



# Narasaraopeta Engineering College (Autonomous)

Kotappakonda Road, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: R16CE2101

II B.Tech I Semester Supplementary Examinations, May-2018.

PROBABILITY AND STATISTICS

(CE)

Time: 3 hours

Max Marks: 60

Question Paper Consists of Part-A and Part-B.

Answering the question in Part-A is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

## PART-A

- (a) State Conditional Probability and give two examples.
- (b) State the Weibull distribution.
- (c) Define Point and Interval Estimation.
- (d) What is  $\chi^2$  distribution? Write any three properties.
- (e) Write the Normal equations of the second degree curve.
- (f) Write the formula for control limits for attributes.

[2+2+2+2+2+2]

## PART-B

4 X 12 = 48

- (a) State and Prove Baye's theorem. [ 6 ]  
(b) If the probability is 0.05 that a certain wide flange column will fail under a given axial load, what are the probabilities that among 16 such columns [ 6 ]  
i) at most two will fail ii) at least four will fail.
- (a) Find the probabilities that a random variable having the standard normal distribution will take on a value [ 6 ]  
i) between 0.87 and 1.28 ii) between - 0.34 and 0.62  
iii) greater than 0.85 iv) greater than - 0.65  
(b) If a random variable has the gamma distribution with  $\alpha = 2$  and  $\beta = 2$ , find the mean and standard deviation of this distribution. [ 6 ]
- A random sample of size 100 is taken from an infinite population having the mean  $\mu = 76$  and the variance  $\sigma^2 = 256$ . What is the probability that  $\bar{X}$  will be between 75 and 78? [ 12 ]
- The following random samples are measurements of the heat-producing capacity ( in millions of calories per ton ) of specimens of coal from two mines : [ 12 ]

Mine 1 :	8260	8130	8350	8070	8340
Mine 2 :	7950	7890	7900	8140	7920

Use the 0.05 level of significance to test whether it is reasonable to assume that the variances of the two populations sampled are equal.

6. The following are the numbers of minutes it took 10 mechanics to assemble a piece of machinery in the morning  $x$  and in the late afternoon  $y$  : [ 12 ]

$x$ :	11.1	10.3	12.0	15.1	13.7	18.5	17.3	14.2	14.8	15.3
$y$ :	10.9	14.2	13.8	21.5	13.2	21.1	16.4	19.3	17.4	19.0

Calculate  $r$  .

7. The specifications require that the weight of casting have  $\mu = 4.1$  ounces and  $\sigma = 0.05$  ounces. [ 12 ]

- i) Use the specifications to calculate a central line and three-sigma control limits for an  $\bar{x}$  chart with  $n = 5$  .
- ii) Use the specifications to calculate a central line and three-sigma control limits for an  $R$  chart with  $n = 5$  .

Sample	1	2	3	4	5	6	7	8	9	10	11	12	13
$\bar{x}$	4.24	4.18	4.26	4.21	4.22	4.18	4.23	4.19	4.21	4.18	4.20	4.25	4.25
$R$	0.09	0.12	0.14	0.24	0.15	0.28	0.06	0.15	0.09	0.15	0.21	0.20	0.17

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**Subject Code: R16CE2102**

**II B.Tech I Semester Supplementary Examinations, May-2018.**  
**BUILDING MATERIALS AND CONSTRUCTION**

**(CE)**

**Time: 3 hours**

**Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from **Part-B**  
All questions carry equal marks of 12.

**PART-A**

1. (a) What is the composition of good brick earth?
- (b) Write any four defects in timber due to natural forces.
- (c) Differentiate between fat lime and hydraulic lime.
- (d) Explain quarter turn and three-quarter turn stair case with neat diagram.
- (e) Define ledgers, braces, toe board in scaffolding.
- (f) What are the points to be noted in case of combined footing?

