(DCE 211)

B.Tech. DEGREE EXAMINATION, DECEMBER 2008.

(Examination at the end of Second Year First Semester)

Civil Engineering

Paper I — MATHEMATICS – III

Time : Three hours **Maximum : 75 marks**

Answer Question No. 1 Compulsorily. **(1 × 15 = 15)**

Answer ONE question from each Unit. **(4 × 15 = 60)**

All questions carry equal marks.

1. (a) Define Periodic Function.

(b) Determine the period of the function $f(x) = \sin x + \frac{\sin 2x}{2} + \frac{\sin 3x}{3} + \frac{\sin 4x}{4} + \ldots\ldots$.

(c) Write a function $f(x)$ to represent the saw – toothed waveform.

(d) Define the complex form of Fourier series.

(e) State Parsevale's Formula

(f) Define Fourier Sine and Cosine integrals.

(g) Mention the change of scale property in Fourier transforms.

(h) Define the Fourier transform of the n^{th} – derivative of $f(x)$.

(i) Define the Central differences.

(j) What are the fundamental operators in Difference Calculus.

(k) Prove that $\nabla = 1 - E^{-1}$.

(l) State Newton's forward interpolation formula.

(m) Give Stirling's formula.

(n) State Simpson's one–third rule.

(o) State Newton's divided difference formula.

UNIT I

2. (a) Expand $f(x) = x \sin x,\ 0 < x < 2\pi$, in a Fourier Series.

(b) If $f(x) = x,\ 0 < x < \frac{\pi}{2}$

$= \pi - x, \frac{\pi}{2} < x < \pi$, expand $f(x)$ as a half–range cosine series.

Or

(c) Find a Fourier series to represent $x + x^2$ from $x = -\pi$ to $x = \pi$.

(d) Obtain two half – range – Fourier series of $f(x) = x$ in $0 < x < 2$.

UNIT II

3. (a) Obtain the Fourier series for $y = x^2$ in $-\pi < x < \pi$. Using the two values of y, show that $\frac{1}{1^4} + \frac{1}{2^4} + \frac{1}{3^4} + \frac{1}{4^4} + ... = \frac{\pi^4}{90}$.

(b) Find the Fourier transform of

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

And hence evaluate $\longrightarrow \int_0^\infty \frac{x \cos x - \sin x}{x^2} \cos \frac{x}{2} dx$.

Or

(c) The following values of y give the displacements in inches of a certain machine part for the rotation x of the flywheel. Expand y in terms of a Fourier series :

x :	0	$\pi/6$	$2\pi/6$	$3\pi/6$	$4\pi/6$	$5\pi/6$
y :	0	9.2	14.4	17.8	17.3	11.7

(d) Solve the integral equation

$$\int_0^\infty f(x) \cos(\alpha\ x) dx = e^{-\alpha}.$$

UNIT III

4. (a) Use the Newton Raphson method to find a root of the equation $3 \sin x - 2x + 5 = 0$ near 3, correct to three decimal places.

(b) Interpolate by means of Gauss's backward formula, the population of a town for the year 1974, given that :

Year :	1939	1949	1959	1969	1979	1989
Population (in thousands) :	12	15	20	27	39	52

Or

(c) Use Bessel's formula to obtain y_{25}, given $y_{20} = 24$, $y_{24} = 32$, $y_{28} = 35$, $y_{32} = 40$.

(d) Estimate the values of $f(22)$ and $f(42)$ from the following data :

x :	20	25	30	35	40	45
$f(x)$:	354	332	291	260	231	204

UNIT IV

5. (a) Certain corresponding values of x and $\log_{10} x$ are given below :

x	300	304	305	307
$f(x) = \log_{10} x$	2.4771	2.4829	2.4843	2.4871

Find $\log_{10} 310$ by

(i) Lagrange's formula

(ii) Newton's divided difference formula.

Or

(b) Find the first and second derivatives of the function tabulated below, at the point $x = 1.1$:

x :	1.0	1.1	1.2	1.3	1.4	1.5	1.6
y :	7.989	8.403	8.781	9.129	9.451	9.750	10.031

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(DCE 212)

B.Tech. DEGREE EXAMINATION, DECEMBER 2008.

(Examination at the end of Second Year First Semester)

Civil Engineering

Paper II — BUILDING MATERIALS AND CONSTRUCTION

Time : Three hours **Maximum : 75 marks**

All questions carry equal marks.

Answer Question No. 1 compulsorily.

(1 × 15 = 15)

Answer ONE question from each Unit.

(4 × 15 = 60)

1. (a) What are igneous rocks?

(b) What are Artificial stones?

(c) What are the requirements of good brick earth?

(d) What are the standard sizes of common building bricks?

(e) Line is chiefly prepared by burning ————.

(f) Define the term Veneer.

(g) Mention two defects in timber.

(h) Give the cross-section of an exogenous tree.

(i) What are the raw materials used in the manufacture of cement?

(j) What are the uses of plywood?

(k) How is water proof cement prepared?

(l) How can rusting of iron be prevented?

