Hall Ticket Number :										

R-15

Code: 5G634

II B.Tech. I Semester Supplementary Examinations May 2017

Building materials and Construction

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

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

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UNIT–I

1. a) Briefly describe the dressing of a building stone. 7M
   b) What precautions are to be taken in blasting? 7M

OR

2. a) Write about the process of manufacture of bricks. 7M
   b) Compare clamp burning with kiln burning. 7M

UNIT–II

3. a) Elucidate the process of manufacture of tiles. What are the characteristics of a good tile? 7M
   b) List the uses of aluminum, glass and bituminous materials in different constructions. 7M

OR

4. a) What are the ingredients of Cement? Explain. 7M
   b) What are the different types of Cement to be used for specific purposes? 7M

UNIT–III

5. a) What is seasoning of timber? Explain. 7M
   b) Give the defects in timber. 7M

OR

6. What are the alternate replacement materials for wood? Explain in detail giving justifications. 14M

UNIT–IV

7. Draw and explain the plan and elevation of a one and a half brick wall in English Bond. 14M

OR

8. Explain different types of shallow foundations used for different structures, in various conditions, with neat diagrams. 14M

UNIT–V

9. a) Write, in detail, about King Post Truss, drawing a neat diagram 7M
   b) Differentiate clearly between a lintel and an arch. What are the different types of lintels and arches? 7M

OR

10. a) Give the causes of dampness in buildings. What is a DPC? Why and how is it provided? Explain. 7M
    b) Explain, in a detailed manner, the purpose of scaffolding and formwork. 7M

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R-15

Code: 5G538

II B. Tech. I-Semester Supplementary Examinations May 2017

Electrical & Mechanical Technology

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

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

Use separate booklets for Part-A & Part-B

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PART-A

UNIT–I

1. a) Explain resistance, inductance and capacitance elements in detail.

   b) Two resistances of 50Ω and 40Ω respectively are connected in parallel. A third resistance of 10Ω is connected in series with the combination and a D.C supply of 220 V is applied to the ends of the completed circuit. Calculate the current in each resistance.

OR

2. a) Discuss about various types of D.C generators.

   b) A 4-pole wave connected DC generator having 60 slots on its armature with 6 conductors per slot, run at 750 rpm and generate an open circuit voltage of 230V. Find the useful flux per pole.

UNIT–II

3. a) Derive the condition for maximum efficiency of a transformer.

   b) Explain the procedure to conduct the following tests on a single phase transformer.
   i) Open circuit test and ii) Short circuit test

OR

4. a) What is an alternator? What is its operating principle?

   b) Derive the expression for Torque of a 3- ø Induction motor.

PART-B

UNIT–III

5. a) Classify various types of welding rods.

   b) What are the essential characteristics of a flux?

OR

6. a) Name the tools and equipment used in electric arc welding. Describe the working principle of arc welding.

   b) Compare A.C. and D.C. arc welding.

UNIT–IV

7. a) Mention the necessity of lubrication. State the main functions of a lubricating system in an I.C. Engine.

   b) Write a brief note on pressure lubrication system.

OR

8. a) List the important equipment and machinery used in earth moving.

   b) Explain the factors which are taken into consideration in the selection of earth moving machinery.

UNIT–V

9. a) How is the performance of a refrigeration system measured?

   b) Mention the basic requirements of a good refrigerant. Discuss relative merits and demerits of F-12 and NH_3 as refrigerants.

OR

10. Draw a line diagram of an air-conditioning system used for hot and humid weather conditions and explain the purpose of each component.

