Roll No. _____   Total No. of Pages : 3

3E1621

3E1621

B. Tech. (Sem. III) (Main/Back) Examination, December 2017
Civil Engg.
3CE1A Strength of Materials - I

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

*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. (Mentioned in form No. 205)

1. NIL _____   2. NIL _____

UNIT - I

1   A bar of steel is 7 m long. First 2 m of it is 250 mm in diameter, next 3 m of it 200 mm in diameter and remaining 2 m of it 150 mm in diameter. Find change in length if applied tensile load is 100 kN and $E = 0.21 \ MN/mm^2$.

16

OR

1   Derive relation between Young's modulus of elasticity and Shear modulus of elasticity.

16

UNIT - II

2   At a point in web of girder, bending stress is 60 MPa tensile and shearing stress at same point is 30 MPa. Calculate principal stresses and maximum shear stress.

16

OR

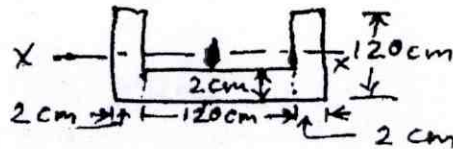2   Determine moment of inertia about centre of gravity XX for section shown below.

Fig. 1

16

UNIT - III

3   A hollow cast iron column, hinged at both ends is 4 m long. Its external diameter is 200 mm and internal diameter is 150 mm. Find maximum load it can carry if factor of safety is 4. Use Rankine's formula. Take $\sigma_y = 550 \ N/mm^2$ and $a = 1/1600$.

16

OR

3   Calculate minimum wall thickness of a thin cylinder 1 m in diameter, if it is to with stand internal pressure of $2 \ N/mm^2$ and longitudinal stress is not to exceed $30 \ N/mm^2$ and also hoop stress not to exceed $40 \ N/mm^2$.

16

UNIT - IV

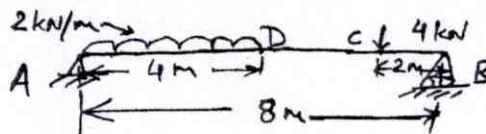4   Draw shear force and bending moment diagrams for beam shown below.

Fig. 2

16

OR

4 Draw SFD and BMD for beam shown below.
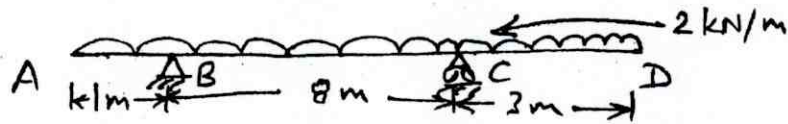

Fig. 3

16

UNIT - V

5 An R.S.J. 55 cm deep and 19 cm wide having flange and web thicknesses of 1.5 cm and 0.99 cm respectively is used as beam. Calculate moment of resistance at section where max. Stress is $100 \ N/mm^2$.
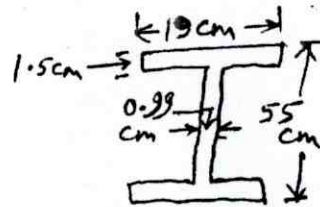

Fig. 4

16

OR

5 For same section as **fig. 4**, if it is subjected to shear force of 100 kN, show variation of shear stress.

16

Roll No. _____

3E1622

3E1622

Total No. of Pages : 3

B. Tech. (Sem. III) (Main/Back) Examination, December - 2017
Civil Engg.
3CE2A Civil Engg. Materials

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

*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.
(Mentioned in form No. 205)

1. _____ Nil _____   2. _____ Nil _____

UNIT - I

1 (a) List various methods used in quarrying the stones. Describe briefly the
        method of quarrying by blasting.

8

   (b) What are the various uses of stones ? Describe in detail.

8

OR

1 Write short notes on the followings :
   (a) Water absorption test of stone.
   (b) Selection of a site of a quarry.
   (c) Advantages of quarry dressing of stone.
   (d) Geological classification of rocks.

4×4=16

UNIT - II

2 (a) Describe the process of burning of bricks in Hoffman's Kiln with the help of neat sketch.

8

(b) List out different type of tiles and describe briefly two of them with the help of neat sketches.

