Bharatiya Vidya Bhavan's

SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)

Munshi Nagar, Andheri (W) Mumbai – 400058

ENDSEM- EXAMINATION FEB2023

Program: CIVIL S & A. Tech (Civil) Sem III 24/2/23 **Duration: 03 Hours**

Course Code: BS-BTC301 **Maximum Points: 100**

Course Name: ENGINEERING MATHEMATICS-III **Semester: III**

- **Attempt any five out of seven questions**
- **Use of scientific calculator is allowed.**

QNO.	QUESTION	POINTS	CO	BL	PI
QI a)	Obtain Laplace transforms of $f(t)=\sqrt{1+\sin t}$	06	1	2	2.1.3
QI b)	Find the bilinear transformation which maps $1, i, -1$ to $2, i, -2$ respectively. Find the fixed points of the transformation.	06	2	3,5	1.1.1
QI c)	Find for what values of k the set of equations $2x-3y+6z-5t=3,\ y-4z+t=l,\ 4x-5y+8z-9t=k$ has (i) no solution (ii) infinite number of solutions.	08	3	1	1.1.2
QII a)	Find the eigen values and eigenvectors of the matrix $A=\begin{bmatrix}1 & 0 & -1\\ 1 & 2 & 1\\ 2 & 2 & 3\end{bmatrix}$	10	3	2	2.1.4
QII b)	Prove that $\int_0^{\infty}\frac{\sin 2t+\sin 3t}{te^{t}}dt=\frac{3\pi}{4}$ using Laplace transforms	10	1	2	2.3.1
QIII a)	. Find the bilinear transformation that maps the point $z_1=-i, z_2=0, z_3=i$ into the points $w_1=-1, w_2=i, w_3=1$ respectively. Into what curve the y – axis is transformed to this transformation?	10	2	2	1.1.1
QIII b)	Solve $y''+y=t$ Given $y(0)=1 \qquad y'(0)=-2$	10	1	4,5	2.1.4

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QIV a)	If f (z) = u + iv is an analytic function of $z = x + iy$ and $u - v = \frac{e^y - \cos x + \sin x}{\cosh y - \cos x}$, find f (z) subject to the condition that $f\left(\frac{\pi}{2}\right) = \frac{3-i}{2}$	10	2	3	2.3.1
QIV b)	Evaluate: $\mathcal{L}^{-1}\left\{\frac{s}{(s^2+4)(s^2+1)}\right\}$ using convolution theorem	10	1	2	1.1.3
QV a)	Evaluate $L^{-1}\left\{\frac{5S^2+8S-1}{(S+3)(S^2+1)}\right\}$	10	1	2	1.1.1
QV b)	Find the characteristic equation of the symmetric matrix $A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$ and verify that it is satisfied by A and hence obtain A^{-1}. Express $A^6 - 6A^5 + 9A^4 - 2A^3 - 12A^2 + 23A - 9I$ in linear polynomial in A.	10	3	2	2.3.4
QVI a)	Find non – singular matrices P and Q such that P A Q is in normal form $A = \begin{bmatrix} 1 & 2 & 3 & 4 \\ 2 & 1 & 4 & 3 \\ 3 & 0 & 5 & -10 \end{bmatrix}$ Hence find rank of A.	10	3	3	2.1.3
QVI b)	Evaluate: $L^{-1}\left\{\frac{s^2+2s+3}{(s^2+2s+2)(s^2+2s+5)}\right\}$	10	1	3	1.1.1
QVI I a)	Obtain Laplace transforms of L $\{\sin 2t \sin 4t \sinh t\}$	06	1	3	2.1.4
QVI I b)	Show that the function $e^x(\cos y + i \sin y)$ is an analytic function, find its derivative	06	2	2	1.1.3

ENDSEM- EXAMINATION FEB2023

QVI Ic)	Test for consistency and solve $x-2y+3t=2$ $2x+y+z+t=-4$ $4x-3y+z+7t=8$	08	3	3,5	2.1.3

