Hall Ticket Number :										

Code: 5GC43

R-15

II B.Tech. II Semester Regular & Supplementary Examinations May 2018

Environmental Science

(Common to CE, ME and CSE)

Max. Marks: 70 Time: 3 Hours

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

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UNIT–I

1. a) Define the term environment and explain scope and importance of environmental studies. 7M
   b) Write a short note on Biosphere and atmosphere. 7M

OR

2. a) Describe the term environmental education. 7M
   b) Explain the role of people and organizations related to provide environmental awareness. 7M

UNIT–II

3. a) Write about the uses and mineral reserves of India. 7M
   b) Explain the environmental impacts of over exploitation of mineral resources. 7M

OR

4. a) Write about the various applications and environmental impacts of any two fossil fuels. 7M
   b) Briefly explain the effects of pesticides. 7M

UNIT–III

5. a) Define the term ecosystem and explain the structural aspects of forest ecosystem. 7M
   b) Write a note on carbon cycle and nitrogen cycle. 7M

OR

6. a) Explain various values of biodiversity. 7M
   b) Discuss ex-situ conservation strategies in detail. 7M

UNIT–IV

7. a) Write about effects, classification of pollutants and control measures of air pollution. 7M
   b) Explain sources, effects and control measures of thermal pollution. 7M

OR

8. a) Explain various municipal solid waste management practices in detail. 7M
   b) Explain briefly impacts of marine pollution with any case study. 7M

UNIT–V

9. a) Write in detail about acid rain. 7M
   b) Explain water pollution prevention and control act. 7M

OR

10. a) Define the term population explosion and explain reasons and impacts of population growth. 7M
    b) Write a short note on human rights. 7M

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Hall Ticket Number :										

Code: 5G642

R-15

II B.Tech. II Semester Regular & Supplementary Examinations May 2018

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)

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UNIT–I

1. a) Explain the theory of laminar boundary layer concept. 7M

   b) A thin plate is moving in still atmospheric air at a velocity of 5m/s. The length of the plate is 0.6m and width is 0.5m. Calculate (i) the thickness of the boundary layer at the end of the plate (ii) drag force on one side of the plate. Take density of air as 1.24 kg/m^3 and kinematic viscosity 0.15 stokes 7M

OR

2. a) Explain the theory of turbulent boundary layer concept. 7M

   b) Discuss the methods adopted to prevent the boundary layer separation. 7M

UNIT–II

3. a) Explain sub-critical, critical and super critical flows. 7M

   b) Find the velocity of flow and rate of flow of water through a rectangular channel of 6m wide and 3m deep, when it is running full. The channel is having bed slope as 1 in 2000. Take chezy's constant C as 55. 7M

OR

4. a) Describe the concepts of hydraulic jump, depth and length of hydraulic jump. 7M

   b) The depth of flow of water at a certain section of a rectangular channel of 4m wide is 0.5m. The discharge through the channel is 16m^3/s. If a hydraulic jump takes place on the downstream side, find the depth of flow after the jump. 7M

UNIT–III

5. a) Show that the force exerted by a jet of water on an inclined fixed plate in the direction of the jet is given by $F_X = \rho\, a\, V^2 \sin^2\theta$ 7M

   b) A jet of water of the diameter 100mm moving with a velocity of 30m/s strikes a curved fixed symmetrical plate at the centre. Find the force exerted by the jet of water in the direction of the jet, if the jet is deflected through an angle of 120^0 at the outlet of the curved plate. 7M

OR

6. a) Derive an expression for efficiency of series of radial curved vanes. 7M

   b) A jet of water having a velocity of 35m/s impinges on a series of curved vanes moving with a velocity of 20m/s. The jet makes an angle of 30^0 to the direction of motion of vanes when entering and leaving at an angle of 120^0. Draw the velocity triangles at inlet and outlet and find;

   (i) The work done per unit wait of water entering the vane

   (ii) The efficiency 7M

UNIT–IV

7. a) Classify the Hydraulic turbines 7M

   b) A pelton wheel has a mean bucket speed of 10m/s with a jet of water flowing at the rate of 700 lps under a head of 30m. the buckets deflect the jet through an angle of 160^0. Calculate the power given by water to the runner and the hydraulic efficiency of the turbine. Assume coefficient of velocity as 0.98. 7M

OR

8. a) What is the significance of specific speed of a turbine and derive an expression for the specific speed 7M

   b) A turbine is to operate under a head of 25 m at 200 r.p.m. the discharge is 9 m^3/s. If the efficiency is 90% determine (i) Specific speed (ii) Type of turbine (iii) Power generated. 7M