8

OR

2 (a) List out the different tests of bricks. Describe any one test in detail.

8

(b) Explain various constituents of good brick clay.

8

UNIT - III

3 (a) List various types of cements; State briefly the application of each type.

8

(b) Explain the classification of limes in detail.

8

OR

3 Differentiate between the followings :

(a) Initial setting time and Final setting time of cement

(b) Cement and Lime

(c) White cement and Ordinary cement

(d) Quick lime and Slaked lime.

4×4=16

UNIT - IV

4 (a) What is mortar ? List various types of mortar. Explain the method for preparing the cement mortar.

8

(b) Explain the process of natural seasoning of timber. Mention its advantages and disadvantages.

8

OR

4 (a) Explain the various types of paints and varnishes and their application in detail.

8

(b) Differentiate between the followings :
 (i) Cup shakes and Star shakes defects of timber
 (ii) White wash and Distempers.

2×4=8

UNIT - V

5 (a) Write short note on natural materials like bamboo, rammed earth, stabilized block.

8

(b) Explain building material from agro and industrial wastes.

8

OR

5 Write short notes on the following :
 (i) Plastic
 (ii) Glass
 (iii) Silica fume
 (iv) Rice husk ash.

4×4=16

Roll No. _____   Total No. of Pages : 3

3E1623

3E1623

B. Tech. (Sem. III) (Main/Back) Examination, December - 2017
Civil Engg.
3CE3A Engg. Geology

Time : 3 Hours   Maximum Marks : 80
                                 Min. Passing Marks : 26

*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.
(Mentioned in form No. 205)

1. _____ Nil _____   2. _____ Nil _____

UNIT - I

1   Distinguish between weathering and Erosion and describe in brief various agents
    of weathering.

                                                                            16

OR

1   Write short notes on any two of the following :
    (i)   Features formed by wind deposits.

                                                                            8

    (ii) Features formed by river erosion.

                                                                            8

    (iii) Various Physical properties of minerals.

                                                                            8

3E1623]   1   [P.T.O.

UNIT - II

2   Describe in brief about the various geological and engineering properties of Rocks. that are important in selection of rocsks.

(a)   As building material

(b)   As road aggregates.

8+8=16

OR

2   Write short notes on any two of the following :

(i)   Mineralogical classification of igneous rocks.

8

(ii)   Structures of sedimentary rocks.

8

(iii) Agents of Metamorphism.

8

UNIT - III

3   Distinguish between joints and Faults. Write in brief about the classification of faults and illustrate your answer with diagrams.

2+14=16

OR

3   Write short notes on any two of the following :

(i)   Define unconformity and describe different types of unconformities.

2+6=8

(ii)   Describe various types of joints.

8

(iii) How are faults recognised in the field ?

8

UNIT - IV

4   Describe in brief about the various geological, geophysical and other investigations which need to be carried out in selection of a site for dam and Reservoir.

16

OR

4   Describe in brief geophysical electrical resistivity methods and their uses in Civil engineering.

16

UNIT - V

5   Define remote sensing and describe advantages and limitation of remote sensing and G.I.S. in different fields of civil engineering.

2+7+7=16

OR

5   Write short notes on any two of the following :

(i)   Describe in brief about the different types of platforms used in remote sensing.

8

(ii)   Define sensors and write in brief about the characteristics of sensors.

2+6=8

(iii) Describe in brief E.M.R. and Electromagnetic spectrum.

4+4=8

Roll No. _____

3E1624

Total No. of Pages : 3

3E1624

B. Tech. (Sem. III) (Main / Back) Examination, December - 2017
Civil Engg.
3CE4A Construction Technology

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

*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 materials is permitted during examination.
(Mentioned in form No. 205)

1. _____ Nil _____ 2. _____ Nil _____

UNIT - I

1 (a) What is a building ? What are the components of a building ? Explain in detail.

8

(b) What do you understand by Pre-cast structures ? What are the advantages and disadvantages of Pre-cast structure ?

8

OR

1   (a)   Define scaffolding ? What are the components of scaffolding ? Explain any two types of scaffolding with neat diagram.

