

D 10025

(Pages : 2)

Name.....

Reg. No.....

THIRD SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION
NOVEMBER 2010

EN 09 301—ENGINEERING MATHEMATICS—III

Time : Three Hours

Maximum : 70 Marks

Part A

Answer all questions.

1. Prove that $f(z) = z \int_{mz}^{\infty} \frac{1}{t} dt$ is differentiable only at $z = 0$.
2. Obtain the expansion of $\frac{z-1}{z^2}$ in a Taylor series in powers of $(z-1)$.
3. Find the invariant points of the transformation $w = \frac{3z-5i}{iz-1}$.
4. Determine the subspace spanned by $H = \{(1, -2, 3), (3, 0, 1)\}$ in \mathbb{R}^3 .
5. Find the Fourier sine transform of

$$f(x) = \begin{cases} 1, & 0 < x < a \\ 0, & x > a \end{cases}$$

(5 × 2 = 10 marks)

Part B

Answer any four questions.

6. Find the image of the line $y - x + 1 = 0$ under the transformation $w = \frac{1}{z}$.
7. Evaluate $\int_C \frac{3z^2 + 7z + 1}{z+1} dz$ where C is the circle $|z+i|=1$.
8. Let $V = \mathbb{R}^4$ and W be a subspace generated by $(1, -2, 5, -3)$, $(2, 3, 1, -4)$ and $(3, 8, -3, -5)$. Find a basis and $\dim(W)$.
9. Show that the set $\{(x, y, z) \in \mathbb{R}^3 : 2x + 5y - 7z = 0\}$ is a vector subspace of \mathbb{R}^3 .
10. Find the Fourier transform of the function $f(t) = e^{-a|t|}$, $-\infty < t < \infty$, $a > 0$.
11. Find the Fourier cosine transform of $f(x) = \frac{e^{-ax}}{x}$.

(4 × 5 = 20 marks)

Turn over

Part C

Answer all questions as per choice given.

12. (a) Find the bilinear transformation which maps the points $z = 1, i, -1$ on to the points $w = i, 0, -i$. Hence find the image of $|z| < 1$.

Or

- (b) Determine the analytic function whose real part is $\frac{\sin 2x}{\cosh 2y - \cos 2x}$.

13. (a) Evaluate $\oint_C \frac{e^z dz}{\cos \pi z}$ where C is the unit circle $|z| = 1$.

Or

- (b) Evaluate $\int_0^{2\pi} \frac{d\theta}{5 - 3 \cos \theta}$

14. (a) Let $u_1 = (1, 0, 0)$, $u_2 = (-8, 4, 0)$ and $u_3 = (3, -6, 3)$.

- (i) Show that $B = \{u_1, u_2, u_3\}$ is a basis of \mathbb{R}^3 .
(ii) Find the coordinate vector for $v = (-8, 2, 3)$.

Or

- (b) Find an orthonormal basis for the sub-space spanned by $(1, 2, 1), (1, 0, 1), (3, 1, 0)$ of \mathbb{R}^3 .

15. (a) Using the Fourier Integral representation, show that $\int_0^{\infty} \frac{t \sin xt}{1+t^2} dt = \frac{\pi}{2} e^{-x}, (x > 0)$.

Or

- (b) Show that the Fourier transform of $e^{-x^2/2}$ is self reciprocal.

(Total marks = 40 marks)

10026

Name:

Reg.No.

THIRD SEMESTER B-TECH DEGREE EXAMINATION DECEMBER 2010

EN09-302 HUMANITIES AND COMMUNICATION SKILLS

(Common to all Branches) 2009 Admission

Time: Three hours

Maximum: 70 marks

PART A

Answer the following questions in a sentence or two:

1. What is the importance of Stone Age to the students of technology?
2. Define Communication.
3. How is a short report different from a long one?
4. What is skimming?
5. What is professional ethics?



(5 × 2 = 10 Marks)

Answer any four of the following questions:

6. Write a note on the Egyptian contribution to civil engineering.
7. What are the different reading skills?
8. Define body language and its role in communication.
9. What is the difference between note making and note taking?
10. What is a CV? Why is it relevant at an interview?
11. What is code of ethics? How does it help engineers?