UNIT–V

9. a) Explain the working principle of a centrifugal pump. 7M

   b) A centrifugal pump delivers water against a net head of 14.5 meters and a design speed of 1000 r.p.m. The vanes are curved back to an angle of 30^0 with the periphery. The impeller diameter is 300 mm and outlet width 50 mm. Determine the discharge of the pump if manometric efficiency is 95% 7M

OR

10. a) Describe the importance of multistage centrifugal pumps. 7M

    b) Find the number of pumps required to take water from a deep well under a total head of 89 m. all the pumps are identical and are running at 800 r.p.m. the specific speed of each pump is given as 25 while the rated capacity of each pump is 0.16 m^3/s. 7M

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Hall Ticket Number :										

R-15

Code: 5GC42

II B.Tech. II Semester Regular & Supplementary Examinations May 2018

Probability and Statistics

(Common to CE, ME and IT)

Max. Marks: 70 Time: 3 Hours

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

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UNIT–I

1 a) A class consists of 6 girls and 10 boys. If a committee of 3 is chosen at random from the class, find the probability that (i) 3 boys are selected (ii) exactly 2 girls are selected. 7M

b) In a bolt factory machines A, B, C manufacture 20%, 30% and 50% of the total of their output and 6%, 3% and 2% are defective. A bolt is drawn at random and found to be defective. Find the probabilities that it is manufactured from (i) Machine A. (ii) Machine B. (iii) Machine C. 7M

OR

2 a) A random variable X is defined as the sum of the numbers on the faces when two dice are thrown. Find the mean of X. 7M

b) A sample of 4 items is selected at random from a box containing 12 items of which 5 are defective. Find the expected number E of defective items. 7M

UNIT–II

3 a) Ten coins are thrown simultaneously. Find the probability of getting at least seven heads. 7M

b) Fit a Poisson distribution for the following data and calculate the expected frequencies

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

7M

OR

4 a) In a normal distribution 31% of the items are under 45 and 8% are over 64. Find the mean and variance of the distribution. 7M

b) In a sample of 1000 cases, the mean of a certain test is 14 and standard deviation is 2.5. Assuming the distribution to be normal, find how many students score between 12 and 15? 7M

UNIT–III

5 A population consists of five numbers 2, 3, 6, 8 and 11. Consider all possible samples of size two which can be drawn with replacement from this population. Find a) The mean of the population. b) The standard deviation of the population. c) The mean of the sampling distribution of means and d) The standard deviation of the sampling distribution of means (i.e., the standard error of means). 14M

OR

6 a) A normal population has a mean of 0.1 and standard deviation of 2.1. Find the probability that mean of a sample of size 900 will be negative. 7M

b) Ten bearings made by a certain process have a mean diameter of 0.5060 cm with a standard deviation of 0.0040 cm. Assuming that the data may be taken as a random sample from a normal distribution, construct a 95% confidence interval for the actual average diameter of the bearings? 7M

UNIT–IV

7 a) An ambulance service claims that it takes on the average less than 10 minutes to reach its destination in emergency calls. A sample of 36 calls has a mean of 11 minutes and the variance of 16 minutes. Test the claim at 0.05 level significance 7M

b) The mean yield of wheat from a district A was 210 pounds with S.D. 10 pounds per acre from a sample of 100 plots. In another district the mean yield was 220 pounds with S.D.12 pounds from a sample of 150 plots. Assuming that the S.D of yield in the entire state was 11 pounds, test whether there is any significant difference between the mean yield of crops in the two districts. 7M

OR

8 a) 20 people were attacked by a disease and only 18 survived. Will you reject the hypothesis that the survival rate if attacked by this disease is 85% in favour of the hypothesis that is more at 5% level. 7M

b) A sample of 26 bulbs gives a mean life of 990 hours with a S.D of 20 hours. The manufacturer claims that the mean life of bulbs is 1000 hours. Is the sample not upto the standard. 7M

UNIT–V

9 a) The measurements of the output of two units have given the following results. Assuming that both samples have been obtained from the normal populations at 10% significant level, test whether the two populations have the same variance.

Unit-A	14.1	10.1	14.7	13.7	14.0
Unit-B	14.0	14.5	13.7	12.7	14.1

7M

b) The number of automobile accidents per week in a certain community are as follows: 12, 8, 20, 2,14, 10, 15, 6, 9, 4. Are these frequencies in agreement with the belief that accident conditions were the same during this 10 week period. 7M

OR

10 a) In one sample of 10 observations, the sum of the squares of the deviations of the sample values from sample mean was 120 and in the other sample of 12 observations, it was 314. Test whether the difference is significant at 5% level? 7M

b) Four coins were tossed 160 times and the following results were obtained.

