Total No. of Questions—**8**] [Total No. of Printed Pages—**7**

Seat No.	

[4757]-1001

S.E. (Civil) (First Semester) EXAMINATION, 2015

ENGINEERING MATHEMATICS III

(2012 PATTERN)

Time : Two Hours **Maximum Marks : 50**

N.B. **:—** (*i*) Neat diagrams must be drawn wherever necessary.

(*ii*) Figures to the right indicate full marks.

(*iii*) Use of electronic pocket calculator and steam tables is allowed.

(*iv*) Assume suitable data, if necessary.

1. (*a*) Solve any *two* of the following : [8]

(*i*) $\dfrac{d^2y}{dx^2} + 2\dfrac{dy}{dx} + y = 4 + 2^x + 3e^{-x} + \cos x$

(*ii*) $x^3 \dfrac{d^3y}{dx^3} + 2x^2 \dfrac{d^2y}{dx^2} + 2y = x + x^{-1}$

(*iii*) Use the method of variation of parameters to solve the linear differential equation :

$$\frac{d^2y}{dx^2} + y = \operatorname{cosec} x .$$

P.T.O.

(*b*) Solve the following system of linear equations by Gauss Elimination method : [4]

$$5x - 2y + 2z = 5\,, \quad 2x + y - z = 2\,, \quad x - y + z = 1\,.$$

Or

2. (*a*) Solve the system of simultaneous symmetric equations : [4]

$$\frac{dx}{2x} = \frac{dy}{-y} = \frac{dz}{4xy^2 - 2z}\,.$$

(*b*) Apply Runge-Kutta method of 4th order to solve the differential equation :

$$\frac{dy}{dx} = x + y^2\,, \qquad y(0) = 1$$

to find y for $0 \le x \le 0.2$ with $h = 0.1$. [4]

(*c*) Solve the following system of equations by Cholesky method : [4]

$$2x + 3y + z = 0$$

$$x + 2y - z = -2$$

$$-x + y + 2z = 0\,.$$

3. (*a*) The first four moments about the value 4 are –1.5, 17, –30 and 108. Calculate the moments about the mean. Also find coefficient of skewness and kurtosis. [4]

(*b*) Assume the mean height of soldiers to be 68.22 inches with a variance of 10.8 inches. How many soldiers in a regiment of 10,000 would you expect to be over 6 feet tall, where the data is normally distributed. (Given : $\phi(1.15) = 0.3749$) [4]

(*c*) Find the directional derivative of

$$\phi = xy^2 + yz^3$$

at the point (2, −1, 1) in the direction of vector $i + 2j + 2k$. [4]

Or

4. (*a*) Attempt any *one* : [4]

(*i*) Prove that $\frac{\bar{r}}{r^3}$ is solenoidal.

(*ii*) Show that :

$$\nabla \cdot \left[r \nabla \frac{1}{r^n} \right] = \frac{n(n-2)}{r^{n+2}}.$$

(*b*) Verify whether :

$$\bar{F} = (2xyz^2)i + (x^2z^2 + z\cos yz)j + (2x^2yz + y\cos yz)k$$

is irrotational. [4]

(*c*) Two lines of regression are :

$$5y - 8x + 17 = 0 \quad \text{and} \quad 2y - 5x + 14 = 0 .$$

If $\sigma_y^2 = 16$, find : [4]

(*i*) σ_x^2

(*ii*) Coefficient of correlation.

5. (*a*) Evaluate $\int_C \bar{F} . d\bar{r}$ for

$$\bar{F} = (2xy + 3x^2)\bar{i} + (x^2 + 4yz)\bar{j} + (2y^2 + 6yz)\bar{k}$$

where C is the curve $x = t$, $y = t^2$, $z = t^3$ joining (0, 0, 0) and (1, 1, 1). [4]

(*b*) Use divergence theorem to evaluate $\iint_S \bar{F} . d\bar{s}$

for $\bar{F} = 4xz\,\bar{i} - y^2\,\bar{j} + yz\,\bar{k}$ over the surface of cube bounded by the planes $x = 0$, $x = 2$, $y = 0$, $y = 2$, $z = 0$, $z = 2$. [4]

(*c*) Using Stokes' theorem evaluate $\iint_S (\nabla \times \bar{F}) . d\bar{s}$

for $\bar{F} = (x^3 - y^3)\bar{i} - xyz\,\bar{j} + y^3\,\bar{k}$ where S is the surface $x^2 + ay^2 + z^2 - 2x = 4$ above the plane $x = 0$. [5]

Or

6. (*a*) Using Green's theorem, evaluate $\oint \bar{F} \cdot d\bar{r}$ for the field :

$$\bar{F} = x^2 \bar{i} + xy \bar{j}$$

over the region R enclosed by $y = x^2$ and then line $y = x$. [4]

(*b*) Use divergence theorem to evaluate :

$$\iint_S (x^3 \bar{i} + y^3 \bar{j} + z^3 \bar{k}) \cdot d\bar{s}$$

where S is the surface of the sphere $x^2 + y^2 + z^2 = 16$. [4]

