Hall Ticket Number :										

R-14

Code: 4GC43

II B.Tech. II Semester Supplementary Examinations December 2017

Environmental Science

(Common to CE, ME & CSE)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

****

UNIT–I

1. a) Illustrate the scope & Importance of environmental studies 7M
   b) How does the declination of ecosystems occurs? 7M

OR

2. a) What is the scope and importance of environmental studies? 7M
   b) Describe the multidisciplinary nature of environmental studies. 7M

UNIT–II

3. a) Write about the applications of alternative energy resources 7M
   b) Write about the importance of natural resources 7M

OR

4. a) Distinguish between traditional agricultural and modern agricultural. 7M
   b) Summarize the effects of dams on forest and tribal people. 7M

UNIT–III

5. a) Write short note on sustainable development with examples. 7M
   b) Write short note on food chain and food web with examples. 7M

OR

6. a) What are the various threats leading to loss of biodiversity? 7M
   b) Discuss the various strategies of in-situ conservation of biodiversity 7M

UNIT–IV

7. a) How does the biodiversity is maintained ? 7M
   b) What are the various methods of control to reduce thermal pollution? 7M

OR

8. a) Explain about causes of marine pollution. 7M
   b) Explain about causes of noise pollution. 7M

UNIT–V

9. a) Explain about causes of air pollution. 7M
   b) What are the salient provisions of Wild life Act? 7M

OR

10 Explain the value of environment education and the role of women and environment. 14M

***

Hall Ticket Number :										

Code: 4G642

R-14

II B.Tech. II Semester Supplementary Examinations December 2017

Hydraulics and Hydraulic Machinery

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

****

UNIT–I

1. a) Describe boundary layer separation with its disadvantage and mention any two methodologies to control them. 4M

   b) A 20 Km/h wind blows over a 6m flat plate. If the density and kinematic viscosity of air are 1.2 Kg/m^3 and 1.5x10^{-5} m^2/s respectively. Calculate the force per meter of the plate. Also determine the thickness of the boundary layer at the trailing edge. 10M

OR

2. a) Define Magnus effect and derive equation. 4M

   b) Given that the velocity distributions in a laminar boundary layer due to flow over a flat plate is

   $\frac{u}{U} = \left[\frac{3}{2}\eta - \frac{1}{2}\eta^3\right]$ Where $\eta = \frac{y}{\delta}$

   Calculate the displacement and momentum thicknesses in terms of the nominal boundary layer thickness $\frac{\delta.}{\ldots}$ 10M

UNIT–II

3. a) Classify the open channel flows using a flow chart and provide suitable example for each type of flow. 3M

   b) Describe the Specific Energy diagram of the open channel flow using all regular notations for various parameters. 3M

   c) It is required to convey 10 m^3/s of water at a mean velocity of 1.25 m/s. Calculate the dimensions of the most efficient section of rectangular and triangular shapes. 4M

   d) In a flow through a rectangular channel for a certain discharge the Froude numbers corresponding to the two alternate depths are F1 and F2. Show that $(F2/F1)^{2/3} = \frac{2+F2^2}{2+F1^2}$ 4M

OR

4. a) Give complete list of GVF profiles with their flow type, channel slope, depth condition and also draw their neat profiles. 10M

   b) In hydraulic jump occurring in a rectangular horizontal channel, the discharge per unit width is 2.5 m^3/s/m and the depth before the jump is 0.25m. Estimate (i) the sequent depth (ii) the energy loss. 4M

UNIT–III

5. a) A jet of water having a velocity of 45 m/s impinges without a shock a series of vanes moving at 15 m/s, the direction of motion of the vanes being inclined at 20^o to that of the jet. The relative velocity at outlet is 0.9 of that at inlet, and the absolute velocity of water at exit is to be normal to motion of the vanes. Find vane angles at entry and exit, work done per unit weight of water supplied by the jet, the hydraulic efficiency. 10M

   b) Determine the force exerted by a jet of water on a moving flat plate in the direction of the jet. 4M

OR

6. Consider the jet striking on an unsymmetrical moving curved vane tangentially at one of the tips and derive the expression for force exerted by the jet on the vane, work done and efficiency. Draw the velocity triangles at inlet and out let. 14M