10

     (b)   What is the significance of providing foundation to the building ? Explain designing criteria for width of a shallow foundation.

6

UNIT - II

2   (a)   Enumerate the structural components of an arch with neat diagram. Explain pointed arch and Florentine arch.

10

     (b)   Explain the various technical terms used in case of stair with neat diagram.

6

OR

2   (a)   Define the general principles to be considered in case of damp proofing. Explain air drain and asphalt tanking methods of damp proofing with diagram.

8

     (b)   What is the purpose of providing a partition wall ? Explain brick-nogged partition and stud partition with diagram.

8

UNIT - III

3   (a)   Explain the precautions to be taken during the erection of steel structures at the slopes.

6

     (b)   What is a composite floor ? What are the features of a composite floor ? Explain the construction mechanism of jack arch floor.

10

OR

3   (a)   Explain following with diagram of a pitched roof -
        (i)   Battens
        (ii)   Dragon Beam
        (iii) Purlins
        (iv) Rafters

2×4=8

     (b)   Describe at least four types of pitched roof with diagram.

8

UNIT - IV

4 (a) Explain following -
   (i) Dewatering equipments
   (ii) Grouting equipments
   (iii) Pile driving equipments
   (iv) Compaction equipments

   $2.5 \times 4 = 10$

(b) Explain the functioning of Asphalt batch hot mix plant.

   6

OR

4 (a) What are the pumping equipments ? Explain their functioning in detail.

   10

(b) How the latest innovations in construction equipments has affected the working of construction industry ? Explain.

   6

UNIT - V

5 (a) How would you explain forecasting of equipments ? Explain briefly.

   6

(b) Explain following -
   (i) Owning cost
   (ii) Investment cost
   (iii) Overhead cost
   (iv) Operation cost
   (v) Depreciation

   $2 \times 5 = 10$

OR

5 (a) Explain break-even point theory with major concern of determination of break-even point value.

   8

(b) What is preventive maintenance ? What are its functions ? Explain.

   8

3E1624]   3   [9700]

Roll No. _____

Total No. of Pages : 4

3E1625

3E1625

B. Tech. (Sem. III) (Main/Back) Examination, December - 2017
Civil Engg.
3CE5A Fluid Mechanics

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

*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 materials is permitted during examination.

1. _____ Nil _____   2. _____ Nil _____

UNIT - I

1 (a) Enunciate Newton's law of viscosity. Explain the importance of viscosity in fluid motion. What is the effect of temperature on viscosity of water and that of air ?

8

(b) The dynamic viscosity of oil, used for lubrication between a shaft and sleeve is 6 poise. The shaft is 0.4 m and rotates at 190 r.p.m. Calculate the power lost in the bearing for a sleeve length of 90 mm. The thickness of the oil film is 1.5 mm.

8

OR

1   (a) Write short notes on any four :
         (i)   Specific weight, Specific volume and Specific gravity.
         (ii) Compressibility and Bulk modulus of compressibility.
         (iii) Surface tension and capillarity.
         (iv) Vapour pressure and cavitations.
         (v)   Different types of fluids.

                                                        4×4=16

UNIT - II

2   (a) Explain the different types of measurement of pressure in Fluid with neat sketch. Also give the expression for pressure in inclined single column manometer.

                                                        10

    (b) A simple U-tube manometer containing mercury is connected to a pipe in which a fluid of sp. gr. 0.8 and having vacuum pressure is flowing. The other end of the manometer is open to atmosphere, Find the vacuum-pressure in pipe, if the difference of mercury level in the two limbs is 40 cm and the height of fluid in the left from the centre of pipe is 15 cm below.

                                                        6

OR

2   (a) What is meta-centre ? Explain the analytical method of determination of meta-centric height.

                                                        8

    (b) A uniform body of size 3 m long x 2 m wide x 1 m deep floats in water. What is the weight of the body if depth of immersion is 0.8 m? Determine the meta-centric height also.

                                                        8

UNIT - III

3   (a) Determine the equation of motion by Euler's equation of motion. Also explain Bernoulli's equation from Euler's equation. Give all the assumptions made in Bernoulli's equation.