(*c*) Evaluate $\int_C \bar{F} \cdot d\bar{r}$ using Stokes' theorem for :

$$\bar{F} = 4y \bar{i} + 2z \bar{j} + 6y \bar{k}$$

where C is the intersection of :

$$x^2 + y^2 + z^2 = 2z, \quad x = z - 1 . \qquad [5]$$

7. (*a*) A string is stretched and fastened to two points l apart. Motion is started by displacing the string in the form $y = a \sin \frac{\pi x}{l}$ from which it is released at time $t = 0$. Show that the displacement of any point at a distance x from one end at time t is given by : [7]

$$y(x, t) = a \sin\left(\frac{\pi x}{l}\right) \cos\left(\frac{\pi ct}{l}\right).$$

(*b*) Solve :

$$\frac{\partial u}{\partial t} = k \frac{\partial^2 u}{\partial x^2}$$

subject to : [6]

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

(*ii*) $u_x(l, t) = 0$

(*iii*) $u(x, t)$ is bounded and

(*iv*) $u(x, 0) = \frac{u_0 x}{l}, \ 0 \le x \le l$.

Or

8. (*a*) Solve the equation :

$$\frac{\partial^2 v}{\partial x^2} + \frac{\partial^2 v}{\partial y^2} = 0$$

subject to : [7]

(*i*) $v = 0$ when $y \to \infty$ for all x

(*ii*) $v = 0$ when $x = 0$ for all y

(*iii*) $v = 0$ when $x = l$ for all y

(*iv*) $v = x(l - x)$ when $y = 0$ for $0 < x < l$ T.

(*b*) Solve the wave equation : [6]

$$\frac{\partial^2 u}{\partial t^2} = a^2 \frac{\partial^2 u}{\partial x^2}$$

under the conditions :

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

(*ii*) $u(\pi, t) = 0$

(*iii*) $\left(\frac{\partial u}{\partial t}\right)_{t=0} = 0$

(*iv*) $u(x, 0) = x, \quad 0 < x < \pi$.

Total No. of Questions—**8**] [Total No. of Printed Pages—**3**

Seat No.	

[4757]-1002

S.E. (Civil) (I Sem.) EXAMINATION, 2015

BUILDING TECHNOLOGY AND MATERIALS

(2012 PATTERN)

Time : Two Hours **Maximum Marks : 50**

N.B. **:—** (*i*) Answer Q. No. **1** *or* Q. No. **2**, Q. No. **3** *or* Q. No. **4**, Q. No. **5** *or* Q. No. **6**, Q. No. **7** *or* Q. No. **8**.

(*ii*) Neat diagrams must be drawn wherever necessary.

(*iii*) Figures to the right indicate full marks.

(*iv*) Assume suitable data, if necessary.

1. (*a*) Discuss the need of Damp Proof course for roofs and basement. [6]

(*b*) Discuss the properties of a good brick used in construction. [6]

Or

2. (*a*) Write a short note on English bond with a neat labelled diagram. [6]

(*b*) Discuss the method underpinning. [6]

P.T.O.

3. (*a*) With a figure explain the Chequer board method of construction of floors. [6]

(*b*) Draw a neat, labelled figured of semi-circular arch and name the various components. [6]

Or

4. (*a*) Explain the IS specifications for Cement concrete flooring tiles. [6]

(*b*) Explain the following with sketches : [6]

(*i*) Dormer window

(*ii*) Meeting style

(*iii*) Barrel bolt.

5. (*a*) Explain the following with sketches : [6]

(*i*) Baluster

(*ii*) Scotia

(*iii*) Landing.

(*b*) Explain the types of Lintels and discuss about any *two*. [7]

Or

6. (*a*) State the requirements of a good stair with respect to : [7]

(*i*) Pitch

(*ii*) Head room

(*iii*) Location

(*iv*) Number of steps in a flight

(*v*) Rise and Tread

(*vi*) Width of stair.

(*b*) Enlist types of stairs depending on the materials of construction. Explain any *one* in detail. [6]

7. (*a*) Define seasoning of timber. Explain defects in timber. [6]

(*b*) Enlist types of pointing and explain any *three* types of pointing with figures. [7]

Or

8. (*a*) Draw the figures showing different types of pointing. [7]

(*b*) Write a short note on Wall cladding. [6]

Total No. of Questions—**8**] [Total No. of Printed Pages—**4+2**

Seat No.	

[4757]-1003

S.E. (Civil) (First Semester) EXAMINATION, 2015

STRENGTH OF MATERIALS

(2012 PATTERN)

Time : Two Hours **Maximum Marks : 50**

N.B. **:—** (*i*) Neat diagrams must be drawn wherever necessary.

(*ii*) Figures to the right indicate full marks.

(*iii*) Use of electronic pocket calculator is allowed.

(*iv*) Assume suitable data, if necessary.

(*v*) Answer Q. No. 1 or Q. No. 2, Q. No. 3 or Q. No. 4, Q. No. 5 or Q. No. 6 and Q. No. 7 or Q. No. 8.