No. of heads	0	1	2	3	4
Observed frequencies	17	52	54	31	6

Under the assumption that coins are balanced, finds the expected frequencies of 0, 1, 2, 3 or 4 heads, and test the goodness of fit at a level of significance 0.05? 7M

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Hall Ticket Number :										

R-15

Code: 5G643

II B.Tech. II Semester Regular & Supplementary Examinations May 2018

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)

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UNIT–I

1. A beam AB of 12m span has fixed ends as shown in Figure 1. It carries a downward load of 120 kN at 4 m from end A and an upward load of 80 kN at 6 m from end B. Calculate the fixed end moments and also draw the BMD.

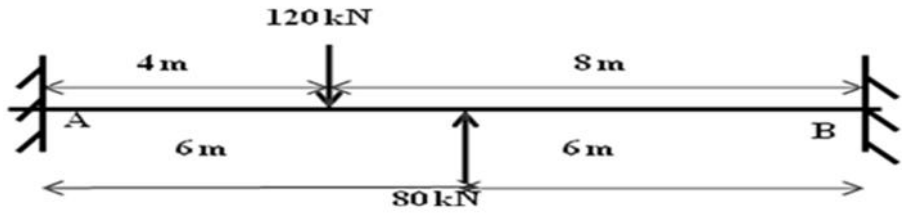

figure-1

OR

2. A fixed beam of span 6 meters shown in Figure 2 carries a concentrated load of 15kN at 3 meters from the left end. If the right end sinks by 10mm, find the fixed end moments at the supports. For the beam section take I=300,000 mm^4 and E=2x10^5 kN/mm^2. Find also the reactions at the supports.

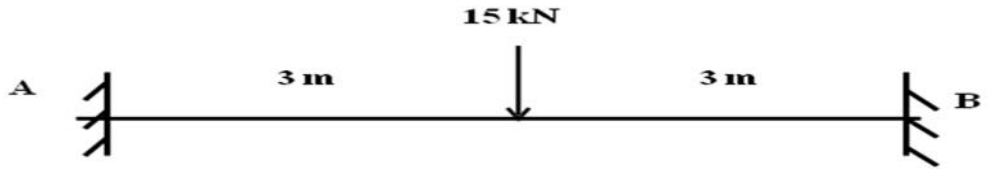

Figure-2

UNIT–II

3. A continuous beam ABC consists of two consecutive spans AB and BC of 4m each, it carries a u.d.l of intensity 60kN/m run over its entire span. The end A is fixed and ends B& C are simply supported. Determine the moments & reactions at the supports and Also draw SFD and BMD.

OR

4. A continuous beam ABC having spans AB and BC of lengths 3m and 4m respectively. Span AB carries a udl of 5kN/m and Span BC carries a udl of intensity 8kN/m. Determine the moments at the supports A,B &C.Also draw SFD and BMD.Take I_{AB}=I and I_{BC}=2I.Supports A,B& C are simply supported.

UNIT–III

5. A beam ABCD, 16 m long is continuous over three spans and loaded as shown in figure-3.Using Slope Deflection method calculate the final moments and reactions at the supports. Also draw SFD and BMD.

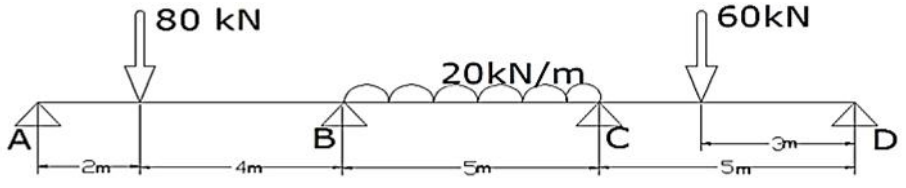

Figure-3

OR

6. A continuous beam ABCD is fixed at A and D and is supported on rollers at B and C. It carries a udl of intensity 20kN/m over span AB and an udl of 10kN/m over span BC. It also carries a concentrated load at middle point of span CD. Analyze the beam by Moment Distribution method when Support B sinks by 10mm. Take $L_{AB}=L_{CD}=6m$, $L_{BC}=3m$; $E=2x10^5N/mm^2$, $I=1.6x10^8mm^4$. Draw Bending moment diagram.

UNIT–IV

7. A simply supported beam of span 'L' carries a Concentrated load 'P' at a distance of 'a' from left support A .Using Castigliano's theorem determine the deflection under the load .Assume uniform flexural rigidity.

