rating? State its importance in the supply of construction materials.
   (b) Rate the vendor quality based on the following conditions: (7)

	Fraction of Product Accepted	Fraction of Lots Accepted	Fraction of Lots Submitted
Vendor A	100%	1.00	1.00
Vendor B	80%	9.00	10.00
Vendor C	60%	8.00	15.00

(8)

UNIT – IV

7. (a) Explain the functions and objectives of Human Resource Management. (8)

(b) Make a comparative study of good systems of remunerating labour. Give your preference with justification. (7)

(OR)

8. Enumerate the common causes of construction accidents. Describe various measures to prevent them. (15)

UNIT – V

9. Draw a typical flow chart of an integrated accounting system for generation of financial reports of a construction firm. Explain the process. (15)

(OR)

10. (a) What are the benefits of a computerized project information system? (7)

(b) Discuss the accuracy and reliability of construction information. (8)

%%%%%%

UNIT – I

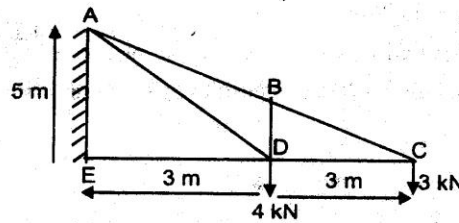1. Determine the magnitude and nature of forces in all members of the frame shown in figure-1.

Figure-1

(OR)

2. A pin jointed frame shown in figure-2 is hinged to a rigid wall at A and is free to slide vertically at E. The frame carries a vertical load W at B. The area of each tension member is 'a' and of each compression member is '2a'. The length of all the member is 'L'. Obtain an expression for the vertical deflection at C.
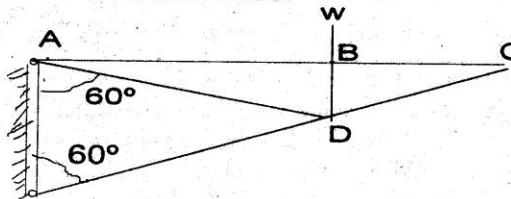

Figure-2

UNIT - II

3. A cantilever of I-section (flange 30 mm × 2·5 mm, web, 45 mm × 2·5 mm), 2·4 m long is subjected to a load of 200 N at the free end. The inclination of the load is 20° to the vertical. Determine the resulting bending stress at corners of the fixed section of the cantilever. (Figure-3)
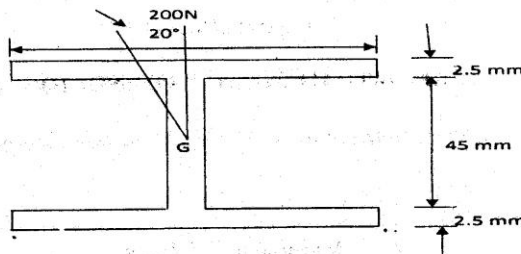

Figure-3

(OR)

4. A channel section has flanges 120 mm × 20 mm, web 160 mm × 10 mm. Determine the shear centre of the channel.

UNIT - III

5. A masonry chimney 24 m high of uniform circular section, 3·5 m external diameter and 2 m internal diameter is subjected to a horizontal wind pressure of 1 kN/m^2 of projected area. Find the maximum and minimum stress intensities at the base, if the self-weight of the masonry is 22 kN/m^3.

(OR)

6. Find the Euler's crushing load for a hollow cylndrical cast iron column 150 mm external diameter and 20 mm thick. It is 6 m long and hinged at both ends. Assume E = 80 GPa. Compare this load with crushing load given by Rankine's formula using σ_c = 567 MPa and α = 1/1600.

UNIT - IV

7. A cylindrical vessel whose ends are closed by means of rigid flange plates is made of steel plate 3 mm thick. The internal length and diameter of the vessel are 500 mm and 250 mm respectively. Determine the longituditinal and circumferential stresses in the cylindrical shell due to an internal fluid pressure of 30 MPa. Also, calculate the increase in length, diameter and volume of the vessel. Assume E = 2000 GPa and μ = 0·33.

(OR)

8. Calculate the thickness of metal necessary for a cylindrical shell of internal diameter 160 mm to withstand an internal pressure of 25 MPa, if maximum permissible tensile stress is 125 MPa.

UNIT - V

9. A cantilever of length 'L' loaded with UDL of 'w' per unit length over the whole span, is propped at the free end. Calculate the prop reaction if the prop is rigid. Also, draw the BMD and SFD.

(OR)

10. A fixed beam of 8 m span carries a UDL of 40 kN/m over 4 m length starting from left hand end and a concentrated load of 80 kN at a distance of 6 m from the left hand end. Find the moments at the supports.