1. (*a*) A compound bar ABC 1.5 m long is made up of two parts 'AB' of aluminium and 'BC' of steel having cross-sectional area of steel half of the aluminum bar. The rod is fixed at 'A' and subjected to an axial pull of 200 kN at end 'C'. If the elongations of both materials is equal, find the lengths of each part assuming E_{steel} = 200 GPa and $E_{aluminium}$ as one third of steel. [6]

P.T.O.

(*b*) A simply supported beam 8 m span carries u.d.l. of 3 kN/m over entire span. Find the maximum bending stress induced if the cross-section is as shown in Fig. 1. [6]

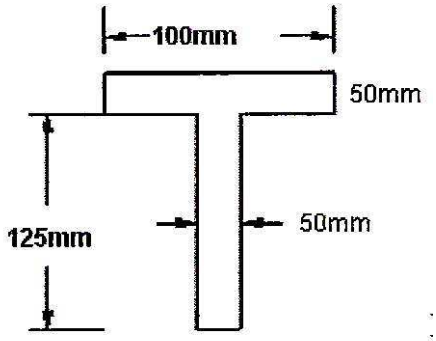


Fig. 1

Or

2. (*a*) A steel bar 2 m long is at 30°C. The temperature of the rod is increased by 150°C. Find : [6]

(*i*) free expansion of the rod

(*ii*) temperature stress produced if expansion is prevented and nature of the stress

(*iii*) stress produced if 2.5 mm expansion is permitted. Assume supports are unyielding ? Take E = 210 GPa, and $\alpha = 12 \times 10^{-6}$/°C. Assume bar diameter = 16 mm.

(*b*) An I section has the following dimensions. Web : 300 mm × 10 mm, Flange 150 mm × 20 mm. The maximum shear stress developed in the beam is 14.8 MPa. Find the shear force to which the beam is subjected. [6]

3. (*a*) Find maximum torque that can be safely applied to a shaft of 80 mm diameter. The permissible angle of twist is 1.5 degree in a length of 5 m and shear stress not to exceed 42 MPa. Take G = 84 MPa. [6]

(*b*) A shaft of 95 mm diameter transmits 200 kW power at 100 rpm. If at a section bending moment is 15 kNm, then find the principal stress, maximum shear stress. [6]

Or

4. (*a*) A steel rod 28 mm in diameter is 3.5 m long. Find the maximum instantaneous stress induced and work done at maximum elongation when a load of 80 kN is suddenly applied. Take E = 210 GPa. [6]

(*b*) A hollow shaft having an inside diameter 60% of its outer is to replace a solid shaft transmitting the same power at same speed. Calculate the percentage saving in material if material to be used is also the same. [6]

5. (*a*) An overhanging beam ABC with end 'A' hinged and simply supported at 'B' is loaded with udl of intensity 30 kN/m acting on 2 m length from 'A' and a point load of 10 kN acting at free end 'C'. Draw B.M.D. and S.F.D. Assume 1(AB) = 4 m and 1(BC) = 1 m. [7]

(*b*) Draw shear force diagram, bending moment diagram and axial thrust diagram for the beam ABCD with end 'A' hinged and loaded as shown in Fig. 2. [6]

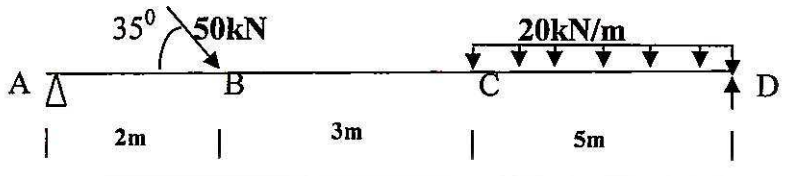


Fig. 2

Or

6. (*a*) Draw Shear force diagram and Bending Moment diagram for the beam as shown in Fig. 3. Indicate the numerical values at all important section. Find the position and value of maximum bending moment. [7]

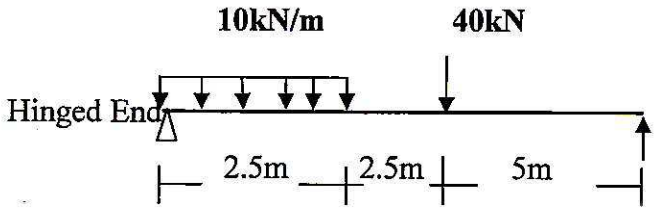


Fig. 3

(*b*) The diagram shown in Fig. 4 is the shear force diagram for a beam which rests on two supports, one being at the left hand end. No couple is acting on beam. [6]

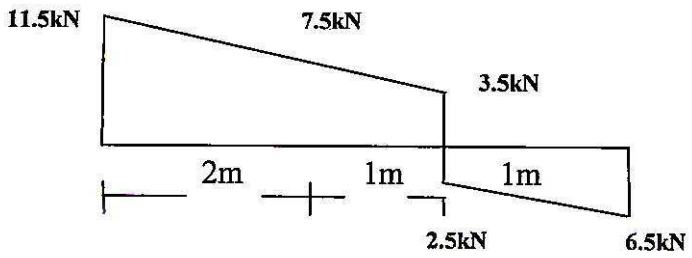


Fig. 4

7. (*a*) Compare the crippling loads given by the Euler's and Rankine's formula for a circular column of 40 mm diameter and 2000 m long. Take yield stress as 300 MPa. Rankine's constant a = 1/7500 and E = 200 GPa. [6]