OR

8. A s.s beam has a span of 15m, a uniformly distributed load of intensity 40kN/m and 5m long crosses the girder from left to right as shown in figure 4. Determine the Shear Force and Bending Moment at a section 6m from the left support.

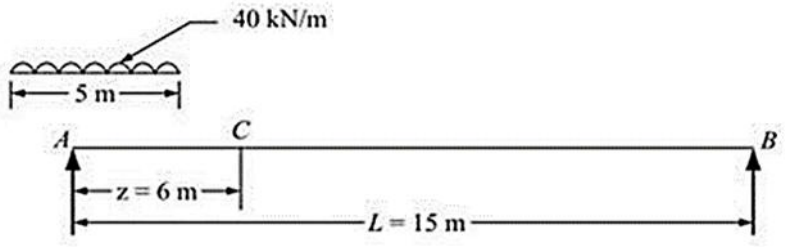

Figure-4

UNIT–V

9. Four point loads 8kN,12kN,16kN,and 10kN having a c/c spacing of 2m between consecutive loads and they traverse a girder of 30m span as shown in the figure 5 with 10kN loading. Calculate the maximum bending moment and shear force at 8m from the left support.

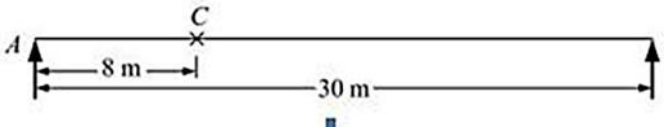

Figure-5

OR

10. Define D_{SI} and D_{KI}. Also determine the D_{SI} and D_{KI} of the following structures.
    i) Fixed beam AB of span L meters
    ii) Simply supported beam AB of span L meters with support A hinged and support B roller

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Hall Ticket Number :										

R-15

Code: 5G644

II B.Tech. II Semester Regular & Supplementary Examinations May 2018

Building Planning and Drawing

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

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PART -A

Answer *all Three* units by choosing one question from each unit (3 x 14 = 42 Marks)

UNIT–I

1. a) Explain Building bye – laws for residential area of a town planning scheme. 7M

   b) Explain briefly.

   (i) Setback line and its importance
   (ii) Floor space index.
   (iii) Minimum sizes for toilet and kitchen 7M

OR

2. a) Write short notes on

   (i) Setback line. 3M

   (ii) Mention the items which are not considered while computing the FSI. 4M

   b) Explain Briefly

   (i) National Building code 2M
   (ii) Plinth Area 3M
   (iii) Carpet Area 2M

UNIT–II

3. a) What are the usual requirements of a residential units? 8M

   b) Write short notes on

   i) Hotel ii) Cinema Halls iii) Dispensary 6M

OR

4. a) What are the functions of different rooms of a Residential building 7M

   b) Why are the residential flats of apartments becoming popular in urban areas? 7M

UNIT–III

5. a) Differentiate bar chart and CPM network methods 7M

   b) Explain

   (i) Activity
   (ii) Dummy activity
   (i) Critical path 7M

OR

6. The utility data for a network are given below

   (i) Draw network diagram

   (ii) Determine the total float, free float, independent and interfering floats and identify the critical path.

Activity	Time in weeks	predecessors
A	3	None
B	2	A
C	4	A
D	5	B
E	3	C
F	6	D

14M

PART -B

Answer *any* ***One*** question from the following units (1 x 28 = 28 Marks)

UNIT–IV

7. Draw to a suitable scale One brick, one half brick, and two brick wall in English bond. 28M

OR

UNIT–V

8. The Line Plan of a residential building is as shown in Fig.1

Draw:

(i) Detailed dimensioned plan.

(ii) Section A-B

Specifications:

Foundation: 300 mm thick c.c.1:2:4 and 600 wide.

Basement: Brick work in c.m. 1:6, 300 mm wide and 450mm above ground level.

Superstructure: All walls are 200 mm thick are of bricks in c.m. 1:6. Height of ceiling above floor level is 3000 mm.

Roof: 100 mm thick R.C.C. slab. Provide 40 mm two layers of flat tiles each 13 mm thick as the weathering coat. Parapet wall 100 mm thick should extend to a height of 600 mm above the roof.

Flooring: 20 mm thick c.m. 1:3 over plain cement concrete layer of 1:3:6, 100 mm thick.

D	Paneled door	1000 mm x 2100 mm
D1	Paneled door	750 mm x 1800 mm
W	Glazed window	1200 mm x 1400 mm
V	Ventilator	900 mm x 500 mm

Sunshade are to be provided over all the openings of the outer walls.