(4 × 5 = 20 Marks)

PART C

12. a) Discuss India's development in the field of information technology.
Or
b) Discuss the impact of space science on Indian technology.
13. a) What are the points to be remembered to make a group discussion effective?
Or
b) What are the barriers to communication? Explain using a model.
14. a) Make a report of an industrial accident or a natural disaster you are familiar with.
Or
b) You purpose to start an industry. Make a project report of the same.
15. a) What is cyber crime? Explain with examples.
Or
b) Discuss environmental ethics.

(4 × 10 = 40 Marks)

L_0031

(Pages : 2)

Name.....

Reg. No.....

**THIRD SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION
DECEMBER 2010**

CE 09 303/PTCE 09 302—MECHANICS OF SOLIDS

(2009 admissions)

Time : Three Hours

Maximum : 70 Marks

Part A

Answer all questions.

- I. (a) List out the different types of stresses and strains.
(b) What is bulk modulus?
(c) Define the term simply supported beam.
(d) Write the Relationship between (i) bending stresses and radius of curvature ; (ii) bending moment and radius of curvature.
(e) Define hoop stress.

(5 × 2 = 10 marks)

Part B

Answer any four questions.

- II. (a) Derive an expression for the total extension of a uniformly tapering rod of diameters D_1 and D_2 when the rod is subjected to an axial load P .
(b) Draw SFD and BMD for a cantilever beam carrying a point load at the free end.
(c) What is meant by beam of uniform strength? Explain.
(d) Derive the differential equation for deflection curve.
(e) Derive the Euler's formula for a column with one end hinged and other end is fixed.
(f) Derive the expression of Longitudinal stress for thin cylindrical shell.

(4 × 5 = 20 marks)

Part C

- III. (a) A member ABCD is subjected to point loads P_1 , P_2 , P_3 and P_4 as shown in figure 1. Calculate the force P_3 necessary for equilibrium if $P_1 = 120$ kN, $P_2 = 220$ kN and $P_4 = 160$ kN. Determine also the net change in the length of the member. Take $E = 200$ GN/m².

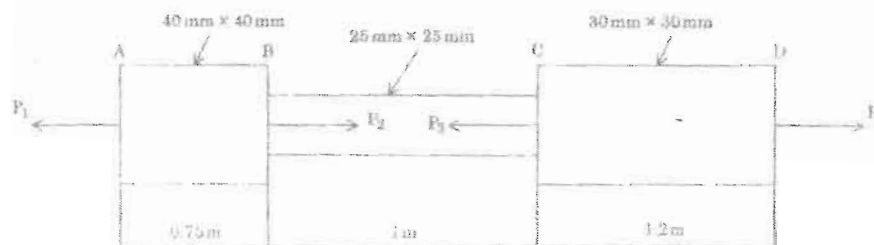


Fig. 1

Or

Turn over

- (b) A steel rod of diameter is enclosed centrally in a hollow copper tube of external diameter 4 cm and internal diameter of 3.5 cm. The composite bar is then subjected to an axial pull of 50,000 N. If the length of each bar is equal to 20 cm. determine (i) The stress in the rod and tube and (ii) load carried by each bar.

- IV. (a) Draw SFD and BMD for the beam shown in figure 2. Indicate the position and the magnitude of maximum bending moment.

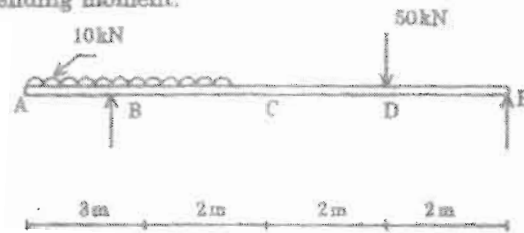


Fig.2

Or

- (b) Draw SFD and BMD for the beam shown in figure 3. Indicate the position and the magnitude of maximum bending moment.