(*b*) State assumptions made in Euler's theory and its limitations. [7]

Or

8. (*a*) Explain core of the section and hence obtain a core section for a hollow circular column of external and internal diameter 'D' and '*d*' respectively. [6]

(*b*) A hollow rectangular section is having external size 500 mm × 450 mm and internal size 400 mm × 350 mm. It carries a vertical load of 100 kN at the outer edge of the column on X-axis. Calculate maximum and minimum intensities of stress in the section. Assume 500 mm side horizontal. [7]

Total No. of Questions—**8**] [Total No. of Printed Pages—**4**

Seat No.	

[4757]-1004

S.E. (Civil) (First Semester) EXAMINATION, 2015

SURVEYING

(2012 PATTERN)

Time : Two Hours **Maximum Marks : 50**

N.B. **:—** (*i*) Neat diagrams must be drawn wherever necessary.

(*ii*) Figures to the right indicate full marks.

(*iii*) Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.

(*iv*) Assume suitable data, if necessary.

1. (*a*) What are the types of error in plane tabling ? How are they minimized ? [6]

(*b*) The following reciprocal levels were taken with one level : [6]

Instrument at	**Reading on**		**Remarks**
	A	**B**	
A	1.884	2.896	Distance between A & B = 900 m
B	0.537	1.894	R.L. of A = 300 m

Determine :

(*i*) The true difference in elevation between A & B.

(*ii*) The reduced level of B.

(*iii*) The error in the collimation adjustment of the level.

P.T.O.

Or

2. (*a*) State the uses and characteristics of contour lines. [4]

(*b*) Find the distance to the visible horizon from the top of a light-house 60 m high. [2]

(*c*) Determine the Fore bearing and back bearing of all the lines in a regular closed (pentagon) from the following direction : [6]

(*i*) Traversing was done in clockwise direction.

(*ii*) Local attraction was not suspected at any station.

(*iii*) Fore bearing of line CD of the closed traverse ABCDEA was observed to be 35° 30'. Draw rough sketch of the traverse.

3. (*a*) What is meant by theodolite traversing ? State various methods of theodolite traversing. [6]

(*b*) Tabulate the data required for setting out the circular curve by the deflection angle method using the following data : [6]

(*i*) Chainage of intersection point = 1580 m

(*ii*) Deflection angle = 35°

(*iii*) Degree of curve = 5°

(*iv*) Peg interval = 30 m.

Or

4. (*a*) State various obstacles in setting out curves. Explain the procedure of setting out simple curve when point of intersection is inaccessible. [6]

(*b*) Two stations A and B are fixed on either side of a wood. The following traverse is run from A to B along the side of the wood : [6]

Line	Latitude	Departure
AC	+290.8 m	+327.5 m
CD	–229.2 m	+623.2 m
DB	–516.6 m	+267.8 m

Determine the length and bearing of AB and DA.

5. (*a*) Enlist the fundamental axes of a transit theodolite and desribe how will you make the trunnion axis perpendicular to the vertical axis. [5]

(*b*) A tacheometer with anallatic lense having the value of constant 100 was used and the following observations were made on staff held vertical : [8]

Instrument Station	H.I. in Meter	Vertical Angle	Staff At	Staff Reading in m
P	1.80	2°40'	M	1.25, 1.93, 2.56
		–4°40'	Q	1.45, 1.85, 2.30

R.L. of station M is 50 m. Calculate the R.L. of P & Q, distance PQ and gradient.

Or

6. (*a*) Explain the test and adjustment for making the line of collimation right angle to the horizontal axis. [5]

(*b*) Draw the sketches of different stadio lines. [4]

(*c*) Determine reduced level of horizontal line of sight from given data. Assume multiply constant 100 with anallatic lens : [4]

Instrument Station	Staff Station	Vertical Angle	Stadio Reading	Remark
A	B	8°20'	0.990, 1.555, 2.120	R.L. of B 100.00 m

7. (*a*) Explain distance and angle measurement with total station. [6]

(*b*) Explain the method of transfer of centre line in long tunnels. [7]

Or

8. (*a*) What is total station ? State the classification based on range of total station. [7]

(*b*) Define gradient. What is the importance of gradient while laying sewer pipe ? How is it decided ? [6]

Total No. of Questions—**8**] [Total No. of Printed Pages—**4**

Seat No.	

[4757]-1005

S.E. (Civil) (First Semester) EXAMINATION, 2015
GEOTECHNICAL ENGINEERING
(2012 PATTERN)

Time : Two Hours **Maximum Marks : 50**

N.B. **:—** (*i*) Answer Q. No. **1** *or* Q. No. **2**, Q. No. **3** *or* Q. No. **4**, Q. No. **5** *or* Q. No. **6**, Q. No. **7** *or* Q. No. **8**.

(*ii*) Figures to the right indicate full marks.

(*iii*) Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.

(*iv*) Assume suitable data if necessary.

(*v*) Neat diagrams must be drawn wherever necessary.