(m) Give a neat sketch of a queen closer.

(n) What are the uses of a Varnish?

(o) Mention the use of refractory bricks.

UNIT I

2. (a) Explain the burning of bricks in Kilns with neat sketches.

(b) What are the methods of quarrying of stones? (7)

Or

3. (a) Give a comparison between fat lime and hydraulic lime. (8)

(b) Explain burning of bricks in clamp. (7)

UNIT II

4. (a) Explain the methods of seasoning of timber. (8)

(b) What are the various defects in timber. (7)

Or

5. (a) Explain the method of painting new wooden door. (8)

(b) What are the various uses of steel? (7)

UNIT III

6. (a) What is a foundation and what are its functions? (8)

(b) Discuss about Ashlar Masonry with neat sketches. (7)

Or

7. (a) Distinguish between stone masonry and brick masonry. (8)

(b) Write short notes on :

(i) English bond

(ii) Flemish bond. (7)

UNIT IV

8. (a) What are the various materials used for flooring? What are the factors affecting the choice of flooring materials? (8)

(b) Discuss about means of preventing dampness in buildings. (7)

Or

9. (a) What are the advantages and disadvantages of flat roots? (8)

(b) Define the terms :

(i) Formwork

(ii) Centering. (7)

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B.Tech. DEGREE EXAMINATION, DECEMBER 2008.

(Examination at the end of Second Year First Semester)

Civil Engineering

Paper III — SURVEYING — I

Time : Three hours **Maximum : 75 marks**

Answer Q.No. 1 compulsory.

Answer ONE question from each Unit.

1. (a) Draw the conventional sign for an electric power line.

(b) ———— is the instrument used for ranging survey lines.

(c) A line had a rise of 6 m for a length of 110 m. Its hypotnusal allowance is ————.

(d) The formula for sag correction is ————.

(e) The length of a long offset is greater than ————.

(f) Bearing of line AB is N 10° E and bearing of BC is N 70° E. $\therefore \angle ABC$ = ————.

(g) In a closed traverse the algebraic sum of deflection angles = ————.

(h) Dip is ———— on the equation.

(i) The strength of fix is ———— along the circumcircle of the three points of Resection method.

(j) Line of collimation is the line joining ————.

(k) The curvature correction for a length of 1500 m is ————.

(l) Agonic line is an imaginary line joining the stations of ————.

(m) 200 mm theodolite means ————.

(n) Transiting is ————.

(o) ———— is a minor instrument consisting of a cylindrical tube attached to a A frame and provided with a target staff for sighting.

UNIT I

2. (a) What is the PRINCIPLE OF SURVEYING? Explain.

(b) An old survey map was plotted to a scale of 10 m to 1 cm. It got shrunk so that a line supposed to be 10 cm long is only 9.8 cm now. There was a note on the plan that the 20 m chain used for surveying was 15 cm too short. If the area of the plan measured by a planimeter is 45 sq.cm. Find the true length of the site.

Or

3. (a) What is RECIPROCAL RANGING? Explain.

(b) A chain line has to cross a pond if A and D are on either end of the pond and a line AB to the left of AD is 200 m long and one Ac on the right side of AD is 250 m long and if B, D and C are in a straight line and BD = 125 m and DC = 150 m find the length AD.

UNIT II

4. (a) What are the fundamental axes of a Theodolite? Mention their relationship if any.

(b) What is method of Repetitions? Explain.

Or

5. (a) What are the accessories of a plane Table? Explain the RADIATION method of plane table survey.

(b) The following bearings were taken where local attraction was suspected. Find their correct bearings.

Line	Fore Bearing	Back Bearing
AB	N	S 5° E
BC	N 16° E	S 16° W
CD	S 89° E	S 89° W
DE	S 77° E	N 72° W
EA	S 63° W	N 65° E

UNIT III

6. (a) Explain

(i) Well conditioned triangle

(ii) Tie line

(iii) Check line

with neat sketches.

(b) The magnetic bearing of a line was N 65° 12' W when the magnetic declination was 3° 38' E. If the present declination is 2° 26' W what is its Magnetic Bearing?

Or

7. (a) What is BOWDITCH CORRECTION? Explain.

(b) How do you continue the chain line when both vision and chaining are obstructed?

UNIT IV

8. (a) What is Reciprocal levelling? Explain.

(b) Fill in the missing details :

B.S.	I.S.	F.S.	H.I.	R.L.

?				11.540
	?			14.290
	?			12.360
	?			11.550
?		4.230		7.770
	?			8.450
	?			8.540
	?			9.860
2.950		4.100	7.180	
		?		6.940

Or

9. (a) What is contour? Describe the characteristics of contour lines.

(b) With a neat sketch explain the functioning of Indian pattern Clinometer.

(DCE 214)

B.Tech. DEGREE EXAMINATION, DECEMBER 2008.

(Examination at the end of Second Year First Semester)

Civil Engineering

Paper IV — STRENGTH OF MATERIALS — I

Time : Three hours **Maximum : 75 marks**

All questions carry equal marks.