UNIT–IV

7. a) Define Cavitation. Describe how this is being controlled in turbines. 4M

   b) Classify different efficiencies used in hydropower turbines. 3M

   c) A double jet 1.5m diameter impulse turbine installation is to develop 3000 KW at 400 rpm under a net head of 270m. If the overall efficiency is 0.90, determine the (i) diameter of jet (ii) speed ratio (iii) specific speed (take C_v=0.85). 7M

OR

8. a) Define Governor. Write about its operation in impulse turbine using a neat sketch. 7M

   b) A Kaplan turbine develops 15000 kW power at a head of 30m. The diameter of the boss is 0.35 times the diameter of the runner. Assuming a speed ratio of 2, a flow a ratio of 0.65 and an overall efficiency of 90%, Calculate the (i) diameter of the runner (ii) rotational speed and (iii) specific speed. 7M

UNIT–V

9. a) Describe the assessment of the hydropower potential. 5M

   b) Define NPSH 2M

   c) A centrifugal pump has an impeller of 80cm diameter and it delivers 1.1 m^3/s against head of 70m. The impeller runs at 1000 rpm and its width at outlet is 8cm. If the leakage loss is 4% of the discharge, external mechanical loss is 10kW and hydraulic efficiency is 82%, Calculate the blade angle at outlet and overall efficiency. 7M

OR

10. a) Describe the main and operating characteristics of centrifugal pump 9M

    b) Define and differentiate the terms load factor, utilization factor and capacity factor. 5M

***

Hall Ticket Number :										

R-14

Code: 4GC42

II B.Tech. II Semester Supplementary Examinations December 2017

Probability and Statistics

(Common to CE, ME & IT)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

****

UNIT–I

1. a) Box A contains nine cards numbered 1 to 9 and box B contains five cards numbered 1 to 5. A box is chosen at random and a card is drawn, if the card shows an even number another card is drawn from the same box, if the card shows an odd number, a card is drawn from the other box.
   (i) What is the probability that the both cards show an even number?
   (ii) If both cards show even number, what is the probability that they come from box A.
   (iii) What is the probability that both cards are odd? 7M

   b) i. If A and B are independent events. Then prove that A^c and B^c are also independent events.
   ii. If A and B are independent events. Then show that A and B^c are also independent events 7M

OR

2. a) If X is a continuous random variable and y= ax+b, prove that
   E(y) = a E(X) + b and $V(y) = a^2 V(x)$ 7M

   b) A continuous random variable is given by $f(x) = \begin{cases} k(1-x^2), 0 < x < 1 \\ 0, otherwise \end{cases}$.

   Find i) k, ii) mean iii) variance. 7M

UNIT–II

3. a) Explain the properties and importance of Normal Distribution. 7M

   b) If a poisson distribution is such that P(x=1). $\frac{3}{2}$ P (x= 3). Find
   (i) P (x ≥ 1) (ii) P (x ≤ 3) (iii) P (2 ≤ x ≤ 5) 7M

OR

4. In a Normal distribution 31% of the items are under 45 and 8% are 64. Find the mean and standard deviation of the distribution. 14M

UNIT–III

5. A population consists of 5, 10, 14, 18, 13, 24. Consider all possible samples of size 2 which can be drawn without replacement from the population. Find
   i. The mean of the population
   ii. The standard deviation of the population
   iii. The mean of the sampling distribution of means
   The standard deviation of sampling distributions of means. 14M

OR

6. a) Find 95% confidence limits for the mean of a normality distributed population from which the following sample was taken 15,17,10,18,16,9,7,11,13,14. 7M

   b) What is the maximum error one can expect to make with probability 0.90 when using the mean of a random sample of size n=64 to estimate the mean of population with variance 2.56. 7M

UNIT–IV

7. a) A sample of 64 students have a mean weight of 70 kgs. Can this be regarded as a sample from a population with mean weight 56 kgs and standard deviation 25 kgs. 7M

   b) Random samples of 400 men and 600 women were asked whether they would like to have a flyover near their residence. 200 men and 325 women were in favor of the proposal. Test the hypothesis that proportions of men and women in favor of the proposal are same, at 5% level. 7M

OR

8. a) Experience had shown that 20% of a manufactured product is of the top quality. In one day, production of 400 articles only 50 are of top quality. Test the hypothesis at 0.05level. 7M

   b) In a study on the influence of habitation, the intelligent quotients (IQs) of 16 students from urban area was found to have a mean of 107 and standard deviation of 10, while the IQs of 14 students from a rural area showed a mean of 112 and standard deviation of 8. Determine whether the IQs differ significantly at 0.05 level. 7M

UNIT–V

9. From the following data find whether there is any significant liking in the habit of taking soft drinks among the categories of the employees.