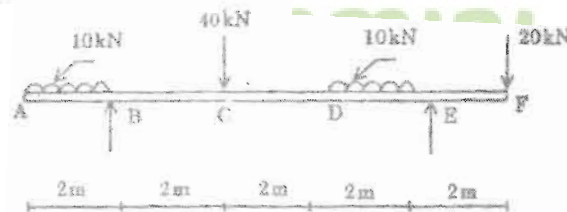


Fig.3

- V. (a) A circular steel pipe of external diameter 60 mm and thickness 8 mm. is used as a simply supported beam over an effective span of 2 m. If permissible stress in steel is 150 N/mm^2 determine the maximum concentrated load that can be carried by it at mid span.

Or

- (b) A symmetric I-section of size 180 mm \times 400 mm, 8 mm thick is strengthened with 240 mm \times 10 mm rectangular plate on top flange. If permissible stress in the material is 150 N/mm^2 , determine how much concentrated load the beam of this section can carry at centre of 4 m span. Given ends of beam are simply supported.

- VI. (a) A vertical steam boiler with 2 m. internal diameter and 4 m high is constructed with 2 cm thick plates for a working pressure of 10 kg./cm^2 . The end plates are flat. Calculate :

- (i) The stress in the circumferential plates due to pressure on the end plates.
- (ii) Stress in the circumferential plates due to resisting the bursting effect.
- (iii) Increase in length, diameter and the volume

Take Poisson's ratio = 0.3 and $E = 2 \times 10^8 \text{ kg/cm}^2$

Or

- (b) A 1.5 m long column has a circular cross section 50 mm diameter. Both ends of the column are fixed. Taking factor of safety of 2. Calculate the safe load using Rankine's formula and Euler's formula. Take $\sigma_c = 1600 \text{ kg/cm}^2$, $\sigma = 100 \text{ N/mm}^2$, and $E = 2 \times 10^5 \text{ N/mm}^2$.

D 10032

Name.....

Reg. No.....

THIRD SEMESTER B.TECH. DEGREE EXAMINATION DECEMBER 2010

CE 09 304—BUILDING TECHNOLOGY—I

(2009 Admissions)

Time: Three Hours

Maximum: 70 Marks

Part A

Answer all questions.

- I. (a) What are the chemical composition of cement ?
(b) Define the work ability of concrete.
(c) Differentiate between Shallow and Deep foundations ?
(d) What is meant by Admixtures ?
(e) What is meant by public buildings

(5 × 2 = 10 marks)

Part B

Answer any four questions.

- II. (a) How are the rocks physically and chemically classified ?
(b) Define and explain workability of concrete by slump test
(c) Briefly explain pile foundation.
(d) What are different types of roof.
(e) What are the laboratory tests for cement ?
(f) How do you classify the buildings ?

(4 × 5 = 20 marks)

Part C

- III. (a) What are the defects in timber ? Explain in detail with neat sketch.
Or
(b) How the cement is manufactured by dry process ?
- IV. (a) What is the purpose of Admixtures in the concrete ? Write a short on Accelerating and Retarding Admixtures.
Or
(b) What are the factors that affects the strength of concrete ? Discuss in detail.
- V. (a) What are different methods of improving bearing capacity of soil ?
Or
(b) What are the advantages and limitations of masonry construction ?
- VI. (a) What are the different types of stairs ? Explain briefly.
Or
(b) How do you select the site for building construction ?

(4 × 5 = 20 marks)

D 10033

(Pages : 3)

Name.....

Reg. No.....

**THIRD SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION
DECEMBER 2010**

CE 09 305/PTCE 09 304—SURVEYING—I

Time : Three Hours

Maximum : 70 Marks

Part A

- I. (a) What is the difference between a plan and a map ?
(b) What is resection method in plane table surveying and how is it different from other methods ?
(c) Distinguish between Datum and Level surface.
(d) What is the method adopted to determine high accuracy horizontal angle measurement using a theodolite ?
(e) Distinguish between Compound curve and Reverse curve

(5 × 2 = 10 marks)

Part B

- II. (a) Describe, with a neat sketch, how it is possible to measure the distance between two points A and B using chain/tape, if the region between A and B is obstructed by intervening high ground or small hillocks. Mention the method used.
(b) The bearing of the side AB of a regular pentagon ABCDE was found to be 54° . Compute the bearings of the remaining sides if the pentagon is run clockwise.
(c) Describe the Trial and Error method for determining the position of the instrument station.
(d) The following staff readings were observed in sequence : 1.324, 2.605, 1.385, 0.638, 1.655, 1.085, 2.125 and 1.555. The instrument was shifted after the third and sixth readings. The third reading was taken to an arbitrary bench mark of elevation 75.000. Find the reduced levels of all the other points, using Height of collimation method.
(e) Explain the importance of Traversing in surveying and how is it done using a theodolite.
(f) What are the elements of a simple curve, that are necessary for setting it on the ground ? Explain with a suitable diagram.

