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3E2015

Roll No. _____ Total No of Pages: 4

3E2015

B. Tech. III Sem. (Old Back) 2006-07, 07-08 and 08-09

Examination Feb. 2014

Civil Egg.

3CE5 FLUID MECHANICS

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:

*Attempt any **five questions**, **selecting one question** from **each unit**. All questions carry **equal** marks. **Schematic diagrams must be** shown wherever necessary. Any data you feel missing **suitably be assumed and stated** clearly. Units of quantities used / calculated **must be stated clearly**.*

*Use of following **supporting material is permitted** during examination.*

1. _____ 2. _____

UNIT -I

Q.1 (a) Define the following fluid properties

(a) Specific weight

(b) Viscosity

(c) Surface tension

(d) Compressibility [8]

(b) The velocity distribution for water flowing in a pipe follows the Law-

$$u = \frac{k}{4\mu}\left(R^2 - r^2\right)$$

Where R is the radius of the pipe, μ is the viscosity of water and K is a constant. Find the shear stress at the pipe wall and at a distance of $R/2$ from the axis of pipe. [8]

OR

Q.1 (a) If $4m^3$ of oil weighs 48KN, calculate the specific weight, specific volume, mass, density and relative density. [8]

(b) Write short notes on- [8]

(a) Ideal fluid.

(b) Newtonian fluid.

(c) Non- Newtonian fluid.

(d) Real fluid.

UNIT-II

Q.2 (a) Derive an expression for total pressure and centre of pressure of a plane lamina immersed in water. [8]

(b) An open tank contains water for a depth of 2 meters and above it oil for a depth of 1 meter. If oil has a specific gravity 0.8, find the thrust force and its point of application on side wall if its length is 2 meter. [8]

OR

Q.2 (a) Prove that the distance between the centre of Buoyancy and the metacentre is given by $BM = \frac{I}{V}$ with the usual notations. [8]

(b) A uniform cylinder 300 mm in diameter and 150 mm in length floats in mercury of specific gravity 13.6, the depth of immersion of cylinder being 80 mm. find the metacentric height. [8]

UNIT-III

Q.3 (a) Define the following – [8]

(a) Uniform and non uniform flow

(b) Steady and unsteady flow

(c) Stream line and path line

(d) Tangential and normal acceleration

(b) A cylindrical tank 1.5m in diameter and 3m in height contains water to a depth of 2.5m. Find the speed of tank so that 25% of the original volume is spilled out.

[8]

OR

Q.3 (a) Derive the continuity equation for three dimensional flow. [8]

(b) Derive the Euler's equation of fluid motion starting from first principle. [8]

UNIT-IV

Q.4 (a) What do you understand by momentum correction factor. Derive its value for pipe flow. [8]

(b) If there is an error of 2% in observing the head over

(i) a rectangular weir and (ii) a triangular weir,

Determine the error in the discharge resulting from it. [8]

OR

Q.4 (a) Define Cc, Cv and Cd for a sharp edged orifice. Explain the methods of determination for above coefficients. [8]

(b) Find the depth and a top width of a v-notch capable of discharging a maximum of 0.7 m^3 /sec. Then head over the notch is 7.5cm when the discharge is 0.006m^3/sec. The coefficient of discharge of the notch is same as that of a right angle V-notch for which $Q = 1.20\, H^{5/2}$ [8]

UNIT-V

Q.5 (a) Write short notes on-

(i) Equivalent length of pipe.

(ii) Moody's diagrams.

(iii) Reynolds experiment.

(iv) Law's of fluid friction. [8]

(b) Derive an expression for maximum power transmission for a give head H in the reservoir. [8]

OR

Q.5 (a) A pipe having a length of 6km and diameter 0.70m is connected between two reservoirs A and B, the difference between their water level is 20m. Calculate the discharge. Take f = 0.02 [8]

(b) Derive an expression for three pipes connected in series. [8]

3E1453

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3E1453

B. Tech. III Sem. (Old Back) 2006-07, 07-08 and 08-09

Feb. 2014

Civil Engineering

3CE3 ENGINEERING GEOLOGY

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal marks**. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Unit of quantities used / calculated must be stated clearly.*

Use of following supporting material is permitted during examination.