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End Semester Examination 2023 (February)

Program: B. Tech. Civil Engineering S.Y. Sem III 11/3/23 **Duration: 3 hrs.**

Course Code: PE-BTC303 **Maximum Points: 100**

Course Name: Basics of Surveying **Semester: III**

Notes:

1. There are **TOTAL SEVEN MAIN** questions, each of **20 points**.
2. **QUESTION 1 is COMPULSORY. Solve any FOUR from remaining SIX QUESTIONS.**
3. Write **answer to each MAIN QUESTION on a new page.**
4. Answers to be accompanied with **appropriate sketches/facts & figures/table or cbart/graph/diagram/flowchart** wherever necessary or required.
5. Assume suitable data wherever needed and state it clearly.

Q. No.	Questions	Points	CO	BL	PI
1	**Answer the following:** 1. Enlist and explain the function of each of the instruments / accessories required for plane table surveying. (4) 2. Define the terms: Consecutive coordinates and Independent coordinates. (4) 3. Explain the use of Gale's Traverse table. (2) Draw the Gales traverse table and show all the columns. (2) 4 State the trapezoidal formula and prismoidal formula for volume computation and compare. (4) 5. Describe the temporary adjustments of a theodolite. (4)	20	1,2,3,4	1,2,3	1.1
2.A	Following are the observed magnetic bearings of the traverse legs: *Line* | *PQ* | *QR* | *RS* | *SP* F.B. | 124°30' | 68°15' | 310°30' | 200°15' B.B. | 304°30' | 246°00' | 135°15' | 17°45' Is there any local attraction? If so, determine the stations where local attraction is suspected. (2) Determine the correct bearings. (6) Calculate the included angles. (4) Draw the actual and corrected traverse. (2)	14	2	3,4,5	1.1 2.1
2.B	Describe in detail with neat sketch the method of plotting contour by taking spot levels in the field.	06	2	1,2,3,4	1.1
3.A	Describe with neat sketch the procedure measure the following angles with theodolite: (5 points each) i. Deflection angle ii. Interior angle	10	2	1,2,3	1.1
3.B	Explain, with the help of a neat sketch, the working of a digital roller planimeter for determining the area of a plan. (6) State other types of planimeter available in the market. (2) State the accuracy level of a planimeter and on the factors on which it depends. (2)	10	2	1,2,3	5.1