Answer Question No.1 and any 'FOUR' questions.

1. (a) What is indicated by the area under stress-strain curve upto the proportionals limit?

(b) What is the value of modules of elasticity for plastic materials?

(c) Calculate the modulus of Rigidity, if Young's modulus of elasticity and Poisson's ratio are $1.25 * 10^5$ MPa and 0.34 rly.

(d) Calculate the stress in a wire of length 10 cm, with an increase in length of 10 cm. Take E = 200 kN/mm^2.

(e) A material expands freely during heating. Mention the type of stress developed in that material.

(f) Mention the moment of inertia of a square of side "b" about its diagonal.

(g) Define Neutral axis of the beam.

(h) Mention whether the point of contraflexure exists or not in a cantilever beam, which is carrying a u.d.l with reason.

(i) Draw the bending moment diagram for a cantilever beam subjected to an anticlockwise couple at the end of the beam.

(j) A rectangular beam of width 0.30 and depth 0.45 m subjected to a shear force of 13.50 N. Find out the Max. shear stress.

(k) Draw the shear stress distribution for a 'T' section.

(l) What is meant by Torsional section modulus?

(m) Mention the type of stress induced in a shaft due to a twisting couple.

(n) A torque of 2N-m was required to produce a twist of one radian per unit length of a given shaft. Find out the torsional rigidity of the shaft.

(o) Mention the purpose of helical spiring.

2. A square wooden piece of 50 mm side and 300 mm long is subjected to a tensile stress of 400 N/mm^2 along its longitudinal axis and lateral compressive stress of 200 N/mm^2 along the other pairs of sides calculate the changed dimensions of wooden piece and volumetric strain Take $E = 1.5 \times 10^4$ N/mm^2 and Poisson's ratio = 0.40.

Or

3. Two parallel plates 6 m apart are stayed together by a steel rod of 2.5 cm dia at a temperature of 80°C. Calculate the pull exerted by the rod, when it has coded to 22°C, when (i) if the wall don't yield ; (ii) if the total yield at the two ends is 1.5 mm. Take $E = 200GN/m^2$ and α (coefficient of expansion) = $11 \times 10^{-6}/^\circ C$.

4. A beam of 20 m span is hinged at each end. It carries of UDL of 2 KN/m for a length of 10 m from the left end and a point load of 10 KN from the left end. In addition to this, it is subjected to 20 KN-m anticlockwise couple at left end and 30 KN-m clockwise couple at right end of beam. Draw the SFD and BMD for the beam.

Or

5. Draw the shear force Bending moment diagrams for the beam as shown in Fig. 1

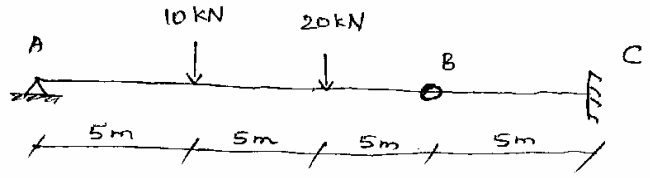

Fig. 1

6. A cast iron pipe of 50 cm internal dia with 2 cm thickness is supported at two points, which are 10 m apart. Find the maximum stress in the metal, when the pipe is running full. Take unit weight of cast iron as 72 KN/m^3 and that of water as 10 KN/m^3.

Or

7. A timber beam 120 mm wide and 150 mm deep supports UDL over a span of 2 meters. If the safe stresses are 8 N/mm^2 and 2 N/mm^2 in bending and shear respectively, calculate the maximum load, which can be supported by the beam.

8. A solid shaft of a hydraulic turbine in a power plant is to transmit 1000 KW power, while rating at 120 rpm. If the shear stress of the material must not to exceed 80 N/mm^2 and the maximum torque is likely to exceed the mean by 25% ; find the diameter of the shaft required. What % of saving in weight would be achieved ; if the shaft is to be replaced by a hollow one, whose internal dia is equal to 0.60 times the external diameter? The length of the material and maximum stresses being the same.

Or

9. A closely coiled spring, made out the of 10 mm dia rod has 12 coils of 120 mm mean diameter. Find the maximum permissible axial load for this spring, if the maximum shear stress is limited to 260 N/mm^2. Also calculated the deflection under axial load and the stiffness of the spring.

(DCE 215)

B.Tech. DEGREE EXAMINATION, DECEMBER 2008.

(Examination at the end of Second Year First Semester)

Civil Engineering

Paper V — FLUID MECHANICS

Time : Three hours **Maximum : 75 marks**

All questions carry equal marks.

Answer Question No. 1 and any FOUR questions.

Assume suitable data wherever necessary.

1. (a) What is the effect of temperature on the viscosity of liquids and gases?

(b) A square plate 2 × 2 m is just held submerged below the water in a vertical position. Find out the total pressure on 'one' face of the plate.

(c) A metallic plate weighs 78.0 N in air and 55.0 N in water. Find out the relative density of the metal.

(d) Define meta centre.