1. _____ 2. _____

UNIT I

Q.1 Write an essay on "Importance of Geology in Civil Engg." [16]

OR

Q.1 Describe the geological action of a river & its Various Stages. [16]

UNIT II

Q.2 Give an account of the chemical nature of Igneous Rocks. [16]

OR

Q.2 Discuss about Texture and Structure of Sedimentary Rocks. [16]

UNIT-III

Q.3 Give the classification of fold and discuss the implication of fold at a dam site. [16]

OR

Q.3 Write an essay on the classification and origin of Faults. [16]

UNIT-IV

Q.4 Discuss the various geological investigations to be carried out at a dam site. [16]

OR

Q.4 Explain, how geological features influence selection of a tunnel. Name two important tunnels of India. [16]

UNIT-V

Q.5 Discuss the importance of Remote Sensing in Civil Engineering. [16]

OR

Q.5 Write short notes on:

(i) What is Remote Sensing? [6]

(ii) Discuss Various Stages of Aquisition and Analysis process of Remote Sensing. [10]

3E1451

Roll No. _____ Total No of Pages: 5

3E1451
B. Tech. III Sem. (Old Back) 2006-07,07-08 and 08-09
Exam Feb. 2014
Civil Engineering
3CE1 STRENGTH OF MATERIALS & MECHANICS OF STRUCTURES-I

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal marks**. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.*

Use of following supporting material is permitted during examination.

1 Nil 2 Nil

UNIT-I

Q.1 (a) A solid circular rod in section tapers from 20 mm dia at one end to 10 mm dia at other end. The length of the rod is 200 mm, on applying an axial pull of 6 kN it was found to be extended by 0.064 mm. Find the young's modulus of the material of the rod. [8]

(b) A rod is 2 meters long at 10°C. Find the expansion of the rod when the temperature is raised to 80°C. If this expansion is prevented, find the stress in the material. Take $E = 1 \times 10^5$ N/mm^2 and co-efficient of thermal expansion $\alpha = 0.000012$ per°C. [8]

OR

Q.1 (a) Draw stress - strain diagram for a mild steel rod tested in tension, showing distinct points on it. [6]

(b) A member ABC is formed by connecting a steel bar of 20 mm dia to an aluminium bar of 30 mm dia, and is subjected to forces as shown in Fig.1. Determine the total deformation of the bar. Take E for steel as 2×10^5 N/mm^2 & for aluminium as 0.7×10^5N/mm^2. [10]

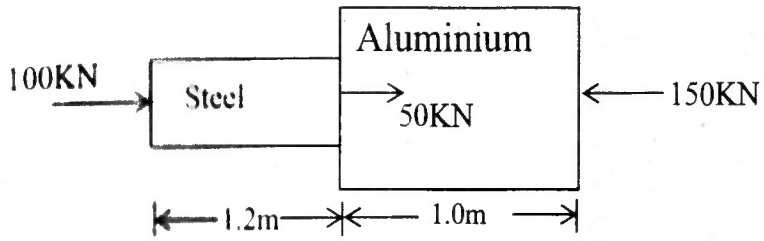

Fig.1

UNIT-II

Q.2 (a) Define principal stresses and principal planes. Draw Mohr circle for finding out normal and tangential stresses at a plane inclined at θ degree from vertical plane, when a piece of material is subjected to normal stresses on two mutually perpendicular planes as p_1 tensile and p_2 compressive along with a shear stress q on these planes. [8]

(b) At a point in an elastic material, a direct tensile stress of 60 N/mm^2 and a direct compressive stress of 40N/mm^2 are applied on planes at right angle to each other. If the maximum principal stress is limited to 75N/mm^2(tensile), find the shear stress that may be allowed on the planes. Also determine the minimum principal stress and maximum shear stress. [8]

OR

Q.2 (a) Define slenderness ratio and write down the formula for effective length of a column for different end conditions. [6]

(b) Find the gratest length of a mild steel rod section 25mm × 25mm which can be used as a column with one end fixed and other end free to carry a working load of 35 kN. Allow a factor of safety of 4. Take f_c=320 N/mm^2 and Rankine's constant $a = \frac{1}{7500}$. [10]

UNIT-III

Q.3 Find the centroidal and product moment of Inertra of an angle section as shown in Fig.2. Also find out principal moment of inertia. [16]