<table>
<tr><td>4.A</td><td>Describe the methods of reducing the levels, and their relative advantage and disadvantage. (4)
To ascertain the level difference between A nd B, differential levelling was performed from A to B, and extended to C which is bench mark (BM) having reduced level (RL) of 95.75m. The observations were recorded in the level book as given below. Fill the level field book. (8)
<table>
<tr><th>Point</th><th>B.S.
m</th><th>I.S.
m</th><th>F.S
m.</th><th>Rise
m</th><th>Fall
m</th><th>R.L.
m</th><th>Remarks</th></tr>
<tr><td>1</td><td>1.195</td><td></td><td></td><td></td><td></td><td></td><td>A</td></tr>
<tr><td>2</td><td>0.445</td><td></td><td>2.375</td><td></td><td></td><td></td><td></td></tr>
<tr><td>3</td><td>2.150</td><td></td><td>1.000</td><td></td><td></td><td></td><td></td></tr>
<tr><td>4</td><td></td><td>0.720</td><td></td><td></td><td></td><td></td><td>B</td></tr>
<tr><td>5</td><td>1.465</td><td></td><td>0.260</td><td></td><td></td><td></td><td></td></tr>
<tr><td>6</td><td>2.630</td><td></td><td>0.905</td><td></td><td></td><td></td><td></td></tr>
<tr><td>7</td><td>2.140</td><td></td><td>0.975</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>1.305</td><td></td><td></td><td>95.75</td><td>C</td></tr>
<tr><td colspan="8">Arith. Check:</td></tr>
</table></td><td>12</td><td>1,2,3</td><td>3,4,5</td><td>1.1
2.1</td></tr>
<tr><td>4.B</td><td>Explain with neat sketch: (2 points each)
i. Contour interval
ii. Horizontal equivalent
Differentiate between direct and indirect methods of contouring. (4)</td><td>08</td><td>2</td><td>1,2,3,4</td><td>1.1</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>5.A</td><td>The perpendicular offsets taken at 10m intervals from a survey line to an irregular boundary line are as follows:
2.95m, 5.70m, 4.00m, 6.35m, 8.25m, 6.00m, 3.30m, 4.85m, 5.70m.
Calculate the area included between the survey line, the irregular boundary line, and the first and last offsets by
1 Average ordinate rule (2)
2 Trapezoidal rule (3)
3 Simpson's rule (3)
Compare these 3 methods and derive your conclusion from the areas calculated. (2)</td><td>10</td><td>1,2,4</td><td>3,4,5</td><td>1.1
2.1</td></tr>
<tr><td>5.B</td><td>Define 'Resection'. (2)
State where these methods can be adopted: (2)
i. Resection by back sighting
ii. Resection by compass
Explain the two point problem in detail with neat sketch. (6)</td><td>10</td><td>2</td><td>1,2,3</td><td>1.1</td></tr>
<tr><td>6.A</td><td>Following data pertains to a theodolite traverse ABCDEA.
<table>
<tr><th>Line</th><th>Length (m)</th><th>W.C.B</th><th>Included angle</th></tr>
<tr><td>AB</td><td>186</td><td>30°25'</td><td>Angle B = 82°12'</td></tr>
<tr><td>BC</td><td>164</td><td>128°13'</td><td>Angle C = 137°02'</td></tr>
<tr><td>CD</td><td>303</td><td>171°11'</td><td>Angle D = 73°46'</td></tr>
<tr><td>DE</td><td>162</td><td>277°25'</td><td>Angle E = 128°38'</td></tr>
<tr><td>EA</td><td>240</td><td>328°47'</td><td>Angle A = 118°22'</td></tr>
</table>
Calculate:
a. Consecutive coordinates (5)
b. Closing error (3)
c. Corrections to the consecutive coordinates by Bowditch's rule (5)
d. Corrected Consecutive Coordinates (2)</td><td>15</td><td>1,2,3</td><td>3,4,5</td><td>1.1
2.1</td></tr>
</table>

6.B	Explain 'Omitted Measurements'.(2) Explain the case of 'Omitted measurements are in one side – *length and bearing of a side unknown*'. (3)	**05**	**1,3,4**	**3,4**	**1.1**
7	Explain in brief: 1. Sources of errors and precautions in a compass survey. (4) 2. Types of errors in levelling. (6) 3. Errors in theodolite survey. (6) 4. Plane table testing and adjustment. (4)	**20**	**2,3,4**	**1,2,3**	**1.1**

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END SEMESTER EXAMINATION-FEB-2023

Program: Civil Engineering S.Y. B.Tech Civil Sem IV 3/3/23 **Duration: 3.00 hrs.**

Course Code: ES-BTC-304 **Maximum Points: 100**

Course Name: Building Drawing with CAD **Semester: III**

Notes:

1. Q.1 is compulsory & attempts any four out of remaining six.
2. Illustrate answer with neat sketches wherever required.
3. Make suitable assumptions where necessary and state them clearly.