1. (*a*) Starting from first principles derive the following equations with usual nomenclature : [6]

$$\gamma = \frac{(G + eS_r)\gamma_\omega}{(1 + e)}.$$

(*b*) Explain with diagram a method for determining coefficient of permeability 'K' for clayey soils in the laboratory. [6]

P.T.O.

Or

2. (*a*) On a single graph paper, draw neat labelled graphs for : [6]

(*i*) Uniformly graded soil

(*ii*) Well graded soil

(*iii*) Gap graded soil

(*iv*) Show on the same graph, zones of clay size, silt size, sand and gravel clearly.

(*b*) State the applications of flownet and explain how seepage through a dam can be determined using flow net. (State the equation and terms involved in it). [6]

3. (*a*) Write a note on Vane Shear Test with neat sketch and the formulae involved. [6]

(*b*) A load 1000 kN acts as a point load at the surface of a soil mass. Estimate the stress at a point 3 m below and 4 m away from the point of action of the load by Boussinesq's formula. Compare the value with the result from Westergaard's theory. [6]

Or

4. (*a*) Draw a curve showing the relation between dry density and moisture content for Standard Proctor test and indicate the salient features of the curve. [6]

(*b*) Define total and effective stress.

Determine the shear strength in terms of effective stress on a plane within a saturated soil mass at a point where the total normal stress is 200 kN/m^2 and the pore water pressure is 80 kN/m^2. The effective stress shear strength parameters for the soil are $c' = 16\ kN/m^2$ and $\Phi' = 39°$. [6]

5. (*a*) Describe Rehbann's construction for determination of earth pressure with neat sketch. [7]

(*b*) Derive the expression for the active state of pressure at any point for a submerged cohesionless backfill along with pressure diagrams. [6]

Or

6. (*a*) Explain how surcharge will affect earth pressure for cohesionless and cohesive soils in active state with pressure diagrams. [7]

(*b*) A smooth vertical wall retains a level surface with γ = 18 kN/m^3, ϕ = 30°, to a depth of 8 m. Draw the lateral pressure diagram and compute the total active pressure in dry condition and when water table rises to the GL. Assume γ_{sat} = 22 kN/m^3. [6]

7. (*a*) Write short notes on causes and remedial measures of Landslides. [7]

(*b*) Explain controlling techniques for subsurface contamination. [6]

Or

8. (*a*) What is slope stability and how are the different types of factor of safety determined ? [7]

(*b*) Discuss sources and types of ground contamination. [6]

Total No. of Questions—**8**] [Total No. of Printed Pages—**4+2**

Seat No.	

[4757]-1006

S.E. (Civil Engineering) (Second Semester)

EXAMINATION, 2015

CONCRETE TECHNOLOGY

(2012 PATTERN)

Time : Two Hours **Maximum Marks : 50**

N.B. **:—** (*i*) Answer Q. No. **1** *or* Q. No. **2,** Q. No. **3** *or* Q. No. **4**, Q. No. **5** *or* Q. No. **6,** Q. No. **7** *or* Q. No. **8**.

(*ii*) Neat diagrams must be drawn wherever necessary.

(*iii*) Figures to the right indicate full marks.

(*iv*) Your answers will be valued as a whole.

(*v*) Use of electronic pocket calculator is allowed.

(*vi*) Assume suitable data, if necessary.

(*vii*) Use of IS code 10262, 456 is not allowed.

1. (*a*) What are the minor compounds in Portland cement ? What is their role. [6]

(*b*) Explain the physical properties of aggregates affecting workability of concrete. [6]

P.T.O.

Or

2. (*a*) What are the functions of types of admixtures ? [6]

(*b*) Define creep of the concrete. What are the factors affecting creep of concrete. [6]

3. (*a*) State the various types of non-destructive tests carried on hardened concrete. Explain "Impact echo test" for determination of concrete properties. [6]

(*b*) Describe the types of vibrators used for compaction of concrete. [6]

Or

4. (*a*) Write short notes on : [6]

(*i*) Cellular light weight concrete

(*ii*) Self-compacting concrete.

(*b*) Define Ferro cement. Explain the basic concepts in forming ferrocement composites used in the construction industry. [6]

5. Using Indian Standard recommended guidelines, design a concrete mix for a reinforced concrete structure to be subjected to the mild exposure conditions for the following requirements : [13]

(A) Stipulations for proportioning :

(*a*) Grade designation : M30

(*b*) Standard deviation, s = 5

(*c*) Type of cement : OPC 43 grade conforming to IS8112

(*d*) Workability : 75 mm (slump)

(*e*) Degree of supervision : Good

(*f*) Type of aggregate : Angular coarse aggregate,

(*g*) Maximum cement content : 450 kg/m^3.