(e) Mention the type of acceleration in a fluid flow, if the stream lines are curved and parallel to each other.

(f) State the reason for greater destructive force near the center of a tornado, than that at the sides of tornado.

(g) The mean velocities at ends of a stream tube are 2.5 m/sec. and 3 m/sec. respectively. Find the convective tangential acceleration at midway, it the ends of tube are 10 cm apart.

(h) The potential flow is applicable only for irrotational flow. State "True" or "False" with reasons.

(i) Mention the kinetic energy correction factor for uniform velocity distribution in pipe flow.

(j) Find out the discharge through a right angled V-notch when the depth of flow over the sill of notch is 10 cm and coefficient of discharge is 0.60.

(k) Mention the name of velocity of flow at lower critical Reynold's number.

(l) Mention the equation for discharge and head loss for the pipes connected in parallel.

(m) The total head available for a pipe line is 60 m. Calculate the allowable frictional head loss, so as to have maximum power transmission through the pipe line.

(n) Calculate the thickness of laminar sublayer for a condition of hydrodynamically rough surface, when the height of roughness projection in a pipe line is 0.006 m.

(o) What is meant by mixing length in pipe flow?

2. (a) A flat plate of 0.30 m² in area moves edgewise through an oil held between two large fixed parallel planes of 10 cm apart. If the velocity of plate is 0.60 m/sec and oil has a kinematic viscosity of 0.40 stokes and sp. gravity 0.80. Calculate the shear force when (i) the plate is 2.5 cm from the top plane; (ii) the plate is equidistant from both the planes; (iii) the plate is 2.5 cm from the bottom plane. Comment on the results for the conditions (i) and (iii).

Or

(b) An empty barge 5 m wide, 16 m long and 3 m high has a weight of 350 kN in air. What should be the weight of coal that can be placed on the barge, if the draft should not be more than 2.0 m?

(c) A U tube mercury differential manometer has been used to measure the pressure difference across the inlet and throat of a venturimeter that conveys water. Calculate the pressure difference, when the venturimeter is laid vertically and the inlet lies 20 cm above the throat and the manometer reads 10 cm.

3. (a) The velocity at a point is given by $V = (4t = 3x^2 + 2y)\,\hat{i} + (t^2 + 2xy + 3y^2)\,\hat{j}$. Determine the local acceleration and the total acceleration at a point (2, 3) for $t = 1.5$ seconds.

(b) Define a stream line and obtain an equation for it in a 2 dimensional flow.

Or

(c) A 30° reducer bend tapers from 600 mm dia at inlet to 300 mm dia at outlet. The pressure at inlet is 1.5 bar end the flow rate of oil of specific gravity 0.90, through the bend is 500 lit/sec. Assuming friction losses to be 20% of the kinetic energy head at the inlet, compute the magnitude and direction of the resultant force exerted by the fluid on the bend.

4. (a) What is end contraction? How it is taken care in Cipoletti Weir.

(b) A river 30 m wide and 3 m deep has mean velocity of flow 1.2 m/sec. Find the height of weir to rise the water level by 1.2 m. Take $C_d = 0.58$.

Or

(c) Explain how will you determine whether a boundary layer flow is (i) attached flow (ii) detached flow and (iii) on the verge of separation.

(d) A smooth flat plate of 5 m width and 5 m length is moving with a velocity of 4 m/sec in stationary air. Find the total drag on both sides of plate, assuming that the boundary layer is entirely turbulent. Take $\rho_{\text{air}} = 1.25$ kg/m³; $\gamma_{(nu)} = 1.5 \times 10^{-5}$ m²/sec.

5. (a) A rough pipe is of diameter 8 cm. The velocity at a point 3 cm from the wall is 30% more than that of at a point '1' cm from pipe wall. Determine the average height (k) of the roughness. Take the velocity distribution for rough pipe as $\frac{u}{u_*} = 5.75 \log_{10} (y/k) + 8.5$.

Or

(b) A siphon of 200 mm dia connects, two reservoirs, which are having a difference of elevation as 20 m. The length of siphon is 500 mm and the summit is 3 m above the water level in the upper reservoir. The length of pipe from upper reservoir to the summit is 100 m. Determine the discharge through the siphon and also pressure at the summit. Neglect minor losses. Take friction factor as 0.02.

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(DCE 216)

B.Tech. DEGREE EXAMINATION, DECEMBER 2008.

(Examination at the end of Second Year First Semester)

Civil Engineering

Paper VI — ENGINEERING GEOLOGY

Time : Three hours **Maximum : 75 marks**

All questions carry equal marks.

Answer Question No. 1 compulsorily. (1 × 15 = 15)

Answer ONE question from each Unit. (4 × 15 = 60)

1. (a) Onion weathering is another name for ——————— weathering.

(b) Mechanical decay of rocks is called ——————— while chemical decay is called decomposition.

(c) ——————— mineral exhibits soapy touch.

(d) When two minerals have the same chemical composition but different physical properties then the minerals are called ———————.

(e) A crypto crystalline mineral of conhoidal fracture and of sharp cutting edges is ——————.