Q.No.	Questions	Marks	BL	CO	PO	PI Code
1.	A) Draw to a suitable scale developed plan for ground floor of G+1 storey bungalow for an Executive Engineer in a site of the data given below. 1. Plot size: 20M x 25M. (FSI: 1.2) 2. Road is on south side parallel to 20 M direction 3. Wind direction is E-SW-W & climatic zone is cold 4. Requirements of Engineer a. Office room b. Master bed room c. Living room d. Children bed room e. Kitchen cum dining room f. Guest bed room g. Staircase/bath/WC/store/verandah are to be provided B) Draw line plan of terrace plan for above question	15+05	L4	1-5	1/3/5	1.3.1/5.3.2/ 3.4.1
2	A. Draw to a suitable scale line plan of first floor for Q.1A. B. State: Built up area, carpet area, super built up area, FSI for Q.1A.	15+05	L2	1-5	1/5	1.3.1/5.3.2/
3	A. Draw to a suitable scale line plan of public building in a site given below 1. Hostel (30m x 50m) – Roll No. 1-10 & 51-60 2. School (2 guntha land)– Roll No. 11-20 & 61-70 3. Market Building (20 acre) – Roll No.21-30 4. Bank (2500 sq.ft)- Roll No.31-40 5. Auditorium (2000 sq.ft)- Roll No.41-50.	20	L3	2-5	1,2	1.3.1/5.3.2/ 3.4.1
4	A. Explain the duties & responsibilities of Contractor/Builder & buyer under Real estate regulation act, 2016. B. Explain how Circulation and Prospect is to be maintained in a planning of residential building as per National Building Code.	10+10	L2	2	1/3	1.3.1/3.1.4

5	A. Explain Perspective Drawing and its types. B. Explain how to fix a height of building and byelaws for Frontage. OR A. Draw a sectional elevational plan for Q.1A	10+10	L2/3	2-5	1/3/5	1.3.1/5.3.2 3.4.1
6	A. Draw to a suitable scale Foundation plan for Q.1A. B. Draw to a suitable scale site plan for Q.1A.	15+05	L3	1-3	1/3/5	1.3.1/5.3.2 3.4.1
7	A. Draw to a suitable scale Water supply & Drainage plan for Q.1A. B. Draw to a suitable scale Electricity& Furniture plan for Q.1A.	10+10	L3	1-3	1/3/5	1.3.1/5.3.2 3.4.1

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End Semester Examinations: February 2023

(2022-23)

Program: SYC Sem-III 6/3/23

Course Code: BS -BTC 305

Course Name: Engineering Geology

Duration: 3 Hrs.

Maximum Points: 100

Notes:

- Question No. 1 is compulsory
- Solve any four out of remaining 5 questions
- Answer to all sub questions should be grouped together.
- Figure to right indicates full marks.
- Draw labeled diagram whenever necessary
- Submit the answer sheet as per the guidelines by the examination section

		Points	CO	BL	PI
Q.1a	Write the identifying properties and economic use of the following minerals	10	3	2	1.2.1
(i)	Pyrite				
(ii)	Gypsum				
(iii)	Quartz				
(iv)	Muscovite				
(v)	Diamond				
Q.1b	Explain with labelled diagram	10	2,3	2	
(i)	Types of folds				
(ii)	Dip and strike				
(iii)	Angular unconformity				
(iv)	Seismic waves				
(v)	Sill and Dyke				
Q.2(a)	Explain theory of plate tectonics with suitable diagram.	10	1	2	1.2.1
(b)	What is weathering? Explain Chemical weathering and its engineering consideration.	10	2	2	
Q.3(a)	Explain mineralogical and textural classification of igneous rocks	10	3	3	1.2.1
(b)	What are the agent of metamorphism? Describe Dynamic metamorphism in detail.	10	3	3	
Q.4(a)	What are Folds? Explain classification of folds on the basis of position Plane	10	4	3	1.2.1
(b)	What are confined and unconfined aquifer? Explain cone of depression ground water.	10	6	2	
Q.5(a)	Describe the geological conditions for site selection of dam and explain how Geological structures create favorable and unfavorable conditions at a dam site?	10	5	3	1.2.1
(b)	Define RQD and Core Recovery, Calculate RQD and Core Recovery from the given data and comment on the suitability of rocks for foundation purpose. Total run 2m.	10	4	4	