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B.E. DEGREE EXAMINATION, 2014

(CIVIL ENGINEERING)

(FOURTH SEMESTER)

CLEC-404 / PCLEC-204 . STRUCTURAL 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. Find the area of steel required by IS: 456 and SP-16 method for a T-beam with b_f = 1500 mm b_w = 300 mm, d = 600 mm, D_f = 150 mm to carry an applied factored moment of 1080 kNm. Take f_{ck} = 30 N/mm^2 and f_y = 415 N/mm^2. (15)

(OR)

2. A room measures 4·3 m × 6·55 m. It is supported on 350 mm thick walls on all the four sides. The slab is simply supported at edges with no provision to resist torsion at corners. Design the slab using M-20 concrete and Fe-415 steel. Check the slab for shear and deflection. (15)

UNIT - II

3   Design an axially loaded column 400 mm × 400 mm pinned at both ends, with an unsupported length of 3 m for carrying a factored load of 2300 kN. Use M-20 concrete and Fe-415 steel. (15)

(OR).

4. Two reinforced concrete columns 400 mm × 400 mm in section carry a load of 1000 kN each, inclusive of the self weight. Design a combined footing having central beam joining the columns. The c/c spacing of the columns is 4 m. The SBC of soil is 150 kN/m^2. Use M-20 concrete and Fe-415 steel. (15)

UNIT - III

5. The general arrangement of a open-newel staircase with a quarter space-landing in a building is shown in figure-1. The risers are 150 mm and treads are 250 mm. Design the stair-case for a live load of 3000 N/m^2. The width of the stair is 1·5 m and the width of the wall is 400 mm. Use M-20 concrete and Fe-415 steel. (15)
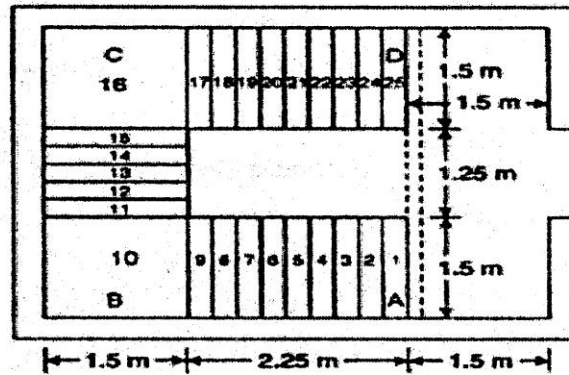

Figure -1

(OR)

6. Figure-2 shows the general layout of a staircase with central stringer beam, supported on columns B, C and D. The rise and tread of the stairs are 100 mm and 250 mm respectively. The width of the steps is 1·40 m. Design the staircase for a live load of 4000 N/m^2. (15)
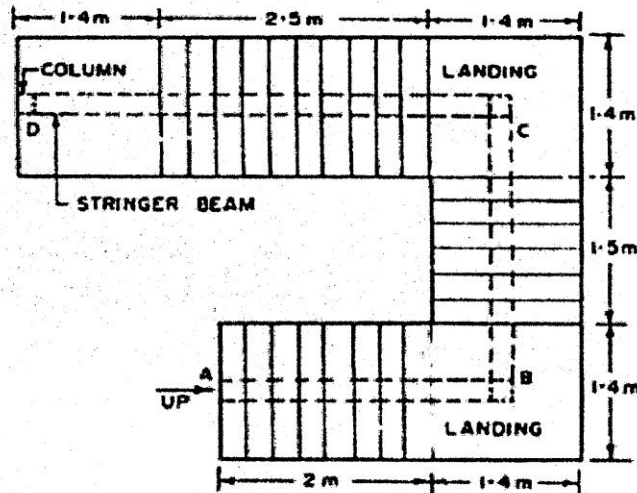

Figure - 2.

UNIT - IV

7. Design a beam of 5 m effective span, carrying a uniform load of 20 kN/m if the compression flange is laterally unsupported. Assume $f_y = 250$ N/mm^2. (15)

(OR)

8. What are the different elements of plate girder? Discusss the general design considerations of a plate girder. Also, write the step by step procedure for the design of plate girder. (15)

UNIT - V

9. A tie member in a bracing system consists of two angles 150 × 115 × 10 mm ($f_y = 250$ MPa) with long legs connected to a gusset plate by 18 mm diameter riverts in such a way that each angle section is reduced in section by one rivet hole only. Determine th tensile strength of the member, if

   (a) The angles are conected to the same side of the gusset plate, 12 mm thick and are tack riveted.

   (b) The angles are connected on the opposite side of the gusset plate, 12 mm thick and are tack riveted.

   What is the effect of tensile strength of the member, if the angles in case (b) are not tack riveted?