(f) ——————— is not only the toughest metamorphic rock but the toughest of all the rocks.

(g) ——————— is a soft ornamental metamorphic rock composed of a single mineral.

(h) ——————— is the angle made by the fault plane with the vertical plane.

(i) When a bed is dipping towards North-East its strike direction is ———————.

(j) A subsoil site where the beds are dipping ——————— stream side is ideal for a gravity dam location.

(k) ——————— waves (seismic) travel only through solids.

(l) ——————— waves are the slowest seismic waves but are highly destructive.

(m) ——————— waves are the fastest waves travelling through solids, liquids and gases.

(n) The effect of earthquakes is sever but confined to limited area when the depth of focus is ———————.

(o) ——————— metamorphic rocks never act as aquifers.

UNIT I

2. What is Geology? Why does knowledge of geology a must for a civil engineer?

Or

3. Define a mineral. State the various physical properties responsible for the identification of minerals by giving suitable examples.

UNIT II

4. Differentiate between the following sets of rocks :

(a) Granite and Gneiss.

(b) Breccia and Conglomerate.

(c) Gabbaro and Basalt.

(d) Sandstone and Quartzite.

(e) Shale and Slate.

Or

5. (a) Describe the various structures of sedimentary rocks.

(b) Elaborate (i) Cataclastic texture (ii) Grannulose texture and (iii) Schistose texture.

UNIT III

6. What is an unconformity? Describe the various types of unconformities with neat sketches.

Or

7. What is an Earthquake? How earthquakes are classified? Give out the reasons for their occurrence.

UNIT IV

8. Explain electrical resistivity methods in detail.

Or

9. (a) Explain the problems going to arise when a tunnel is driven through different beds.

(b) What is Overbreak? Explain.

(DCE 221)

B.Tech. DEGREE EXAMINATION, DECEMBER 2008.

(Examination at the end of Second Year Second Semester)

Civil Engineering

Paper I — CONCRETE TECHNOLOGY

Time : Three hours **Maximum : 75 marks**

Answer ALL questions.

1. (a) List the different methods for measurement of moisture content of aggregates.

(b) List the factors affecting alkali aggregate reaction.

(c) Define fineness modulus.

(d) Define admixture.

(e) List the various tests for the measurement of workability of concrete.

(f) List the various stages in the manufacture of concrete.

(g) Name different moduli of elasticity of concrete.

(h) Mention different methods to control sulphate attack.

(i) Define Mix Design.

(j) What are the types of fibres used in fibre reinforced concrete?

(k) List the effects of cold weather on concrete.

(l) Define surface texture of aggregates.

(m) Write the relation between compressive strength and flexural strength of concrete as per IS 456-2000.

(n) What is carbonation of concrete?

(o) What is creep?

UNIT I

2. Explain with details, the situation in which the following cements are used :

(a) Sulphate resisting cement

(b) Low heat cement

(c) Rapid hardening cement.

Or

3. What is Aggregate Impact value? Write the test to determine the aggregate impact value.

UNIT II

4. What is Vee-Bee time? Write a procedure with figure, to measure the Vee-Bee time of fresh concrete.

Or

5. Explain the following with reference to the properties of fresh concrete

(a) Seggregation

(b) Bleeding.

UNIT III

6. Explain the maturity concept for strength development of concrete. The strength of a sample of fully matured concrete is 40 MPa. Find the strength of identical concrete at the age of 7 days, when cured at an average temperature during day time at 25°C and night time at 12°C. The Plowmann's coefficients may be taken as 32 and 54.

Or

7. What is the significance of compressive strength of concrete? Describe the compression test on hardened concrete.

UNIT IV

8. Explain in detail

(a) Light weight concrete

(b) No-fines concrete

(c) Shot crete.

Or

9. Explain the permeability of cement paste and concrete. Write the concept of Mix Design and list the variables in proportioning.

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(DCE 222)

B.Tech. DEGREE EXAMINATION, DECEMBER 2008.

(Examination at the end of Second Year Second Semester)

Civil Engineering

Paper II — BUILDING DRAWING

Time : Three hours **Maximum : 75 marks**

Unit I and Unit II carries 15 marks each.

Unit III carries 45 marks.

Answer ONE question from each Unit.

UNIT I

1. Write short notes on :

(a) Roominess.

(b) Grouping.

(c) Furniture requirements.

Or

2. Write short notes on :

(a) Building bye-laws for sizes of rooms.

(b) Bye-laws for FAR for residential buildings and define FAR.

(c) Bye-laws for open spaces.

UNIT II

3. Draw the plan and elevation of a dog-legged stair for a residential building.

Or

4. With a typical layout plan of a school building, explain the principle of planning.

UNIT III

5. A health centre building is to be constructed in a plot of 20 m × 50 m. The longer side of the plot is facing the road in eastern direction the following facilities are required to be provided.

Out-patient department consisting of entrance hall 5 m × 6 m, 8 number of consulting rooms each 3 m × 4 m, emergency room 4 m × 5 m, sanitary block 4 m × 5 m and operation theatre 5 m × 6 m. Draw to a suitable scale the plan with all details.