Sample No.	Length of the core in cms	Nature of the lower end of the core sampl	Sample No.	Length of the core in cms	Nature of the lower end of the core sample
a	12	N	i	26	N
b	16	N	j	10	N
c	11	N	k	17	N
d	09	M	l	18	N
e	9	N	m	8	M
f	02	N	n	10	N
g	12	N	o	09	N
h	16	N	p	05	N

Q.6	Write short notes on any four of the following-	20	3,4,6,7	2	1.2.1
(i)	Types and causes of landslide				
(ii)	Aquifer				
(iii)	Normal fault				
(iv)	Products of volcano				
(v)	Cause of earthquake				
(vi)	Pedestal Rock				

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Sardar Patel College of Engineering

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End Semester Examinations March 2023 8/3/23

Program: Civil Engineering S. Y. (C) Sem III **Duration: 3hr**

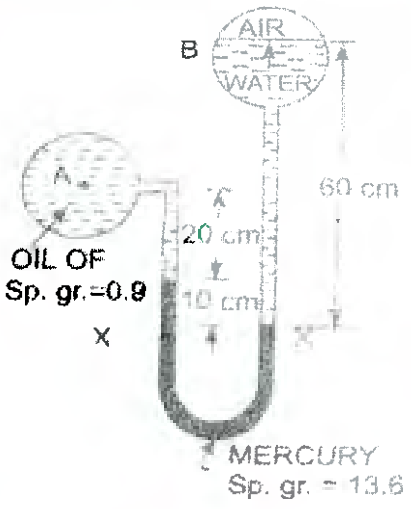
Course Code: PC-BTC306 **Maximum Points:100**

Course Name: Fluid Mechanics **Semester: III**

Instructions

1. **Question No. 1 is compulsory; attempt any 4 questions out of remaining 6 questions.**
2. Neat diagrams must be drawn wherever necessary.
3. Assume Suitable data if necessary and state it clearly.

Q. No.	Questions	Points	CO	BL	PI
1a	A space between two square flat parallel plate is filled with oil.	6	CO1	BL3	2.3.1
	Each side of the plate is 720 mm. The thickness of the oil film is 15 mm. The upper plate which moves at 3 m/s requires a force of 120 N to maintain the speed. Determine: (i) The dynamic viscosity of the oil (ii) The kinematic viscosity of the oil, if G=0.95				
1b	Prove that equipotential lines are orthogonal to stream lines at all points of intersection.	5	CO1	BL1	1.3.1
1c	Discuss laminar boundary layer, turbulent boundary layer and laminar sub-layer	6	CO3	BL3	1.2.1
1d	Compare venturimeter & orifice meter	3	CO1	BL3	1.2.1
2a	A differential manometer is connected at the two points A and B as shown in figure below.	6	CO1	BL3	1.3.1
	At B air pressure is 9.81 N/cm2 (abs) find absolute pressure at A.				