(OR)

10. Write the step by step procedure of the design of lattice columns. (15)

B.E. DEGREE EXAMINATION, 2014

(CIVIL ENGINEERING)

(FOURTH SEMESTER)

PCLEC-404. ARCHITECTURE

(Part-Time)

November]   [Time : 3 Hours

Maximum : 75 Marks

Answer any ONE FULL question from each UNIT   (5 × 15 = 75)

UNIT-I

1. a) Enumerate the climatic data to be collected in architectural design.   (8)

    b) Explain the effect of vegetation in climatic control.   (7)

2. a) Explain the effect of roof treatment in hot places.   (8)

    b) Briefly discuss on the design of housing in hot and wet climate.   (7)

UNIT-II

3. a) Explain the concept of proportion in buildings with examples.   (8)

    b) Discuss about scale in architecture with examples.   (7)

4. a) Briefly outline the concept of balance in architecture.   (8)

    b) How is rhythm brought out in an architectural composition?   (7)

UNIT-III

5. a) Discuss briefly the history of Egyptian Architecture.   (8)

    b) Write short note on (i) orders in Greek Architecture (ii) Parthenon.   (4+3)

6. a) Describe the important aspects of Indian Architecture.   (8)

    b) Outline the Indian architectural elements wall and column.   (7)

UNIT-IV

7. a) Write a brief note on aspect and grouping.   (8)

    b) Explain briefly about circulation and orientation.   (7)

8. a) Explain in detail about planning and treatment of interiors.   (8)

    b) Enumerate the general principles of acoustics in design in auditorium.   (7)

UNIT-V

9. A clinic is to be planned for a plinth area of $350m^2$. Prepare a line sketch satisfying all   (15)
    the basic requirements.

10. Draw a line sketch for a community hall with plinth area $650m^2$. Make appropriate   (15)
    assumptions and state clearly.

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B.E. DEGREE EXAMINATION, 2014

(CIVIL ENGINEERING)

(FOURTH SEMESTER)

CLEC-405. ESTIMATION AND VALUATION

November]   [Time : 3 Hours

Maximum : 75 Marks

(For candidates of 2011-2012 batch and later)

Answer any ONE FULL question from each unit.

ALL questions carry EQUAL marks.

UNIT – I

1. (a) Why approximate estimates are necessary?   (5)

   (b) List out the different methods of estimation and explain them briefly.   (10)

(OR)

2. (a) The expenditure incurred in the construction of a school building with 12 class-rooms was ₹. 79,200 about three years back. The increase in the cost of materials and labour in these three years is approximately 30%. Estimate amount required for constructing a similar school building with 15 class-rooms.   (7)

   (b) The particulars regarding a two storeyed building are given below :

   Plinth area of ground floor(first floor) = 82 m^2.

   Plinth area of first floor (second floor) = 68 m^2.

   Expenditure for the construction of ground floor = ₹.1,10,700.

   Expenditure for the construction of first floor   = ₹.80,240.

   Estimate the probable cost of a similar building proposed to be constructed in the same locality with plinth areas of 96 m^2 in ground floor and 80 m^2 in the second floor.   (8)

UNIT - II

3. Prepare a detailed data for cement concrete 1 : 4 : 10 in foundation -rate for 1 m^3.   (15)

(OR)

4. Prepare a detailed data for flooring with cement concrete 1 : 5 : 100 mm thick and plastered over with cement mortar 1 : 3 : 20 mm thick -rate for 10 m^2. (15)

UNIT - III

5. Write the importance of specifications and essential requirments of specification. (15)

(OR)

6. (a) Explain the advantages of Tender. (5)

(b) Define Tender Notice and list out the informations it should contain. (10)

UNIT - IV

7. What is Turn-key Contracts and explain them in detail. (15)

(OR)

8. Write short notes on : (15)

(a) Lumpsum contract.   (b)   Item rate contract.

(b) Lumpsum and schedule contract.   (d)   Cost plus fixed fee contract.

(e) Advantages of arbitration.

UNIT - V

9. List out the different methods of valuation and explain them in detail. (15)

(OR)

10. (a) Write the different purposes of valuation. (8)

(b) What are the factors which affect the value in general? (7)

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B.E. DEGREE EXAMINATION, 2014

(CIVIL ENGINEERING)

(FOURTH SEMESTER)

CLEC-406. TRANSPORTATION ENGINEERING - I

November]   [Time : 3 Hours

Maximum : 75 Marks

(For the candidates of 2011-12 batch and later)

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

UNIT – I

1. Explain the factors which are to be considered in the classification of roads.   (15)

(OR)

2. At a section of a National Highway due to site constraints, a radius of curvature of only 250 m has to be provided. Design the superelevation. State whether the speed should be restricted.

(15)

UNIT - II

3. Briefly explain the different types of tests done on bitumen.   (15)

(OR)

4. Write the construction procedure of water bound Macadam road.   (15)

UNIT - III

5. Explain the different characteristics of the vehicular traffic which affect the road design.

(15)

(OR)

6. Briefly explain the various factors that are to be considered in the design of a rotary intersection.   (15)

UNIT - IV

7. Discuss the land use and city planning controls. (15)

(OR)

8. Evaluate the simulation process in traffic planning. (15)

UNIT - V

9. Illustrate the turning zone with a diagram and discuss its importance. (15)

(OR)

10. Discuss airport drainage with a neat sketch. (15)