All the dimensions of rooms are clear internal dimensions. 28M

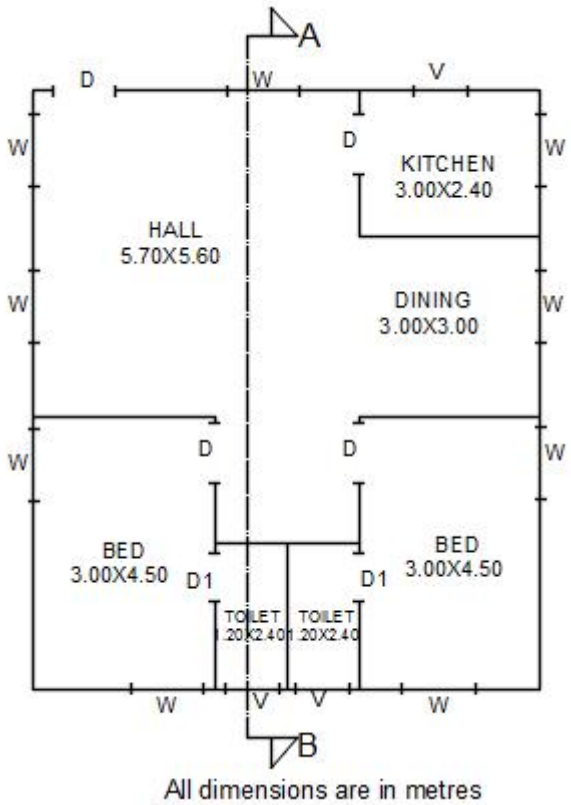

Fig. 1

Hall Ticket Number :										

R-15

Code: 5G641

II B.Tech. II Semester Regular & Supplementary Examinations May 2018

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)

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UNIT–I

1. a) Distinguish between thin cylinder and thick cylinder? 6M

   b) Write equations for radial stress and hoops stress as per Lame's theory 8M

OR

2. A steel cylinder (thick) of 300 mm external diameter is to be shrunk to another steel cylinder of 150 mm internal diameter. After shrinking the diameter at the junction is 250 mm and radial pressure at the common junction is 28 N/mm^2. Find the original difference in radii at the junction. Take $E=2x10^5$ N/mm^2. 14M

UNIT–II

3. a) A 50 kW has to be transmitted at 150 R.P.M. Find the necessary diameter of solid circular shaft. Find necessary hollow shaft with internal diameter equal to 3/4 of external diameter. What will be the % savings in the weight of the shaft? Allowable shear stress is 90 N/mm^2 and density of the material is $7g/cm^3$. 7M

   b) Calculate the angle of twist for a shaft having diameter of 50 mm at one end and 60mm at the other end in a length of 2 m. Also, find the % error committed in calculating, if it is calculated on the basis if an average diameter of 55 mm. 7M

OR

4. Derive the maximum shear stress induced, in the wire of a closed-coiled helical spring which carries an axial load W. Assume mean radius of spring coil is R and diameter of spring wire is d. 14M

UNIT–III

5. a) Derive the equation for the Euler's crippling load for a column with both ends hinged. 7M

   b) What is Prof. Perry's formula explain briefly 7M

OR

6. a) A cast iron hollow column of 200 mm external diameter and 160 mm internal diameter is 4 m long. It is fixed at its both ends and subjected to an eccentric load of 150 kN. Determine the maximum eccentricity, in order that there is no tensionany where in the section. Take $E = 0.94 \times 10^5$ N/mm^2. 7M

   b) Derive of Euler's critical load formulae for various end conditions 7M

UNIT–IV

7. A square chimney, 30 m high, has a flue opening of size 1.5 m x 1.5 m. Find the minimum width required at the base for no tension if the masonry weights 20 kN/m^3 and the wind pressure is 1.5 kN/m^2. The permissible stress in the masonry is $1kN/m^2$. 14M

OR

8. A masonry retaining wall of trapezoidal section is 12m high and retains earth which is level up to the top. The width at the top is 3m and at the bottom is 6m and exposed face is vertical. Find the maximum and minimum intensities of normal stress at the base. Take density of earth=$1600kg/m^3$ and density of masonry=$2300kg/ m^3$ and angle of repose of earth=30^0 14M

UNIT–V

9. a) Explain in brief how stresses in beams due to unsymmetrical bending is considered 7M

   b) Explain the brief the method to locating shear center 7M

OR

10. A standard I-beam is bent by equal and opposite couples M acting at the ends of the beam in the plane m-m. Find the maximum stress and the maximum deflection. $I=2400mm^4$, $Iv=150cm^4$, M=5kNm, l=3m, $\phi=300$, E= 200GPa 14M

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