                                                        10

    (b) A pipe, through which water is flowing, is having diameters, 20 cm and 10 cm at the cross-sections 1 and 2 respectively. The velocity of water at section 1 is given 4.0 m/s. Find the velocity at sections 1 and 2; also rate of discharge.

                                                        6

OR

3E1625]   2   [P.T.O.

3   (a)   Explain velocity potential function and stream function.

                                                       6

    (b)   The velocity potential function (ϕ) is given by an expression

$$\phi = -\frac{xy^3}{3} - x^2 + \frac{yx^3}{3} + y^2$$

        (i)   Find the velocity components in x and y direction

        (ii) Show that ϕ represents a possible case of flow.

                                                       10

## UNIT - IV

4   (a)   What are the different applications of Bernoulli's equation ? Give the expression for rate of flow through venturimeter.

                                                       10

    (b)   An oil of sp.gr. 0.8 is flowing through a venturimeter having inlet diameter 20 cm and throat diameter 10 cm. The oil-mercury differential manometer shows a reading of 25 cm. Calculate the discharge of oil through the horizontal venturimeter. Take $C_d = 0.98$.

                                                          6

OR

4   (a)   Give the classification of Notches and weirs. Find the discharge over a triangular notch and stepped notch.

                                                       10

    (b)   Find the discharge through the notch for given figure, if C_d for all section = 0.62.
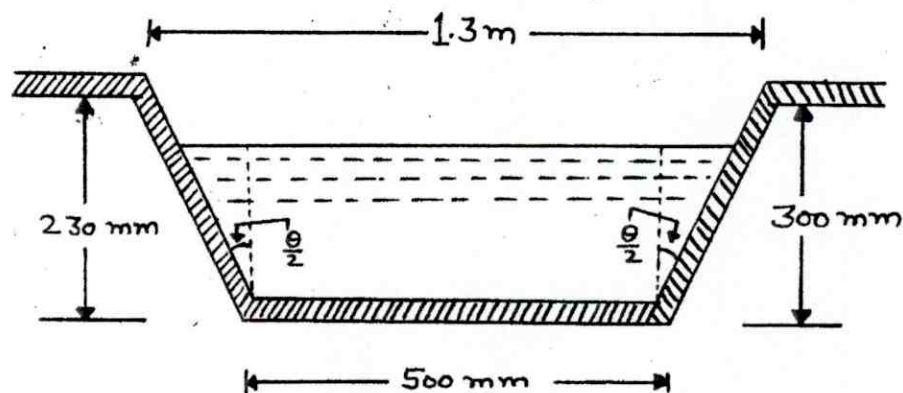
Figure

                                                          6

UNIT - V

5   (a)   What are the different losses of energy in pipes? Derive Chezy's formula for loss of head due to friction in pipes.

8

       (b)   Find the head lost due to friction in a pipe of diameter 300 mm and length 50 m, through which water is flowing at a velocity of 3 m/s using (i) Darcy's formula (ii) Chezy's formula for which C = 60, kinematic viscosity for water is 0.01 stoke.

8

OR

5   (a)   Find an expression for the power transmission through pipes. What is the condition for maximum transmission of power and corresponding efficiency of transmission ?

8

       (b)   A pipe of diameter 300 mm and length 3500 m is used for the transmission of power by water. The total head at the inlet of the pipe is 500 m. Find the maximum power available at the outlet of the pipe, if the value of f =006.

8

_____

50

3E1626

B. Tech. (Sem. III) (Main/Back) Examination, December - 2017
Civil Engg.
3CE6A Advanced Engg. Mathematics

Time : 3 Hours   Maximum Marks : 80
                                 Min. Passing Marks : 26

*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.
(Mentioned in form No. 205)

1. _____ Nil _____   2. _____ Nil _____

UNIT - I

1 (a) Find the Fourier series to represent $x - x^2$ from $x = -\pi$ to $x = \pi$. Hence show that

$$\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \ldots\ldots\ldots = \frac{\pi^2}{12}$$

8

   (b) Find the Z-transform of
        (i) $\sin\theta$

4

        (ii) $c^n \cos n\theta$

4

OR

1   (a) Find the inverse z-transform of $\dfrac{z^3 - 20z}{(z-2)^3 (z-4)}$.