Soft drinks	Clerks	Teachers	Officers
Pepsi	10	25	65
Thumsup	15	30	65
Fanta	50	60	30

14M

OR

10. Fit a poisson distribution and test the goodness of it for the following data.

X	0	1	2	3	4
f(x)	109	65	22	3	1

14M

***

Hall Ticket Number :										

Code: 4G643

R-14

II B.Tech. II Semester Supplementary Examinations December 2017

Structural Analysis-I

(Civil Engineering)

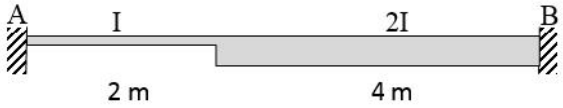
Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

****

UNIT–I

1. For the fixed beam shown below, the support A rotates by 0.002 radian clockwise. Find the fixed end moment. Take EI=10^{13} N-mm^2.



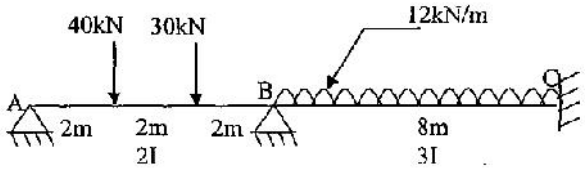
14M

OR

2. A fixed beam AB of span 6m span carries a concentrated load of 30kN at a distance of 3.5m from the fixed end A. Determine the values of fixing moments at supports A and B and also the deflection of the beam under the load. Assume the flexural rigidity of the beam as 1.3X1010 kN-mm2. 14M

UNIT–II

3. Determine the support moments for the continuous beam shown below



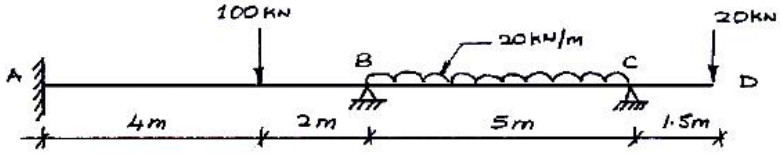
14M

OR

4. A two span continuous beam ABC of uniform section with span AB as 8m and BC as 6m is fixed at A and simply supported at B and C. All three supports are at same level. The span AB carries a uniformly load of 12kN/m and span BC carries another uniformly distributed load of 15 kN/m . Find the moments and reactions at all the supports and draw the bending moment and shear force diagrams using Clapeyorn's theorem of three moments. 14M

UNIT–III

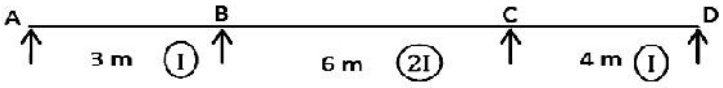
5. Analyze continuous beam ABCD by slope deflection method and then draw bending moment diagram. Take EI constant.



14M

OR

6. Analyze the beam by moment distribution method. The beam at support B and C sinks by 2 mm and 7 mm. Take E = 200 kN/mm2 and I=2.5×107 mm4



14M

UNIT–IV

7. A load of 33kN crosses a simply supported bridge of 25m span. Find the values of maximum shear force and bending moment at a section 8m and 10m from the left end support. Also calculate the absolute maximum bending moment in the bridge. 14M