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Hall Ticket Number :										

R-15

Code: 5GC31

II B.Tech. I Semester Supplementary Examinations May 2017

Engineering Mathematics –III

(Common to CE & ME)

Max. Marks: 70 Time: 3 Hours

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

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UNIT–I

1. a) Find the values of a and b for which the equations $x+ay+z=3,\ x+2y+2z=b,\ x+5y+3z=9$ are consistent. When will these equations have a unique solution? 8M

   b) Find the rank of the matrix $\begin{bmatrix} 5 & 5 & 5 & 5 \\ 1 & 4 & 0 & 7 \\ 0 & -2 & 1 & 3 \end{bmatrix}$ by reducing it into Row-Echelon form. 6M

OR

2. a) Prove that the sum of the eigen values of a matrix is the sum of the elements of the principal diagonal. 6M

   b) Verify Cayley-Hamilton theorem for A= $\begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$ and hence find A^{-1} and A^3. 8M

UNIT–II

3. a) Find a recurrence formula to calculate $\sqrt{N}$ using Newton-Raphson method and hence evaluate $\sqrt{17}$. 7M

   b) Estimate the values of $f(1.2)$ and $f(2)$ from the date given.

x	1	1.4	1.8	2.2
$f(x)$	3.49	4.82	5.96	6.5

7M

OR

4. The following table gives the velocity v of a particle at time t :

t (sec)	0	2	4	6	8	10	12
v (m/s)	4	6	16	34	60	94	136

Find the distance moved by the particle in 12 seconds and also the acceleration at t = 6 seconds. 14M

UNIT–III

5. Find $y(0.1)$ and $y(0.5)$ by Taylor's series method from $\frac{dy}{dx}=xy+1,\ y(0)=1.$ Compare the numeric solution with its exact solution. 14M

OR

6. Apply Milne's method to find a solution of $\frac{dy}{dx}=x-y^2,\ y(0)=0$ in the range $0\le x\le 1.$ 14M

UNIT–IV

7. Obtain Fourier series of a function $f(x) = |x|$, $-® < x < ®$ and hence deduce that $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \frac{1}{7^2} + \text{----} = \frac{®^2}{8}$. 14M

OR

8. a) Form the partial differential equation by eliminating arbitrary constants a, b, c from $(x-a)^2 + (y-b)^2 + z^2 = c^2$. 8M

b) Solve $\frac{\partial^2 z}{\partial x \partial y} - \frac{x}{y} = 100$ by the method of separation of variables. 6M

UNIT–V

9. Find the analytic function $f(z) = u + iv$, if $2u + v = e^x(\cos y - \sin y)$. 14M

OR

10. a) Evaluate $\oint_c \frac{e^z \cos z}{\left(z - \frac{®}{2}\right)^2} dz$, where c is $|z| = 2$. 10M

b) Evaluate $\oint_c z^2 \cot z \, dz$, where c is the unit circle. 4M

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Hall Ticket Number :										

R-15

Code: 5G633

II B.Tech. I Semester Supplementary Examinations May 2017

Fluid Mechanics

(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) State and prove Pascal's law 7M

   b) The surface tension of water in contact with air at 20 ^{0}C is 0.078 N/m. The pressure inside a water droplet is 0.22KN/m^2 greater than the outside pressure. Calculate the diameter of the water droplet. Derive the equation used. 7M

OR

2. a) Derive an expression for total pressure for a vertical plane surface submerged in liquid. 6M

   b) A circular plate 3 m diameter is immersed in water in such a way that its greatest and least depth below the free surface is 4 m and 1.5 m respectively. Determine the total pressure on one face of the plate and position of the centre of pressure. 8M

UNIT–II

3. a) Describe the use and limitations of flow nets 4M

   b) Describe the use of flow nets to represent the two velocity components. The following cases $v = 3xy - 2y + z^3$. Determine the third component of velocity such that they satisfy the continuity equation. 10M

OR

4. a) What is impulse-momentum theorem? Derive the same 7M

   b) Water under pressure of 3.924x10^{-3} N/m^2 is flowing through a 0.3 m pipe at the rate of 0.25 cumecs. If the pipe is bent by 135^0, find the magnitude and direction of the resultant force on the bend. 7M

UNIT–III

5. a) Explain the laws of fluid friction 4M

   b) Determine the difference in the elevations between the water surfaces in the two tanks which are connected by a horizontal pipe of diameter 0.30 m and length 400 m. The rate of flow of water through the pipe is 0.30 m^3/sec. Consider all losses and take the value of f = 0.016. 10M