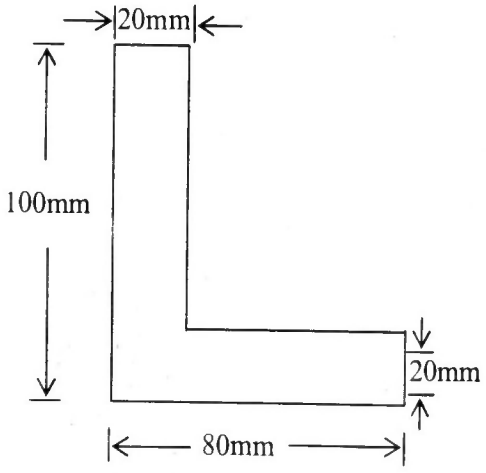

Fig - 2

OR

Q.3 (a) Give the classification of framed structures. [4]

(b) Find the forces in all the members of a truss as shown in Fig.3 [12]

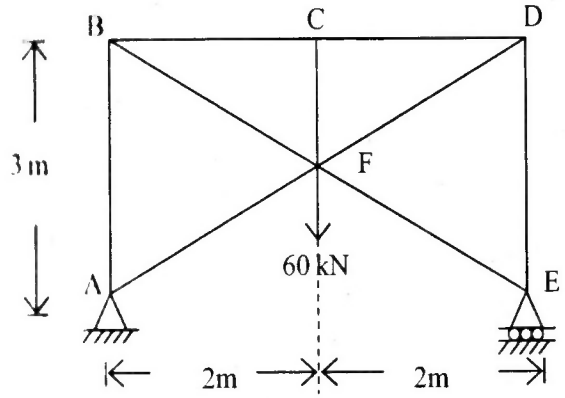

Fig.3

UNIT-IV

Q.4 (a) Define shear force and bending moment. Derive the formula showing the relationship between loading, shear force and bending moment at any section of a beam. [6]

(b) Draw shear force and bending moment diagrams for a beam shown in Fig.4. [10]

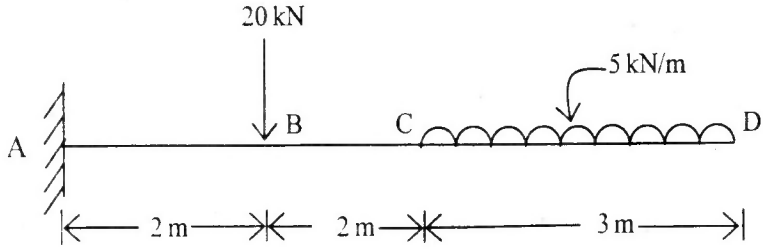

Fig.4

OR

Q.4 Draw shear force and bending moment diagrams for a beam as shown in Fig.5. [16]

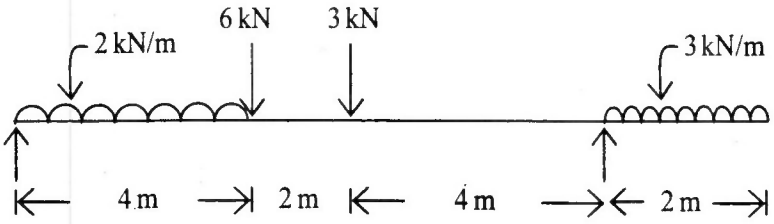

Fig. 5

UNIT-V

Q.5 (a) Drive the formula for simple theory of bending. Also write the assumptions made in derivation. [10]

(b) Compare the weights of two beams of same material and equal strength, one being of solid circular section and other being of hollow circular section whose internal diameter is 0.75 times its external diameter. [6]

OR

Q.5 (a) Define unsymmetrical bending. [3]

(b) Derive the formula for finding out the location of shear centre of a channel section. [5]

(c) Prove that the maximum intensity of shear stress in solid circular section is 1.33 times that of average value of shear stress in the section. [8]

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3E2011

Roll No. _____ Total No of Pages: 5

3E2011
B. Tech. III Sem. (Old Back) 2006-07,07-08 and 08-09
Exam Feb. 2014
Civil Engineering
3CE1 STRENGTH OF MATERIALS & MECHANICS OF STRUCTURES-I

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

*Attempt any **five questions, selecting one question** from **each unit**. All questions carry **equal marks**. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.*

Use of following supporting material is permitted during examination.