(B) Test data for materials :

(*a*) Specific gravity of cement : 3.15

(*b*) Specific gravity of :

(*i*) Coarse aggregate— 2.74

(*ii*) Fine aggregate— 2.74

(*c*) Water absorption :

(*i*) Coarse aggregates— 0.5%

(*ii*) Fine aggregates— 1.00%

(*d*) Free surface moisture :

(*i*) Coarse aggregates— Nil (absorbed moisture also nil)

(*ii*) Fine aggregates— Nil

(*e*) Sieve analysis :

(*i*) Coarse aggregate :

IS Sieve Sizes (mm)	Analysis of Coarse Aggregate Fraction		Percentage of different Fractions			Remarks
	I	II	I (60%)	II (40%)	Combined (100%)	Confirming of Table 2 of IS 383
20	100	100	60	40	100	
10	0	71.2	0	28.5	28.5	
4.75		9.40		3.7	3.7	
2.36		0				

(*ii*) Fine aggregate : Conforming to grading zone I

(C) Design considerations :

Table 1 : From IS 10262; Maximum water content per cubic meter of concrete :

Sr. No.	Nominal Maximum Size of Aggregate (mm)	Maximum Water Content (kg)
(*i*)	10	208
(*ii*)	20	186
(*iii*)	40	165

Table 2 : From IS 10262; Volume of Coarse Aggregate per Unit Volume of Total Aggregate :

Sr. No.	Nominal Maximum Size of Aggregate (mm)	Volume of Coarse Aggregate per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate			
(1)	(2)				
		Zone IV	Zone III	Zone II	Zone I
(*i*)	10	0.50	0.48	0.46	0.44
(*ii*)	20	0.66	0.64	0.62	0.60
(*iii*)	40	0.75	0.73	0.71	0.69

Table 3 : From IS 456; Different exposure conditions for reinforced concrete :

Sr. No.	Exposure	Minimum cement content (kg/cubic m)	Maximum free water cement ratio	Minimum grade of concrete
(*i*)	Mild	300	0.55	M20
(*ii*)	Moderate	300	0.50	M25
(*iii*)	Severe	320	0.45	M30
(*iv*)	Very severe	340	0.45	M35
(*v*)	Extreme	360	0.40	M40

Or

6. (*a*) Write major factors affecting mix design. Explain water cement ratio. [4]

(*b*) Write a short note on statistical quality control of concrete. [4]

(*c*) Explain DOE method of mix design in brief. [5]

7. (*a*) State and explain factors affecting permeability of concrete. What measures should be taken to reduce permeability of concrete ? [8]

(*b*) Explain in detail corrosion monitoring techniques of reinforcement and its preventive measures. [5]

Or

8. (*a*) Write deatiled notes on : [8]

(*i*) Sulphate attack on concrete

(*ii*) Carbonation of concrete and its determination.

(*b*) What are the symptoms of distress of concrete ? [5]

Total No. of Questions—**8**] [Total No. of Printed Pages—**4+1**

Seat No.	

[4757]-1007

S.E. (Civil) (Second Semester) EXAMINATION, 2015

ARCHITECTURAL PLANNING AND DESIGN OF BUILDINGS

(2012 PATTERN)

Time : Two Hours **Maximum Marks : 50**

N.B. **:—** (*i*) Assume suitable data, if required.

(*ii*) Figures to the right indicate full marks.

(*iii*) Solve Q. No. **1** *or* Q. No. **2,** Q. No. **3** *or* Q. No. **4** in answer-book.

(*iv*) Solve Q. No. **5** *or* Q. No. **6,** Q. No. **7** *or* Q. No. **8** on Drawing Sheet only.

1. (*a*) Elaborate the term land use zoning and mention the requirements of each of them. (Minimum **4** zones) [7]

(*b*) Explain the following principles of architectural planning with suitable sketches : [6]

(*i*) Privacy

(*ii*) Roominess.

P.T.O.

Or

2. (*a*) Enlist documents to be submitted for Seeking Commencement Certificate and Occupancy Certificate. [6]

(*b*) Elaborate need for earthquake resistant structures in relation with–loss of human life; property and infrastructure. [7]

3. (*a*) What are Acoustical defects ? Explain any *two* in detail. [6]

(*b*) Differentiate between building line and control line by drawing a suitable sketch. [6]

Or

4. (*a*) The internal dimensions of a factory building are 30×20×10 (m^3). The number of air changes required per hour are 6, the indoor temperature is 36°C and outdoor temperature is 30°C. Find the area of openings required, if the distance between the inlet and outlet openings is 6 m. [6]

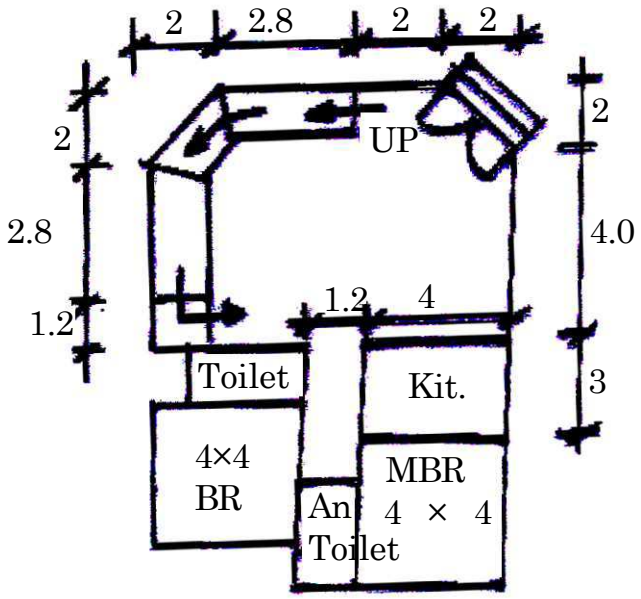
(*b*) Explain with sketch the following terms : [6]

(*i*) SP

(*ii*) CV

(*iii*) PP.