OR

6. a) Sketch a Pitot tube and explain how it is used to measure the velocity of a flowing liquid 5M

   b) The inlet and throat diameter of a Venturimeter are 0.3 m and 0.15 m, respectively. The liquid flowing through the meter is water. The pressure intensity at inlet is 137.34 kN/m^2, while the vacuum pressure head at the throat is 0.37 m of mercury. Find the rate of flow. Assume that 4% of the differential head is lost between the inlet and the throat. Find also the value of C_d for the Venturimeter. 9M

UNIT–IV

7. a) What do you mean by Viscous flow? 2M

   b) An oil of viscosity 0.1 N-Sec/m^2 and relative density 0.90 is flowing through a circular pipe of diameter 50 mm and of length 300 m. The rate of flow of fluid through the pipe is 0.0035 lit/sec. Find the pressure drop in a length of 300 m and also the shear stress at the pipe wall. 12M

OR

8. a) What is the difference between hydro dynamically smooth and rough pipes? 4M

   b) Calculate: (i) the pressure gradient along flow, (ii) the average velocity, and (iii) the discharge for an oil of viscosity 0.02 N-s/m^2 flowing between two stationary parallel plates 1 m wide maintained 10 mm apart. The velocity midway between the plates is 2 m/s 10M

UNIT–V

9. a) Explain the term “dimensionally homogeneous equation” 4M

   b) A spillway model is to be built to geometrically similar scale of 1/50 across a flume of 600 mm width. The prototype is 15 m high and maximum head on it is expected to be 1.5 m. **(i)** what height of model and what head on the model should be used? (**ii**) If the flow over the model at a particular head is 0.012 m^3 per second, what flow per metre length of the prototype is expected? (**iii**) If the negative pressure in the model is 200 mm, what is the negative pressure in prototype? Is it practicable? 10M

OR

10. a) Define and explain Reynold’s number, Froude’s number and Mach number. 6M

    b) The discharge Q over a small rectangular weir is known to depend upon the head H over the weir, the weir height P, gravity g, width of the weir L and fluid properties: density ρ, dynamic viscosity μ and surface tension σ. Express the relationship between the variables in dimensionless form 8M

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Hall Ticket Number :										

R-15

Code: 5G631

II B.Tech. I Semester Supplementary Examinations May 2017

Strength of Materials-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) Define modulus of resilience. 2M

   b) A steel tie rod 20 mm diameter is encased in a copper tube of external diameter of 36 mm and internal diameter of 24 mm with the help of washers and nuts. The nut on the tie rod is tightened and the assembly is subjected to a tensile load of 20 kN. The temperature of the assembly is now raised to 800C. Determine the resultant stresses in the rod and the tube.
   Take Es=210 GPa, Ec = 100 GPa, $\alpha s=11 \times 10^{-6} / {}^{0}C$ and $\alpha c =18 \times 10^{-6} / {}^{0}C$. 12M

OR

2. a) What are temperature stresses? Derive a expression for temperature stress. 5M

   b) A 20 mm square bar deformed by 0.11 mm in a gauge length of 100 mm under an axial tensile force of 50 kN. If the Poisson's ratio of the material is 0.3, compute the stress induced in the bar and the three elastic moduli. Also calculate the volume change. 9M

UNIT–II

3. a) When do you observe an abrupt change in SFD and BMD? Explain each of these cases 4M

   b) What are points of contra flexure? Locate the same in case of a doubly over hanging beam of overhanging spans of 2 m each, with a central span of 8 m, subjected to a UDL of 4 kN/m over the entire beam in addition to a central point load of 20 kN. Also draw the shear force and bending moment diagrams. 10M

OR

4. a) Draw shear force diagram and bending moment diagram for a cantilever beam of 3 m span carrying a concentrated moment 10 kN-m at the free end. 7M

   b) Draw SFD and BMD for a simply supported beam of span 4 m and carrying a point load of 20 kN at 1m from left hand support in addition to a udl of 5 kN/m throughout the span. 7M