Or

6. The line plan of a 2-bed roomed residential building is as shown in the figure. All dimensions are clear internal dimensions specifications.

Good soil for foundations is available at a depth of 1500 mm below the ground level. All the walls of superstructure are 300 mm thick. Assume roof slab thickness of 120 mm.

Draw

(a) A fully dimensioned plan with proper positioning of doors, windows and ventilators of suitable dimensions

(b) A sectional elevation and

(c) Front elevation.

(DCE 223)

B.Tech. DEGREE EXAMINATION, DECEMBER 2008.

(Examination at the end of Second Year Second Semester)

Civil Engineering

Paper III — SURVEYING — II

Time : Three hours **Maximum : 75 marks**

Answer Q. No. 1 compulsory.

Answer ONE question from each Unit.

1. (a) What is the velocity of travel of Electro magnetic waves?

(b) Name the instrument which can electronically measure the distance and is basically an electronic theodolite.

(c) If a line is 120 m long and its bearing is 210^{o}, what is it departure?

(d) What is the difference between independent coordinates and consecutive coordinates?

(e) What is the use of a planimeter?

(f) What are the units of the additive constant of a tacheometer?

(g) When a tachemeter can be used with advantage?

(h) What is boning rod?

(i) What are the values of included angles of well conditioned triangle?

(j) What is the equation to give the distance of the visible horizon from a station of known elevation above the datum?

(k) In a simple circular curve give out an equation for "External distance".

(l) When a reverse curve of radii R and V and of central angles of α and β is to be introduced between two parallel lines, what is the distance between them?

(m) What is the difference between a compound curve and a Reverse Curve?

(n) What is a signal?

(o) What is a base line?

UNIT I

2. (a) Explain the terms

Cycle,

Wave length,

Frequency

and Transit time

as related to electromagnetic waves Mention their units as well.

(b) Describe the operating principle of any one Electronic Distance Measurement units.

Or

3. (a) State the checks applicable in a closed traverse for

(i) interior angles

(ii) exterior angles

(iii) deflection angles

(iv) bearings.

(b) In a traverse ABCD the following readings were recorded.

AB = 87. 6 m

BC = 68. 2 m

$\angle ABC = 118^{o}\ 15'00"$

$\angle BAD = 108^{o}\ 14'$

Assuming AB as meridian, calculate the length AD.

UNIT II

4. (a) What is a planimeter? Explain its working principle stating the formula used.

(b) In a cross staff survey the following perpendicular off sets are taken from a chain line.

Chainage	0	10	20	30	40	60	80	110	140	170
Off set length	8.5	9.4	11.6	13.7	11.5	10.4	9.2	8.8	7.3	5.3

Compute the enclosed area by Simpson's Rule.

Or

5. (a) With neat sketches explain the difference between a level section and two level section.

(b) A railway embankment 300 m long is 10 m wide at the formation level and had side slopes of $1\frac{1}{2}$: 1. The ground level at various distances is as follows :

Distance	0	75	150	225	300
R.L.	104.3	105.7	107.7	106.7	107.8

If the formation level at O chainage is 106.5 and the embankment has a rising gradient of 1 in 75^{o} and the ground is level across the centre line, calculate the volume of earthwork by Prisomoidal formula.

UNIT III

6. (a) What is Tacheometry? What are its advantages?

(b) The following readings were taken with a tacheometer of constants 100 and 0.

Instrument at	Height of axis	Staff at	Vertical angle	Staff readings
A	1.38	B.M.	$-1^{o}\ 54'$	1.020
				1.720
				2.420
A	1.38	B	$2^{o}\ 36'$	1.220
				1.825
				2.430
B	1.40	C	$3^{o}06'$	0.785

1.610

2.435

If R.L. of B.M. is 650.000, find the R.L. of C.

Or

7. (a) Explain the terms :

(i) Horizontal control and

(ii) Vertical control as applicable to setting out works.

(b) To find the elevation of the top of the signal Q on a hill reading were taken at P and R 150 m apart. P, Q and R in the same straight line. The angles of elevation of Q from P and R are 25° 36' and 10° 12' respectively the staff readings on bench mark of elevation of 150.000 were 1.355 and 2.955 when the instrument was at P and at R. Determine the elevation of the foot of the signal if its height is 2.5 m.

UNIT IV

8. (a) With a neat sketch explain the elements of a simple circular curve.

(b) Generate the data to set a simple Right handed circular curve of a radius of 75 m when its deflects through 35°. Chainage of vertex is 945.000 and the peg interval is 8 m.

Or

9. (a) Explain the specifications of Primary and Secondary Triangulations.

(b) Two triangulation stations P and Q are 50 km apart have elevations of 160 m and 200 m respectively. Find the maximum height of the signal required at Q so that the line of sight may not pass near the ground than 3 m. The ground in between may be assumed to have an elevation of 120 m.