8

     (b) Analyse Harmonically the data given below and express y in Fourier series up to third harmonic :

x:	0	$\pi/3$	$2\pi/3$	π	$4\pi/3$	$5\pi/3$	2π
y:	1.0	1.4	1.9	1.7	1.5	1.2	1.0

8

UNIT - II

2   (a) Find Laplace transform of $f(t) = \dfrac{1 - \cos 2t}{t}$. Also calculate the integral

$$\int_0^\infty e^{-t} \frac{\sin^2 t}{t} dt .$$

8

     (b) Solve $(D^2 - D - 2)x = 20 \sin 2t$, $x(0) = -1$, $x'(0) = 2$.

8

OR

2   (a) Apply convolution theorem and evaluate inverse Laplace transform of

$$\frac{s^2}{(s^2 + a^2)(s^2 + b^2)}$$

8

     (b) Solve $\dfrac{\partial u}{\partial t} = \dfrac{\partial^2 u}{\partial x^2}$ where $0 < x < 1, t > 0$ together with the conditions

$u(x, 0) = 3 \sin 2\pi x$, $u(0, t) = 0$, $u(1, t) = 0$.

8

UNIT - III

3   (a) Find the Fourier transform of $f(x)$, where

$$f(x) \begin{cases} 1 - x^2 , & |x| < 1 \\ 0 , & |x| > 1 \end{cases}$$

and hence evaluate $\displaystyle\int_0^\infty \left(\frac{x \cos x - \sin x}{x^3} \right) \cos \left(\frac{x}{2} \right) dx$.

8

(b) Solve $f(x)$ the integral equation

$$\int_0^\infty f(x)\cos(sx)\,dx = \begin{cases} 1-s, & 0 \le s \le 1 \\ 0, & s > 1 \end{cases}$$

Hence prove that $\int_0^\infty \dfrac{\sin^2 t}{t^2}\,dt = \pi/2$

8

OR

3 (a) Find Fourier cosine transform of $\dfrac{1}{1+x^2}$.

8

(b) Solve $\dfrac{\partial u}{\partial t} = \dfrac{\partial^2 u}{\partial x^2}, x > 0, t > 0$ subject to the conditions :

(i) $u(0, t) = 0$

(ii) $u = \begin{cases} 1, & 0 < x < 1 \\ 0, & x \ge 1 \end{cases}$, when $t = 0$

(iii) $u(x, t)$ is bounded.

8

UNIT - IV

4 (a) Prove that

(i) $\Delta = \dfrac{1}{2}\delta^2 + \delta\sqrt{1 + \dfrac{1}{4}\delta^2}$

4

(ii) $e^x = \left(\dfrac{\Delta^2}{E}\right)e^x \cdot \dfrac{Ee^x}{\Delta^2 e^x}, h = 1$

4

(b) Using Newton's forward interpolation formula, find y at $x = 8$ from the following table :

x :	0	5	10	15	20	25
y :	7	11	14	18	24	32

8

OR

4   (a)   Using Lagrange's interpolation formula, find the value of y at $x = 10$ from the following table :

$x:$	5	6	9	11
$y:$	12	13	14	16

8

(b)   Evaluate $\int_0^1 \frac{1}{1+x^2} dx$ by using :

(i)   Simpson's $\frac{1}{3}$ rule

(ii)   Simpson's $\frac{3}{8}$ rule.

Also find approximate value of π.

8

UNIT - V

5   (a)   Apply Picard method to find solution of differential equation $\frac{dy}{dx} = 1 + y^2$ and $y(0) = 0$ up to fourth order.

8

(b)   Given $\frac{dy}{dx} = x^2(1+y)$ and $y(1) = 1$ then calculate $y(1.4)$ by Milne's PC method.

8

OR

5   (a)   Given $\frac{dy}{dx} = x^2 - y, y(0) = 1$. Find $y(0.2)$ by Runge-Kutta Fourth order method.

8

(b)   Given that $\frac{dy}{dx} = x + y^2$ and $y = 1$ at $x = 0$. Find an approximate value of y at $x = 0.4$ by modified Euler's method.

8

_____