Hall Ticket Number :

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|

**Code : 1GC42**

II B.Tech. II Semester Supplementary Examinations Nov/Dec 2018
**Probability and Statistics**
( Common to CE, ME & IT )

**Max. Marks: 70**                                                  **Time: 03 Hours**
Answer *any five* questions
All Questions carry equal marks (14 Marks each)
*********

1. a)  Find the mean, median and mode for the following distribution.

| x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| y | 4 | 9 | 6 | 25 | 22 | 18 | 7 | 3 |

   b)     Find the rank correlation for the following indices of supply and price of an article.

| Supplyindex | 124 | 100 | 105 | 112 | 102 | 93 | 99 | 115 | 123 | 104 | 99 | 113 | 121 | 103 | 101 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Priceindex | 80 | 100 | 102 | 91 | 100 | 111 | 109 | 100 | 89 | 104 | 111 | 102 | 98 | 111 | 123 |

2. a)  State and Prove Baye's theorem.

   b)  If the probability that a communication system will have high fidelity is 0.81 and the probability that it will have high fidelity and high selectivity is 0.18, what is probability that a system with high fidelity will also have high selectivity?

3. a)  Check whether the following can serve as probability distributions:

   (i)    $f(x) = \dfrac{x-2}{2}$ *for* $x = 1, 2, 3, 4$

   (ii)   $h(x) = \dfrac{x^2}{25}$ *for* $x = 0, 1, 2, 3, 4$

   b)  Find the value of $k$ and the distribution function $F(x)$ given the probability density function of a random variable X as:

   $$f(x) = \frac{k}{x^2 + 1}, \quad -\infty < x < \infty.$$

4. a)  Prove that the mean and the variance of the Poisson distribution are equal.

   b)  Find the probabilities that a random variable having the standard normal distribution will take on a value
   (i)  between 0.87 and 1.28 ;
   (ii)  between -0.34 and 0.62 ;
   (iii)  greater than 0.85;
   (iv) greater than -0.65.

5       A population consists of six numbers 4,8,12,16,20,24. Consider all samples of size two which can be drawn without replacement from this population. Find
   (a) Population mean
   (b) Population S.D
   (c) Mean of the sampling distribution of means
   (d) S.D of the sampling distribution of means.

6. a) Explain briefly the following
   - (i) Point Estimation
   - (ii) Interval Estimation

   b) The average zinc concentration recovered from a sample of zinc measurements in 36 different locations is found to be 2.6 grams per millilitre. Find a 95% confidence intervals for the mean zinc concentration in the river. Assume that the population standard deviation is 0.3.

7. a) Explain the test procedure for $Z-$ test concerning one mean when $†$ is known.

   b) A storekeeper wanted to buy a large quantity of bulbs from two brands A and B respectively. He bought 100 bulbs from each brand A and B and found by testing brand A had mean life time of 1120 hrs and the S.D of 75 hrs and brand B had mean life time 1062 hrs and S.D of 82 hrs. Examine whether the difference of means is significant. Use a 0.01 level of significance.

8. Four methods are under development for making discs of a super conducting material. Fifty discs are made by each method and they are checked for super conductivity when cooled with liquid.

| | 1st Method | 2nd Method | 3rd Method | 4th Method |
|---|---|---|---|---|
| Super Conductors | 31 | 42 | 22 | 25 |
| Failures | 19 | 8 | 28 | 25 |

Test the significant difference between the proportions of conductors at 0.05 level.

****

II B.Tech. II Semester Supplementary Examinations Nov/Dec 2018
## Strength of Materials-II
( Civil Engineering)

Max. Marks: 70                                                    Time: 3 Hours

Answer any **five** questions
All Questions carry equal marks (**14 Marks** each)
*********

1.  Derive an expression for change in dimensions of a thin cylindrical shell due to internal pressure.                                                                14M

2.  A steel plug 120mm in diameter is forced into a steel ring of 180mm external diameter and 75mm wide. The strain in the circumferential direction was measured as $0.700 \times 10^{-4}$. If µ between the contact surfaces is 0.3 and E= 200 $GN/m^2$, calculate the axial force required to push the plug out of the ring.     14M

3.  a)  What are the assumptions made in the theory of pure torsion?                 7M
    b)  Derive the basic torsion equation $T/J = fs/R = c\theta/l$.                   7M

4.  A weight of 200N is dropped on to a helical spring made of 15 mm wire, closely coiled to a mean diameter of 150mm with 22 coils. Determine the height of drop if the instantaneous compression is 68mm. C= 84 $GN/m^2$.       14M

5.  Compare the crippling loads given by Rankine's and Euler's formulae for a tabular strut 3m long with outer and inner diameters of 40mm & 35mm loaded through pin joints at both ends. Take yield stress as 350 $MN/m^2$, = 1/7500 & E= 200 $GN/m^2$.                                                               14M

6.  A hollow circular cast iron column of 25cm external diameter and 2cm thickness carries a load of 100 KN in the vertical plane at an eccentricity of 8cm. Determine the maximum and minimum stresses developed in the material.                                                                          14M

7.  a)  Explain the term unsymmetrical bending.                                      5M
    b)  A beam of rectangular section 100mm wide and 120mm deep is subjected to a maximum BM of 16KNm. Locate the nutral axis of the section & calculate the maximum bending stress induced in the section.                              9M

8.  A ring beam of circular shape has a radius of 4m and is supported on 8 equally spaced supports. The beam carries a udl of 3.6 KN/m inclusive of its own self weight. Determine the bending moment & shear force at salient points & plot their variation.                                                           14M

***