5. Draw a detailed floor plan to a scale of 1:50 of a residential building for the given line plan below. Use the following data : RCC framed structure, wall thk. 150 mm, Single storey building, Plinth height 450 mm. All dimensions in the sketch are in m. Indicate suitable locations and sizes of doors, windows in schedule of openings. Tread for the step is 280 mm. [13]



Or

6. Draw a detailed floor plan to a scale of 1:50 with the following data : [13]

(*i*) Living room 1 no. approx. area 15 m^2

(*ii*) Kitchen-cum-Dining 1 no. approx. area 15 m^2

(*iii*) Bed rooms 2 no. approx. area 12 m^2 each

(*iv*) Floor to floor height 3.3 m

(*v*) Load bearing structure

(*vi*) Foundation and plinth in UCR masonry

(*vii*) Varandah, passage, staircase, W.C. and Bath/attached toilet etc. of suitable sizes should be provided. Indicate the North.

7. Design a single storey hostel building and draw only line plan with the following data : [12]

(*i*) Number of students 50

(*ii*) Twenty rooms are two seated with 7.5 sq. m area per student and ten single seated with 9.5 sq. m area.

(*iii*) Recreation room approx. area 35 m^2

(*iv*) Gymnasium approx. area 15 m^2

(*v*) Office space approx. area 12 m^2

(*vi*) Store room approx. area 10 m^2

(*vii*) Varandah, passage, staircase, W.C. and Bath etc. of suitable size should be provided.

Show North direction and mention scale.

Or

8. Draw a line plan of a Post-office using the following data :[12]

Entrance and moving space : 30 m^2 with seating arrangement

Public dealing counters : 6 in no. with 0.5 m width

Post-master's room : 15 m^2

Working area for other staff : 30 m^2

Post separation room : 30 m^2

Safe custody area for cash : 10 m^2

Cash transaction room : 12 m^2

Speed post delivery section : 12 m^2

Water room and Toilet (separate for male and female) : 7.5 m^2.

Total No. of Questions—**8**] [Total No. of Printed Pages—**3**

Seat No.	

[4757]-1008

S.E. (Civil Engineering) (Second Semester) EXAMINATION, 2015
ENGINEERING GEOLOGY
(2012 PATTERN)

Time : Two Hours **Maximum Marks : 50**

N.B. **:—** (*i*) Write the answers to any *four* questions in a single answer-book.

(*ii*) Neat diagrams must be drawn wherever necessary.

(*iii*) Figures to the right indicate full marks.

(*iv*) Assume suitable data if necessary.

1. (*a*) Explain different forms of Minerals with suitable examples. [6]

(*b*) Describe Civil Engineering significance of foliations of metamorphic rocks. [6]

Or

2. (*a*) What are extrusive and intrusive Igneous bodies ? Describe various Discordant Igneous intrusive bodies with neat diagrams. [6]

(*b*) State and explain general principles of Stratigraphy. [6]

P.T.O.

3. (*a*) What is Fold ? Give nomenclature of the FOLD. Describe how fold passes into the Fault. [6]

(*b*) What are Joints ? How do they occur in igneous and metamorphic rocks ? Describe types of Joints and their Civil Engineering significance. [6]

Or

4. (*a*) What is Rejuvenation ? Explain *two* features resulting due to rejuvenation. [6]

(*b*) Write in detail mineral wealth of Gondwana. [6]

5. (*a*) What are the geological requirements for the foundation of Dam ? [6]

(*b*) Describe geological work of groundwater in detail. [7]

Or

6. (*a*) What is Artesian condition ? Explain any *three* geological conditions leading to artesian well. [7]

(*b*) Describe any *three* features developed due to marine erosion. [6]

7. (*a*) What difficulties you may face while tunnelling through : [7]

(*i*) Axial portion of Syncline

(*ii*) Dyke crossing the alignment.

(*b*) Define Remote sensing. Enlist elements of Remote Sensing. Explain any *two* elements. [6]

Or

8. (*a*) What observations and precautions are necessary during Core Drilling for Preliminary Geological Exploration ? [7]

(*b*) What is Landslide ? What are the causes of it ? [6]

Total No. of Questions—**8**] [Total No. of Printed Pages—**4+2**

Seat No.	

[4757]-1009

S.E. (Civil) (Second Semester) EXAMINATION, 2015

STRUCTURAL ANALYSIS–I

(2012 PATTERN)

Time : Two Hours **Maximum Marks : 50**

N.B. **:—** (*i*) Answer Q. No. **1** *or* Q. No. **2**, Q. No. **3** *or* Q. No. **4**, Q. No. **5** *or* Q. No. **6** and Q. No. **7** *or* Q. No. **8**.