(DCE 224)

B.Tech. DEGREE EXAMINATION, DECEMBER 2008.

(Examination at the end of Second Year Second Semester)

Civil Engineering

Paper IV — STRENGTH OF MATERIALS — II

Time : Three hours **Maximum : 75 marks**

All questions carry equal marks.

Answer Question No. 1 and any FOUR questions.

Any data missing may be assumed suitably.

1. (a) Radius of circle in Mohr's circle represents which stress and what is its value (maximum or minimum).

(b) What is the value of shear stress carried by principal plane?

(c) Mention for angle between the planes of minimum shear stress and principal planes.

(d) If 'σ_1' and 'σ_2' be the major and minor tensile stresses, then mention the maximum value of tangential stress.

(e) Mention the strain energy per unit volume due to pressure 'σ' on all sides of a thin cylinder.

(f) What is meant by proof resilience?

(g) Mention the dia of kern for a circular section of diameter '*D*'.

(h) Mention the ratio of hoop strain to longitudinal strain in a thin walled cylinder in terms of poison's ratio '*m*'.

(i) Mention the ratio of longitudinal stress to shear stress in the thin walled cylinder.

(j) Mention the equivalent length of a column with its both ends hinged, in terms of its length '*l*'

(k) What is meant by slenderness ratio for a column?

(l) Mention the factor of safety considered in Euler's formula for crippling load.

(m) A cantilever beam is deflected by '*d*' units due to a load '*P*'. If the beam depth is doubled, then mention the deflection in terms of '*d*'.

(n) The ratio of control deflection due to a central load in the case of a beam freely supported at both ends to the beam fixed at both ends will be ————————.

(o) Two equal length beams are fixed at their ends one carries a distributed load and the other carries same load, but concentrated in the middle. Mention the ratio of maximum deflections in these beams.

2. At a certain point in an elastic material, these exists two normal tensile stresses of 50 N/mm^2 and 30 N/mm^2 respectively at right angles to each other with a shearing stress of 25 N/mm^2. Determine (a) the principal stresses and the position of principal planes and (b) max shear stress and its plane position.

Or

3. (a) A beam 4 m in length is simply supported at the ends and carries a u.d.l of 5 kN/m. Determine the strain energy stored in the beam. Take E = 2×10^7 N/cm^2; I = 1200 cm^4.

(b) A circular shaft of 3 cm dia is 2 m long. It is required to transmit 10 HP at 80 rpm. Determine the strain energy stored in the shaft. Take G = 0.84×10^6 kg/cm^2.

4. A short cast iron column is of hollow section, 30 cm external dia and 6 cm thick. A vertical compressive load of 2 *t* acts at an eccentricity of 9 cm from the axis. Determine the maximum tensile and compressive stresses. Also plot the variation of stress in the column.

Or

5. A steel pipe 30 cm in dia and 6 mm thick is subjected to a pressure of 28 kg/cm^2. Estimate the hoop stress in the pipe under this pressure and also when wound, before stressing with wire 2.5 mm diameter, carrying a tension of 700 kg/cm^2. What is the stress in the wire, when the pipe is under pressure? Assume E = 2.1×10^6 kg/cm^2 and γ = 0.25.

6. A steel tube has a mean dia of 120 mm and a thickness of 2 mm. Calculate the torque which can be transmitted by the tube with a factor of safety '3'; if the criterion of failure is (a) maximum shear stress and (b) maximum strain energy theory. Take E_s = 225 MN/m^2 and γ = 0.30.

Or

7. A hollow cast iron column with fixed ends supports an axial load of 1000 kN. If the column is 5 m long and has an external diameter of 250 mm, find the thickness of metal required. Use the Rankine's formula, taking a consistent 1/6400 and assume a working stress of 80 N/mm^2.

8. A beam with variable moment of inertia is loaded as shown in Fig. 1. Determine the deflection at mid span. Take I = 8000 cm^4.

Or

9. Find the slope and deflection of a cantilever beam carrying :

(a) A concentrated load at free end

(b) UDL over the whole span.

(DCE 225)

B.Tech. DEGREE EXAMINATION, DECEMBER 2008.

(Examination at the end of Second Year 2nd Semester)

Civil Engineering

Paper V — HYDRAULICS AND HYDRAULIC MACHINES

Time : Three hours **Maximum : 75 marks**

All questions carry equal marks.

Answer Question No. 1 and any FOUR questions.

1. (a) What is meant by unsteady SVF? Give on example.

(b) Mention the equation for pressure distribution for flows over convex shaped section.

(c) Mention the relationship between Chezy's constant and Mannings roughness factor.

(d) It was decided to design a circular channel for maximum discharge. It the hydraulic radius calculated is 3.448 m, what should be the dia of circular section.

(e) What is meant by critical depth of flow?

(f) Calculate the absolute velocity of an elementary wave travelling upstream in a rectangular channel of depth 1.20 m and velocity 2.0 m/sec.

(g) Justify the statement "The hydraulic jump in a free surface flow is analogous to normal shock wave in compressible flow".