OR

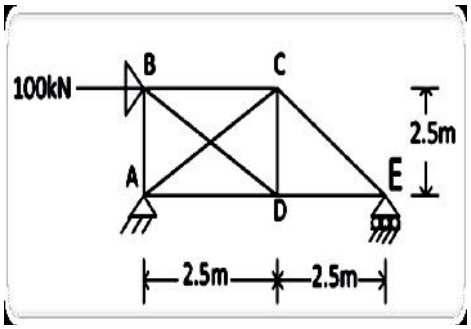
8. State and derive Castiglione's first theorem. A cantilever beam of uniform cross-section is loaded by a concentrated load of 20 kN at its free end. The span of the cantilever is 4m. Using Castiglione's first theorem, determine the deflection under the load. The cross-section of the cantilever is 200×250mm. Assume E=210GNm. 14M

UNIT–V

9. A load of 75kN crosses a simply supported bridge of 26m span. Find the values of positive shear force, negative shear force and the bending moment at a section 12m from the left end. Using the influence lines and the maximum shear forces and find bending moment at section 15 m from the left end support. 14M

OR

10. Determine the forces in all the members of the redundant pin jointed truss shown in figure below. Assume cross-sectional area of each member as 1500 mm^2.



14M

***

Hall Ticket Number :										

R-14

Code: 4G641

II B.Tech. II Semester Supplementary Examinations December 2017

Strength of Materials-II

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

****

UNIT–I

1. a) A boiler shell is to be made of 20 mm thick plate having a limiting tensile stress of 135 N/mm^2. If the efficiency of the longitudinal joints and circumferential joints are 80% and 40% respectively, determine the permissible intensity of internal pressure when the shell diameter is 2 m. 7M

   b) A thin cylindrical shell of 70 cm diameter, 1 cm thick and 3 m long is subjected to an internal pressure of 3.5 N/mm^2. Determine the change in length, diameter and volume of the shell. E = 2×10^5 N/mm^2, Poisson's ratio, μ = 0.25. 7M

OR

2. a) Find the thickness of metal necessary for a cylindrical shell of internal diameter 150 mm to withstand am internal pressure of 7 N/mm^2. The maximum hoop stress in the section is not to exceed 40 N/mm^2. 7M

   b) A steel cylinder of 320 mm external diameter is to be shrunk to another steel cylinder of 160 mm internal diameter. After shrinking, the diameter at the junction is 230 mm and radial pressure at the common junction is 29 N/mm^2. Find the original difference in radii at the junction. E = 2×10^5 N/mm^2. 7M

UNIT–II

3. Derive the expression for maximum torque transmitted by a hollow circular shaft. 14M

OR

4. The stiffness of a close coiled helical spring is 1.7 N/mm of compression under a maximum load of 70 N. The maximum shearing stress produced in the wire of spring is 135 N/mm^2. The solid length of the spring (the coils are touching) is given as 7 cm. Determine : (a) diameter of wire, (b) mean diameter of coils, (c) number of coils required. C=4.5×10^4 N/mm^2. 14M

UNIT–III

5. A simply supported beam of length 4.5 m is subjected to a uniformly distributed load of 35 kN/m over the hollow span and deflects 18 mm at the centre. Determine the crippling loads when this beam is used as a column with one end fixed and other end hinged. 14M

OR

6. A 2 m long column has a circular cross-section of 7 cm diameter. One of the ends of the column is fixed in direction and position and other end is free. Taking factor of safety as 4, calculate the safe load using Rankine's formula. Take σ_c = 550 N/mm^2 and a = 1/1600for pinned ends. 14M

UNIT–IV

7. The line of thrust, in a compression testing specimen 20 mm diameter, is parallel to the axis of specimen but is displaces from it. Calculate the distance of the line of thrust from the axis when the maximum stress is 22 % greater than the mean stress on a normal section. 14M

OR

8. A column is rectangular in cross-section of 350mm×450mm in dimensions. The column carries an eccentric point load of 400 kN on one diagonal at a distance of quarter diagonal length from a corner. Calculate the stress at all four corners. Draw stress distribution diagram for any two adjacent sides. 14M

UNIT–V

9. a) Derive the expression of shear centre for channel section. 7M

   b) How do you determine the deflection of a beam under unsymmetrical bending? Derive the expression for the same. 7M

OR

10. A short vertical strut is of rectangular cross-section 4cm×3cm. It carries a load of 8000 kg at a point 1.25cm away from the centre of the section along one of the diagonals. Calculate the intensity of the maximum tensile and compressive stresses on the cross-section and locate the points at which they occur. 14M

***