1. Nil 2. Nil

UNIT-I

Q.1 (a) A solid circular rod in section tapers from 20 mm dia at one end to 10 mm dia at other end. The length of the rod is 200 mm, on applying an axial pull of 6 kN it was found to be extended by 0.068 mm. Find the young's modulus of the material of the rod. [8]

(b) A rod is 2 meters long at 10°C. Find the expansion of the rod when the temperature is raised to 80°C. If this expansion is prevented, find the stress in the material. Take E = 1×10^5 N/mm^2 and co-efficient of thermal expansion $\alpha = 0.000012$ per°C. [8]

OR

Q.1 (a) Draw stress - strain diagram for a mild steel rod tested in tension, showing distinct points on it. [6]

(b) A member ABC is formed by connecting a steel bar of 20 mm dia to an aluminium bar of 30 mm dia, and is subjected to forces as shown in Fig.1. Determine the total deformation of the bar. Take E for steel as 2×10^5 N/mm^2 & for aluminium as 0.7×10^5N/mm^2. [10]

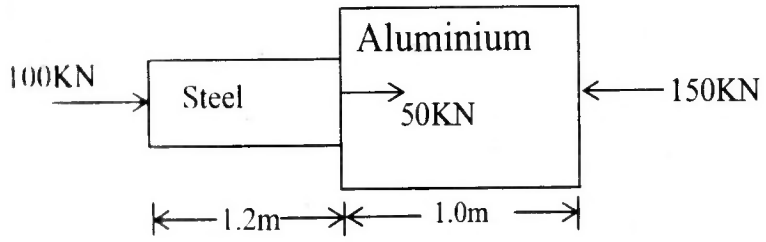

Fig.1

UNIT-II

Q.2 (a) Define principal stresses and principal planes. Draw Mohr circle for finding out normal and tangential stresses at a plane inclined at θ degree from vertical plane, when a piece of material is subjected to normal stresses on two mutually perpendicular planes as p_1 tensile and p_2 compressive along with a shear stress q on these planes. [8]

(b) At a point in an elastic material, a direct tensile stress of 60 N/mm^2 and a direct compressive stress of 40N/mm^2 are applied on planes at right angle to each other. If the maximum principal stress is limited to 75N/mm^2(tensile), find the shear stress that may be allowed on the planes. Also determine the minimum principal stress and maximum shear stress. [8]

OR

Q.2 (a) Define slenderness ratio and write down the formula for effective length of a column for different end conditions. [6]

(b) Find the gratest length of a mild steel rod section 25mm × 25mm which can be used as a column with one end fixed and other end free to carry a working load of 35 kN. Allow a factor of safety of 4. Take f_c=320 N/mm^2 and Rankine's constant $a = \frac{1}{7500}$. [10]

UNIT-III

Q.3 Find the centroidal and product moment of Inertra of an angle section as shown in Fig.2. Also find out principal moment of inertia. [16]

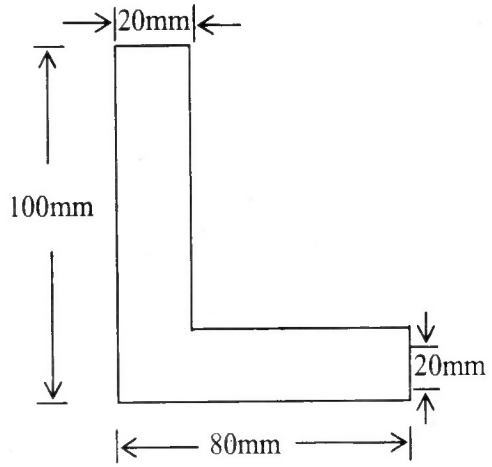

Fig - 2

OR

Q.3 (a) Give the classification of framed structures. [4]

(b) Find the forces in all the members of a truss as shown in Fig.3 [12]