[2+2+2+2+2+2]

**PART-B**

4 X 12 = 48

2. (a) Explain the process of wedging and blasting in stone quarrying with neat diagrams.
- (b) Explain the Hoffman's kiln in the process of manufacture of bricks with neat diagram.
3. (a) Define the cavity wall and what are reasons of providing a cavity in a wall.
- (b) What are the artificial seasoning methods and explain them in a brief.
4. (a) What is the composition of lime and explain the calcination in continuous kiln with neat diagram.
- (b) Explain any six types of cements with properties in a brief.
5. (a) Explain different types of arches according to their shape with neat diagrams.
- (b) Explain couple roof and lean to roof with neat diagrams.
6. (a) What is meant by pointing? Explain any four types of pointing with neat diagrams.
- (b) What are the requirements for good formwork?
7. (a) What is the difference between strap footing and mat footing explain in detail with neat diagrams.
- (b) Classify the different types of piles according to load transfer and materials.

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Subject Code: R16CE2104

**II B.Tech I Semester Supplementary Examinations, May-2018.**

**SURVEYING - I  
(CE)**

Time: 3 hours

Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from **Part-B**  
All questions carry equal marks of 12.

**PART-A**

1. (a) Define Surveying?
- (b) Define Subsidiary lines?
- (c) What is Local attraction ?
- (d) Explain datum surface?
- (e) Write down about contour interval?
- (f) Explain the working principle of spirit level?

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**PART-B**

4 X 12 = 48

2. (a) Write a brief note on the role of errors in survey measurements?  
(b) A line was measured with a steel tape which was exactly 30m at 25° C at a pull of 10kg, the measured length being 1700m. The temperature during measurement was 34° C and the pull applied was 18kg. Compute the length of the line if the cross sectional area of the tape is 0.025 cm<sup>2</sup>. Take  $\alpha = 3.5 \times 10^{-6}$  per 1° C &  $E = 2.1 \times 10^6$  kg/cm<sup>2</sup> for the material of the tape.
3. (a) Discuss various methods for determining the width of river?  
(b) Discuss briefly 'Recording Field Notes' in chain surveying?
4. (a) What are different types of Compass? Discuss each briefly and write their uses?  
(b) Determine the correct bearings of the lines of the traverse ABCDE from the following data taken from a compass survey

Line	F.B.	B.B.
AB	N55°00'E	S54°00'W
BC	S68°30'E	N66°30'W
CD	S24°00'W	N24°00'E
DE	S77°00'W	N75°30'E
EA	N64°00'W	S63°30'E

5. (a) The following reading were observed successively with a levelling instrument. The instrument was shifted after 5<sup>th</sup> & 11<sup>th</sup> readings. 0.485, 1.020, 1.785, 3.395, 3.875, 0.360, 1.305, 1.785, 2.675, 3.385, 3.885, 1.835, 0.435, 1.705. Draw up a page of level book and determine the R.L of various points by Rise & Fall method if the R.L of point on which the first reading was taken is 264.350m.  
(b) Explain briefly about comparison of Height of Instrument method with Rise and Fall method?
6. (a) What are the uses of a contour map? How will you determine the intervisibility of points from a contour map?  
(b) What is meant by counteracting? Discuss their merits & demerits?
7. (a) Write a short note on practical utility of three point resection?  
(b) Discuss advantages & disadvantages of plane tabling?

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Subject Code: R16CE2105

II B.Tech I Semester Supplementary Examinations, May-2018.  
FLUID MECHANICS  
(CE)

Time: 3 hours

Max Marks: 60

Question Paper Consists of Part-A and Part-B.  
Answering the question in Part-A is Compulsory & Four Questions should be answered from Part-B  
All questions carry equal marks of 12.

**PART-A**

- (a) Explain surface tension and capillarity  
(b) Distinguish between 'Total pressure' and 'Centre of pressure'  
(c) Explain path line and stream line  
(d) Give the assumptions made in Bernoulli's equation  
(e) Define coefficient of contraction and coefficient of velocity  
(f) Differentiate between hydraulic gradient line and total energy line.