UNIT–III

5. a) Draw the shear stress distribution diagrams across circular, rectangular and H sections. 4M

   b) A T-section is used as a cantilever of span 1.5 m. A point load of 2.0 kN is acting at the free end of the cantilever in addition to a udl of 3 kN/m from the free end to a distance of 1.0 m. The flange is 100 x 20 mm and web is 10 x 150 mm deep. Calculate the maximum tensile and compressive stresses in the section. 10M

OR

6 a) Write the flexure formula and discuss its applications 4M

   b) A simply supported beam of T- section with flange of size 120mm x 20 mm thick and a web of size 180 mm x 20 mm carries a uniformly distributed load on an effective span of 4 m. If the allowable stress in bending and shear are 12 N/ mm^2 and 5 N/ mm^2 respectively, what is the safe value of the udl that can be placed on the beam including self-weight? 10M

UNIT–IV

7. a) Prove, from the fundamentals, that the deflection at the free end of a cantilever of span 'L' carrying a load of 'W' at a distance 'a' from the fixed end and flexural rigidity 'EI' is $W a^3 / 3 EI + (W a^2 / 2 EI) (L-a)$. 7M

   b) Find the maximum deflection of the simply supported beam of span 8 m, when it carries a udl of 40 kN/m for a length of 4m. The udl starts from 1m from the left hand support. Take E=200 GPa and $I = 4.3 \times 10^8$ mm^4. 7M

OR

8. a) Write Mohr's theorems and explain 4M

   b) A simply supported beam of span 10 m is loaded by a point load at 8 m from the left hand support. The moment of inertia of the beam is '4I' for the left 8 m and 'I' for the remaining 2 meters length. Determine the slope at the supports and the deflection at the mid-span. Take 'I'= 8×10^{-5} m^4 and E = 200 GPa. 10M

UNIT–V

9. a) Derive an expression for elastic strain energy in bending. 6M

   b) A simply supported beam of span 3 m is carrying point loads of 9 kN and 18 kN at 1 m and 2 m respectively from the left hand support. Determine the strain energy stored in the beam due to bending. 8M

OR

10. a) Describe the construction steps of Mohr's Circle. 4M

    b) Explain the various theories of failure. 10M

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Hall Ticket Number :										

R-15

Code: 5G632

II B.Tech. I Semester Supplementary Examinations May 2017

Surveying

(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) A chain line CDE crosses a river, D and E being on the near and distant banks respectively. A perpendicular DF, 54m long, is set out as D on the left of the chain line. The respective bearings of E and C taken as F are 67°30' and 157°30'. Find the chainage of E, given that CD is 27m and the chainage of D is 376.5m. 10M

   b) Explain the following.
   (i) True bearings
   (ii) Magnetic declinations

OR 4M

2. a) What is meant by chain surveying? Explain its principle. 7M

   b) The following offsets were taken from a chain line to a hedge.

Distance in m :	0	8	16	24	32	48	64	88	112
Offset in m :	3.76	4.32	5.44	4.88	3.84	3.36	3.00	2.52	1.84

compute the area in square metres included between the chain line , the hedge and the end offsets by Simpsons rule. 7M

UNIT–II

3. Two pegs A and B were 750 m apart across a wide river. The following readings were taken with one level

Level at	Reading on A	Reading on B
A	1.543	2.847
B	1.422	2.622

The error in the collimation adjustment of the level was + 0.002 m per 100m. Determine the true difference of level between A and B and the refraction 14M

OR

4. Explain the characteristics of contour lines and their uses 14M

UNIT–III

5. Explain the temporary and permanent adjustments of vernier transit. 14M

OR

6. The following are the interior angles of a closed traverse ABCDE.
   < A, 78°12'40" : < B, 168°33'50" ; < C, 84°22'30" ; < D, 115°43'25" < E, 90°7'35" .
   If the observed bearing of AB is 138°42'20", compute the bearings of the remaining sides. 14M

UNIT–IV

7. Explain the following.
   (i) Anaiiatical lens
   (ii) Inclined sights 14M

OR

8. Explain the components of a plane table with neat sketch. 14M

UNIT–V

9. Explain the various methods of determining the length of a transition curve. 14M

OR

10. Explain the following.
    (i) Cubic spiral
    (ii) Vertical curve
    (iii) Reverse curve 14M

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