(*ii*) Neat sketches must be drawn wherever necessary.

(*iii*) Figures to the right indicate full marks.

(*iv*) Assume suitable data, if necessary.

(*v*) Use of electronic pocket calculator is allowed.

(*vi*) Use of cell phone is prohibited in the examination hall.

1. (*a*) A 4 m simply supported beam subjected to clockwise moment 20 kNm at mid span, determine maximum slope and deflection in term of EI. [6]

P.T.O.

(*b*) Determine moment at B for the continuous beam loaded and supported as shown in the Fig. 1(*b*) by Clapeyron's theorem. [6]

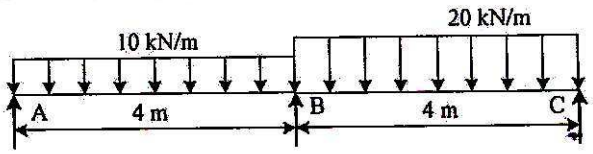


Fig. 1(*b*)

Or

2. (*a*) A propped cantilever of span 3 m loaded with uniformly distributed load 10 kN/m on entire span, determine the prop reaction. [6]

(*b*) Determine the fixed end moments for the fixed beam loaded and supported as shown in Fig. 2(*b*). [6]

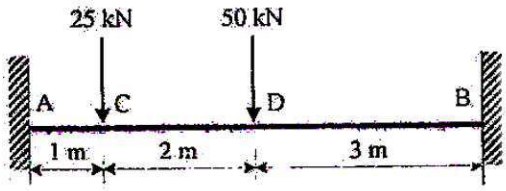


Fig. 2(*b*)

3. (*a*) Find the horizontal deflections of joint C of the truss shown in Fig. 3(*a*). The area of inclined member is 2000 mm^2 while the area of horizontal member is 1600 mm^2. Take E = 200 kN/mm^2. [6]

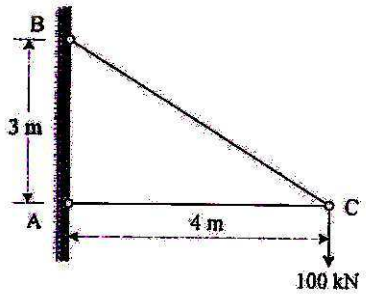


Fig. 3(*a*)

(*b*) A simply supported beam is loaded and supported as shown in Fig. 3(*b*). Determine support reaction at A, Shear and moment at C by drawing Influence line diagram. [6]

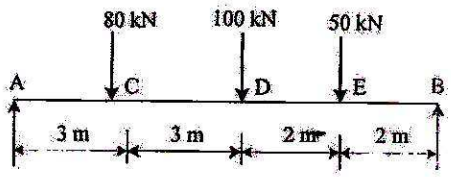


Fig. 3(*b*)

Or

4. (*a*) Find forces in members of the truss as shown in Fig. 4(*a*). Cross-sectional area and material of all members is same. [6]

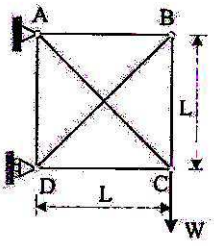


Fig. 4(*a*)

(*b*) Draw the influence line diagram for the members U_2U_3, L_2L_3 and U_2L_2 of a truss as shown in Fig. 4(*b*). [6]

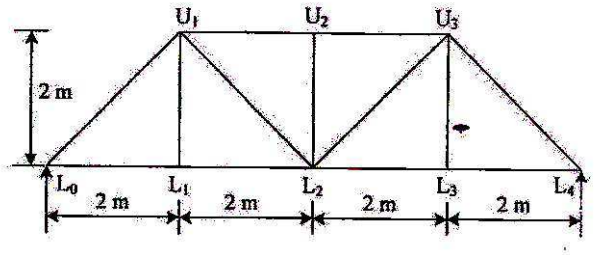


Fig. 4(*b*)

5. (*a*) A three hinge parabolic arch has a span of 24 m and a central rise of 4 m. It carries a concentrated load of 50 kN at 18 m from left support. Determine thrust and radial shear at a section 6 m from left support. [7]

(*b*) Derive the expression for horizontal thrust when a uniformly distributed load w is acting on entire span of two hinged semicircular arch. [6]

Or

6. (*a*) A three hinged circular arch has a span of 40 m and a central rise of 8 m. It carries a uniformly distributed load 20 kN/m over the left-half of span. Find the reaction at the supports and shear at a section 10 m from left support. [7]

(*b*) A two hinged parabolic arch of span 30 m and central rise 4 m is subjected to a point load of 30 kN at the center of the arch. Find the horizontal thrust and moment at 8 m from left hand support. [6]

7. (*a*) State and explain lower bound, upper bound and uniqueness theorem. [5]

(*b*) A beam fixed at both ends is subjected to central point load W. The beam is of uniform plastic moment M_P. Determine the magnitude of collapse load. [8]

Or

8. (*a*) Find the shape factor for circular cross-section of diameter *d*. [5]

(*b*) Determine collapse load in a propped cantilever of span L subjected to central concentrated load W. [8]