(4 × 5 = 20 marks)

Part C

- III. (a) Explain the likely errors in chain surveying and the precautions that should be taken to eliminate them.

Or

- (b) Explain at least *one* method each to continue and measure the distance between points on either side of the obstacle in the case of (a) Pond and (b) River.

(10 marks)

Turn over

- IV. (a) The following bearings were observed in traversing, with a compass in an area where local attraction was suspected. Find the amounts of local attraction at different stations and correct the bearings of the lines.

Line	F.B.	B.B.
AB	80°30'	260°30'
BC	351°15'	173°00'
CD	32°15'	208°00'
DE	106°15'	287°45'
EF	99°00'	280°00'
FG	209°30'	29°30'

Or

- (b) How do you obtain the position of the station occupied by plane table, given the plotted position of two points? Describe the procedure in detail.

(10 marks)

- V. (a) A page of an old level had been damaged by white ants and the readings marked "×" are missing. Find the missing readings with the help of available readings.

B.S	I.S	F.S	H.I	R.L	Remarks
×			×	209.510	B.M
	1.675			×	
	×			210.425	
	3.355			209.080	
0.840		×	209.520	×	C.P
	×			208.275	
	×			210.635	Underside of bridge girder
×		2.630	×	×	×
	×			206.040	
	1.920			205.895	
		×		205.690	

Or

- (b) Explain the direct method of contouring. Explain the advantages and disadvantages of these methods.

(10 marks)

VI. (a) Find the lengths of lines RS and ST of a traverse PQRSTP from the data given below

Line	PQ	QR	RS	ST	TP
Length (m)	201.54	189.68	?	?	256.83
Bearing	62°42'	154°54'	202°32'	281°44'	22°

Or

(b) Two straight roads intersect at an angle of $60^\circ 30'$ at chainage 3030m. The maximum speed of vehicles is 120 kmph. The centrifugal ratio is $\frac{1}{4}$ and the rate of change of radial acceleration is to be 0.2 m/sec^3 . Find the chainages of the points at the beginning and the end of the transition curves ; and the junctions of transition curve and circular curve. Consider the transition curve to be True spiral.

(10 marks)

(4 × 10 = 40 marks)



10034

Name:

Reg.No.

THIRD SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2010

CE09306PTCE09/305 - ENGINEERING GEOLOGY

Time: Three hours

Maximum: 70 marks

Part - A

I. (Answer all questions)

1. Seismograph
2. Cleavage
3. Soil profile
4. Water table
5. Rasater model

(5 × 2 = 10 marks)

Part - B

II. (Answer any four questions)

1. Circum pacific belt
2. Products of weathering
3. Granite petrography
4. Perched water table
5. Geological factors in design of building

(4 × 5 = 20 marks)

Part - C

III. (Answer section (a) or (b) of each questions)

(a) Comment on the geologic work of glaciers.

OR

(b) Describe building stones of Kerala and their effective utilization.

(1 × 10 = 10 marks)

IV. (a) Geological structures and their significance in civil engineering projects.

OR

(b) What are the distinguishing features of igneous rocks?

(1 × 10 = 10 marks)

V. (a) Describe the origin and occurrence of groundwater. How they are superior to surface water?

OR

(b) Comment on seismic exploration techniques for site investigation in civil engineering projects and for water exploration.

(1 × 10 = 10 marks)

VI. (a) What are volcanoes? Comment on their geological importance, distribution and products.

OR

(b) Explain the basic principles of remote sensing. How they can be used for site investigation of roads, bridges and tunnels.

(1 × 10 = 10 marks)