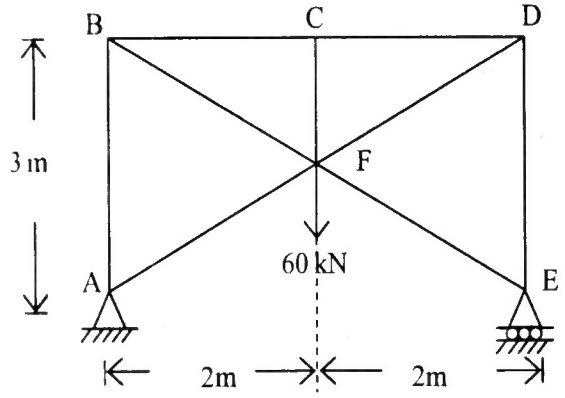

Fig.3

UNIT-IV

Q.4 (a) Define shear force and bending moment. Derive the formula showing the relationship between loading, shear force and bending moment at any section of a beam. [6]

(b) Draw shear force and bending moment diagrams for a beam shown in Fig.4. [10]

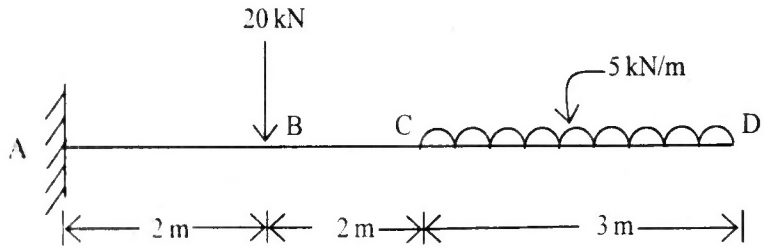

Fig.4

OR

Q.4 Draw shear force and bending moment diagrams for a beam as shown in Fig.5. [16]

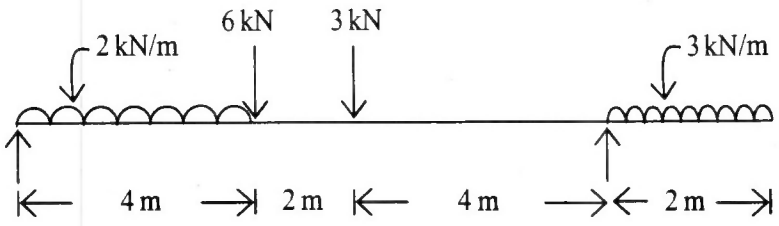

Fig. 5

UNIT-V

Q.5 (a) Drive the formula for simple theory of bending. Also write the assumptions made in derivation. [10]

(b) Compare the weights of two beams of same material and equal strength, one being of solid circular section and other being of hollow circular section whose internal diameter is 0.75 times its external diameter. [6]

OR

Q.5 (a) Define unsymmetrical bending. [3]

(b) Derive the formula for finding out the location of shear centre of a channel section. [5]

(c) Prove that the maximum intensity of shear stress in solid circular section is 1.33 times that of average value of shear stress in the section. [8]

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3E2014

Roll No. _____ Total No of Pages: 4

3E2014

B. Tech. III Sem. (Old Back) 2006-07, 07-08 and 08-09

Feb. 2014

Civil Engineering

3CE4 COMPUTER APPLICATIONS IN CIVIL ENGINEERING

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Unit of quantities used / calculated must be stated clearly.*

Use of following supporting material is permitted during examination.

1. NIL 2. NIL

UNIT-I

Q.1 (a) If $u = 5xy^2/z^3$ and errors in x, y, z are 0.001, compute the relative maximum error $(E_r)_{max}$ in u When $x = y = z = 1$. [8]

(b) Perform four iterations of the Newton- Raphson method to obtain the approximate value of $(17)^{1/3}$ starting with the initial approximation $x_0=2$. [8]

OR

Q.1 (a) Derive error equation for Secant method. [6]

(b) Determine quadratic factors using Bairstow method to the equation

$x^4 + 5x^3 + 3x^2 - 5x - 9 = 0.$ [10]

UNIT-II

Q.2 (a) Write the algorithm for Gauss-Elimination method for solving linear equations. [8]

(b) Solve the following system of equations by Gauss-Seidel method:

$54x + y + z = 110,$

$x + 15y + 6z = 72;$

$-x + 6y + 27z = 85$ [8]

OR

Q.2 (a) Write the algorithm for Gauss – Seidel method for solving linear equations. [8]

(b) Solve the following system of equations by Gauss-Elimination method:

$2x + y + z = 10,$

$3x + 2y + 3z = 18,$

$x + 4y + 9z = 16.$ [8]