[2+2+2+2+2+2]

**PART-B**

4 X 12 = 48

- (a) Define mass density and specific weight  
(b) The velocity distribution in a pipe line is given by the relation,  $u=3y-y^2$  where  $u$  is the velocity of fluid at a distance  $y$  from solid boundary. Calculate (i) shear stress at the wall (ii) shear stress at 1 cm from the wall and (iii) Total resistance for a 2.5 cm diameter pipe over a length of 80 m.
- (a) List out the various types of pressure gauges. Explain any one of them with a sketch  
(b) A circular plate of diameter 3m is immersed in water in such a way that its least and greatest depth from the free surface of water are 1m and 3m respectively. For the front side of the plate find (i) total force exerted by water and (ii) the position of centre of pressure.
- (a) Explain the methods of drawing flow nets.  
(b) If velocity potential function ( $\Phi$ ) =  $4xy$ , find the stream function ( $\psi$ ). Also find discharge between points (1,3) and (2,4).
- (a) Explain Pitot tube  
(b) Derive Bernoulli's equation from the principle of conservation of energy
- (a) Define mouthpiece and give its classification  
(b) Find the discharge through a trapezoidal notch which is 1.2 m wide at the top and 0.45 m at the bottom and 0.3 m in height. The head of water on the notch is 225 mm. Take  $c_d=0.6$
- (a) List out the minor losses of head during flow of liquid through a pipeline.  
(b) Derive the Darcy- Weisbach equation for head loss due to friction in a pipe

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Subject Code: R16CE2106

II B.Tech I Semester Supplementary Examinations, May-2018.

MECHANICS OF SOLIDS

(CE)

Time: 3 hours

Max Marks: 60

Question Paper Consists of Part-A and Part-B.

Answering the question in Part-A is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) Define bulk modulus
- (b) Write down the properties of Mohr's Circle.
- (c) What do you mean by point of contraflexure
- (d) What are the assumptions made in the theory of pure bending
- (e) Give Rankine's formula and its advantages
- (f) What are the types of stresses developed in thin cylinders subjected to internal pressure.

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) Give the stress- strain diagrams for ferrous and non ferrous materials.
- (b) A steel rod 5 m long and 25 mm diameter is subjected to an axial tensile load of 45 KN. Determine the change in length, diameter, and volume of the rod. Take  $E = 2 \times 10^5 \text{ N/mm}^2$  and Poisson's ratio = 0.25
3. (a) A body is subjected to direct stresses in two mutually perpendicular directions accompanied by simple shear stress. Draw the Mohr's circle of stresses and explain how will you obtain the principal stresses and principal planes.
- (b) Explain (i) Maximum principal strain theory and (ii) Maximum shear stress theory
4. (a) Derive the relationship between load intensity, shear force and bending moment.
- (b) A simply supported beam of 10 m carries point loads of 5 KN and 6 KN at a distance of 2 m and 4 m from left end. Draw the shear force and bending moment diagrams for the beam
5. (a) Derive an expression for bending stress at a layer in a beam
- (b) A timber cantilever 250 mm wide and 350 mm deep is 3.5 m long. It is loaded with a U.D.L. of 4 KN/m over entire length. A point load of 3 KN is placed at free end of the cantilever. Find the maximum bending stress produced.
6. (a) Define slenderness ratio and derive the expression for the Euler's crippling load for a long column when both ends are fixed.
- (b) A solid round bar 4m long and 5cm in diameter was found to extend 4.6mm under a Tensile load of 50KN. This bar is used as a strut with both ends hinged. Determine the buckling load for the bar, also find the safe load taking factor of safety as 4.0.
7. (a) Derive the relation for a circular shaft when subjected to torsion as given below.  
 $T/J = q/r = N\theta/L$  with usual notations.
- (b) A hollow circular shaft of external diameter 120 mm transmits a power of 240 KW at 200 r.p.m. Determine the maximum internal diameter if the maximum stress in the shaft is not to exceed 60 MPa.