(h) Mention the equation for the force exerted by a Jet of water on a stationary vertical plate, in the direction of jet.

(i) Distinguish between unit speed and specific speed of turbine.

(j) What is meant by spouting velocity of Jet?

(k) Mention the turbine which should be always installed above the water level in tail race.

(l) There exists Francis and Kaplan turbines. To have more hydraulic efficiency, which turbine is preferrable.

(m) Distinguish between Manometric had and static head.

(n) Define Euler number.

(o) What is meant by scale effect is models?

2. (a) Explain briefly the following :

(i) Laminar and turbulent flows

(ii) Steady and unsteady flows.

(b) Show that the hydraulic mean depth of a trapezoidal channel having the best proportion is half of the minimum depth.

Or

3. (a) Define specific energy. Draw the specific energy curve and show the salient features.

(b) The specific energy for a 3 m wide channel is to be 3 N–m/N. What would be the maximum possible discharge?

4. In a rectangular channel of width 24 m and depth of flow 6m. The rate of flow of water is 86.40 m^3/sec. If the bed slope of the channel is 1 in 4000, find the slope of the tree water surface. Take Cheby's constant C = 60.

Or

5. What is meant by hydraulic jump? Derive the expression for loss of energy in hydraulic jump in a rectangular channel in terms of sequent depths.

6. A jet of water 100 mm diameter and having a velocity 30 m/sec strikes tangentially on a vane, which deflects the jet through an angle of 120°. Calculate the thrust on the vane, when (a) the axis of symmetry of the vane is horizontal (b) the tangent at inlet tip is horizontal.

Or

7. (a) With a neat sketch explain the construction and working of pelton wheel turbine.

(b) A turbine is to be operated under a head of 25 m at 200 rpm. The discharge is 9 m^3/sec. Determine the specific speed of the turbine, if the overall efficiency is 90 percent.

8. (a) Define (i) Head coefficient, (ii) Flow coefficient, (iii) Power coefficient.

(b) A centrifugal pump is discharging 0.025 m^3 /sec of water against a total head of 18 m. The dia of impeller is 0.40 m and is rotating at 1400 rpm. Calculate the head coefficient and power coefficient of a geometrically similar pump of dia 0.25 m, when it is running at 2800 rpm.

Or

9. (a) Describe the procedure for Rayleigh's method of dimensional analysis.

(b) Write short notes on : (i) Reynold's model law (ii) Froude's model law.

(DCE 226)

B.Tech. DEGREE EXAMINATION, DECEMBER 2008.

(Examination at the end of Second Year Second Semester)

Civil Engineering

Paper VI — FUNDAMENTALS OF ELECTRICAL SCIENCE AND MECHANICAL SCIENCE

Time : Three hours **Maximum : 75 marks**

All questions carry equal marks.

Answer Question No. 1 and No. 6 Compulsory.

Answer ONE question from each Unit.

PART A

(ELECTRICAL SCIENCE)

(1 × 7 = 7)

1. (a) What is 'power factor'? Define.

(b) Define 'Average Value' of alternating quantity.

(c) What is the functions of 'commutator' in d.c. generator?

(d) Write the applications of d.c. series and shunt motors.

(e) Draw the equivalent circuit of a single phase transformer and identify the parameters in it.

(f) Name different types of single phase induction motors.

(g) Define 'sag' in overhead lines.

UNIT I

2. (a) Draw the circuit diagram of a full-wave rectifier. Derive the expressions for load current and ripple.

(b) Derive an expression for the induced emf in a transformer.

Or

3. (a) Explain the term 'Back Emf' in a d.c. motor. Derive the torque equation of d.c. motor.

(b) Distinguish between separate excitation and self excitation. Discuss the characteristics of self-excited d.c. generators.

UNIT II

4. (a) Derive the expression for induced emf in a single-phase alternator.

(b) Explain working of capacitor-start-capacitor-run single phase induction motor. Draw relevant figures.

Or

5. (a) Briefly explain how a torque is produced in a 3-phase induction motor. Write the torque equation.

(b) Briefly explain the effects of 'sag' and 'stress' in overhead conductors.

PART B

(MECHANICAL SCIENCE)

6. Write briefly on :

(a) Creep in belts

(b) Moulding sands

(c) Super heater in steam generator

(d) Diesel cycle

(e) Intercooler in air compressors

(f) Soldering operation

(g) Specification of a milling machine.

UNIT III

7. (a) Derive an expression for the length of an open belt.

(b) Find the power transmitted by a belt running over a pulley of 600 mm diameter of 200 rpm. The coefficient of friction between the belt and pulley is 0.25; Angle of lap 160° and maximum tension in the belt is 2500 N.

Or

8. (a) Discuss various operations that you can perform on lathe machine.

(b) Explain the equipment and process of oxy-acetalyne welding.

UNIT IV

9. (a) Distinguish between diesel and petrol engine.

(b) Draw the valve timing diagram of 4-stroke petrol engine and explain salient features.

Or

10. Explain the operation of multistage air compressor and enumerate the advantage of multistage compressors.

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