UNIT-III

Q.3 (a) Establish the relation $\mu\delta = \frac{1}{2}(\Delta + \nabla)$ [6]

(b) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using - [10]

(i) Trapezoidal rule, taking h = ¼

(ii) Simpson's one-third rule, taking h = ¼

OR

Q.3 (a) Fit a parabola $y = a + bx + cx^2$ to the following data: [8]

$x \rightarrow$	2	4	6	8	10
$y \rightarrow$	3.07	12.85	31.47	57.38	91.29

(b) Given that: [8]

$x \rightarrow$	1.0	1.1	1.2	1.3	1.4	1.5
$y \rightarrow$	7.989	8.403	8.781	9.129	9.451	9.750

Find dy/dx at $x=1.6$

UNIT-IV

Q.4 (a) Solve, by Euler's method, the initial value problem - [8]

$$\frac{dy}{dx} = \frac{x - y}{2}, \quad y(0) = 1$$

over [0, 3], using step size 0.5

(b) Apply fourth order Runge- Kutta method to $\frac{dy}{dx} = 3x + \frac{1}{2}y, \quad y(0) = 1,$

to determine $y(0.1)$ correct to four decimal places. [8]

OR

Q.4 (a) Using Euler's modified method, obtain a solution of

$$\frac{dy}{dx} = x + \left|\sqrt{y}\right|; \quad y(0) = 1$$

for the range $0 \leq x \leq 0.6$ in steps of 0.2 [8]

(b) Solve the initial value problem $\frac{dy}{dx} = 1 + xy^2$, [8]

by Milne's Predictor- Corrector method. It is given that -

x→	0	0.1	0.2	0.3
y→	1	1.105	1.223	1.355

UNIT-V

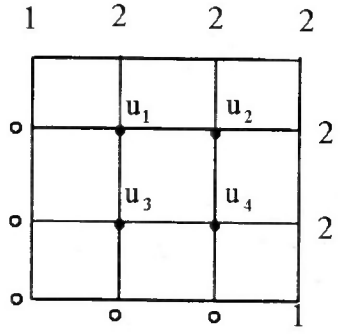
Q.5 (a) Write a short note on solution of Elliptic equation by relaxation method. [8]

(b) Solve parabolic equation $\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2}$;

subject to the conditions $u(x, 0) = 0$, $u(0, t) = 0$ and $u(1, t) = t$. Taking $h = 1/2$, $K = 1/8$, using Crank- Nicholson method. [8]

OR

Q.5 Solve the Laplace equation $u_{xx} + u_{yy} = 0$ for the square mesh with boundary values shown in figure: [16]



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3E1456

Roll No. _____ Total No of Pages: 4

3E1456
B. Tech. III Sem. (Old Back) 2006-07, 07-08 and 08-09
Feb. 2014
Civil Engg.
3CE6 ENGINEERING MATHEMATICS

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.*

Use of following supporting material is permitted during examination.

1._____NIL_____ 2._____NIL_____

UNIT-I

Q.1 (a) Develop half- range cosine series for $f(x) = (x-1)^2$, $0<x<1$, hence show that

$$\frac{\pi^2}{8} = \frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + - - -$$ [8]

(b) Obtain the expansion for Y from the following table up to first harmonic. [8]

x	0	1	2	3	4	5
Y	9	18	24	28	26	20

OR

Q.1 (a) Find the inverse Z- transform of $f(z) = \frac{1}{(z-3)(z-2)}$

For (i) $|z| < 2$ (ii) $2 < |z| < 3$ (iii) $|z| > 3$ [8]

(b) Find Z- transform of Sin $(n\theta + \alpha)$ [8]

UNIT-II

Q.2 (a) Use Laplace- Transform technique to solve [8]

$(D^2+9)\,y = \cos 2t$, $y(0) = 1$, $y(\pi/2) = -1$

(b) Apply Convolution theorem to evaluate- [8]

$$L^{-1}\left\{\frac{s^2}{(s^2+a^2)(s^2+b^2)}\right\}$$

OR

Q.2 (a) Find the bounded solution $y(x, t)$, $0 < x < 1$, $t > 0$ [8]

of the BVP: $\frac{\partial y}{\partial x} - \frac{\partial y}{\partial t} = 1 - e^{-t}, y(x,0) = x$

(b) Evaluate inverse Laplace-transform of [8]

$$\frac{3s+4}{4s^2+12s+9}$$

UNIT-III

Q.3 (a) Find the Fourier sine transform of $f(x) = e^{-x}$ $x \geq 0$, Also show that [8]

$$\int_0^\infty x \frac{x \operatorname{Sin} mx}{x^2+1} dx = \frac{\pi}{2} e^{-m}, m > 0$$

(b) Solve: $\frac{\partial u}{\partial t} = c^2 \frac{\partial^2 u}{\partial x^2}, x > 0, t > 0$ [8]

given that $u(0,t) = f(t)$ and $u(x,0)=0$

OR

Q.3 (a) Find the Fourier transform of $e^{-|x|}$. [8]

(b) Find the Fourier cosine transform of e^{-x^2} [8]

UNIT –IV

Q.4 (a) Show that

(i) $\Delta \log f(x) = \log\left[1 + \frac{\Delta f(x)}{f(x)}\right]$ [5]

(ii) $(1+\Delta)(1-\nabla) \equiv 1$ [3]

(b) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using trapezoidal rule with

$h = 0.2$ and hence determine the value of π. [8]

OR

Q.4 (a) For the following table, interpolate the value of y(x=10). [8]

x	5	6	9	11
y	12	13	14	16

(b) Compute $u_{12.2}$ from the following table- [8]

x^o	10	11	12	13	14
$10^5 u_x$	23967	28060	31788	35209	38368

UNIT-V

Q.5 (a) Using Picard's method, find the fourth order approximated solution at x=0.2 of the equation.

$$\frac{dy}{dx} = 1 + xy, y(0) = 0.$$ [8]

(b) Use Runge_kutta method to find the numerical solution at x=0.8 for $\frac{dy}{dx} = \sqrt{x+y}$, $y(0.4) = 0.41$ take h= 0.2 [8]

OR

Q5. (a) For $\frac{dy}{dx} = x^2 + y, y(o) = 1$; determine y (0.02), y (0.04), y (0.06) using the modified Euler's method. [8]

(b) Apply Milne's P-c-method to find a solution of the differential equation

$$\frac{dy}{dx} = x - y^2,$$ given that

y(0)=0, y(0.2)= 0.02

y(0.4) = 0.0795, y(0.6)=0.1762 [8]

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3E1452

Roll No. _____ Total No of Pages: 3

3E1452
B. Tech. III – Sem. (Main/Back) Examination Feb. 2014
Civil Engineering
3CE2 Building Material & Construction

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Unit of quantities used / calculated must be stated clearly.*

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

1._____ 2._____

UNIT-I

Q.1 (a) How would you classify the stone for engineering works? [8]

(b) Discuss characteristics of good building Stone. [8]

OR

Q.1 (a) Discuss characteristics of good bricks. Discuss in brief functions of various ingredients of good brick-earth. [8]

(b) What is efflorescence in bricks? What are its causes and remedies? [8]

UNIT-II

Q.2 (a) What are the ingredients of Portland Cement? State the functions and limits of each of them. [8]

(b) What do you mean by normal consistency? What is its significance? How is it tested? [8]

OR

Q.2 (a) How lime is classified as per I S code? Discuss the characteristics of lime. [8]

(b) Discuss the characteristics and uses of sand. [8]

UNIT-III

Q.3 (a) Discuss characteristics of good timber. What are the objectives of seasoning of timber? [8]

(b) Explain the following defects of timber - [8]

(i) Shakes
(ii) Rind gall
(iii) Upsets
(iv) Knots

OR

Q.3 (a) Discuss application of glass in building industry. [8]

(b) What are the various ingredients of the plastics? Give their specific uses. [8]

UNIT-IV

Q.4 (a) Discuss classification of building as per occupancy in brief. [8]

(b) State the components of a building. Discuss functional requirements of any two components. [8]

OR

Q.4 (a) Discuss different types of shallow foundations commonly used in short buildings. [8]

(b) Explain with neat sketch commonly used foundations for black cotton soil. [8]

UNIT-V

Q.5 (a) State and discuss classification of store masonry. [8]

(b) Differentiate between English bond and Flemish bond in brick masonry. [8]

OR

Q.5 (a) State and discuss different types of pointing with sketches. [8]

(b) Discuss types and uses of partion wall. [8]

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