2b	State and explain Newton's law of viscosity and derive the equation for the same	6	CO1	BL2	1.2.1
2c	Derive Euler's equation of motion along streamline.	8	CO1	BL2	1.2.1
3a	The velocity vector in a fluid flow is given $V = 4x^3i - 10x^2yj + 2tk$ Find the velocity and acceleration of a particle at (2,1,3) at time t=1	8	CO3	BL2	1.2.1
3b	Explain in detail classification of fluids.	8	CO2	BL4	2.4.1
3c	Write short note on Pitot tube.	4	CO2	BL1	1.2.1
4a	The velocity component in a 2-D flow field for an incompressible fluid is expressed as follows $u = \frac{y^3}{3} + 2x - x^2y, \quad v = xy^2 - 2y - \frac{x^3}{3}$ Check whether the velocity potential exists or not? If exists obtain an expression for velocity potential Φ.	8	CO2	BL4	1.4.1
4b	Find the total pressure and position of center of pressure on a triangular plate. Base 2m and height 3m which is immersed in water in such a way that the plane of the plate makes an angle of 60 degrees with the free surface of the water. The base of the plate is parallel to the water surface and at a depth of 2.5 m from water surface.	7	CO1	BL3	
4c	Define coefficient of discharge, coefficient of velocity and coefficient of contraction and derive relation between them	5	CO2	BL2	1.2.1
5a	A solid cylinder having specific gravity G= 0.7 having diameter 1m and height as 1m floats in fresh water with its axis vertical. Determine the metacentric height and state the condition of its equilibrium.	7	CO1	BL3	1.4.1
5b	Discuss Reynold's number and critical Reynold's number.	5	CO1	BL2	1.2.1
5c	Discuss the methods of preventing the separation of boundary layer.	8	CO3	BL2	1.3.1
6a	Prove that pressure gradient in the direction of flow is equal to the shear gradient in the direction normal to the direction of flow.	8	CO1	BL2	1.3.1
6b	The water is flowing through the pipe. Having diameter 20 cm and 10 cm at section 1 and section 2 respectively. The rate of flow through pipe is 35 lit/sec. The section 1 is 6m above datum and section 2 is 4m above the datum, If the pressure at section 1 is 39.24N/cm^2, find intensity of pressure at section 2.	8	CO2	BL3	1.4.1
6c	Discuss the variation of viscosity with the temperature.	4	CO1	BL2	2.1.2

7a	Discuss the characteristics of turbulent flow.	6	CO1	BL2	2.1.2
7b	Discuss with diagram stream tube, stream line and streak line.	6	CO1	BL2	2.1.2
7c	A 25 mm diameter nozzle discharges 0.76 m3 of water/minute when the head is 60m.	8	CO2	BL3	1.4.1
	The diameter of the jet is 22.5 mm. Determine (i) The values of C_C, C_d and C_v (ii) The loss of head due to fluid resistance.  				

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SY-CIVIL, END SEMESTER EXAMINATION MARCH 2023

Program: B.Tech. Civil Engineering S. Y. B. Tech (Civil) **Duration: Three hours**

Course Code: PC-BTC307 Sem III 10/3/23 **Maximum Points: 100**

Course Name: Building Materials and Construction **Semester: III**

Instructions:

1. Attempt any five out of seven Questions
2. Draw neat diagrams wherever required
3. Assume suitable data if necessary and state them clearly.

Q. No.	Questions	Points	CO	BL	PI
1					
a	What are the qualities of good Timber?	08	1	1	2.3.2
b	Draw neat sketch of Arch; label various components and discuss their functions.	07	1	2	1.3.1
c	Differentiate between Hydraulic and Non-hydraulic lime	05	3	2	2.3.1
2.					
a	Explain the process of natural seasoning of Timber.	08	2	1	1.3.1
b	What are the properties of aggregates to be tested to find their suitability in construction?	07	3	3	2.3.2
c	State the importance of Alkali silica reaction?	05	2	1	1.2.1
3					
a	Why dressing of stone is required? Explain any four types of dressing with neat sketches.	10	2	2	1.2.1
b	What are the constituents of paint, explain in brief?	06	1	1	1.3.1
c	Explain in brief about any sustainable construction materials you have learned with their applications.	04	1	3	1.2.1
4					
a	What are the good qualities of clay burnt bricks?	08	1	1	2.3.2
b	What are the different types of materials used for the construction of partition wall?	06	1	1	1.3.1
c	Draw neat sketch of dead shore and explain different components.	08	4	2	2.3.1
5	What are the requirement of good foundation? Highlight	08	2	1	1.2.1
a	the importance of geotechnical investigation.				
b.	What is underpinning? Explain any one method in detail with its suitability.	07	4	2	2.3.1
c.	Explain advantages of AsCu treatment.	05	2	2	1.3.1

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SY-CIVIL, END SEMESTER EXAMINATION MARCH 2023

6					
a.	State the advantages and disadvantages of Cavity wall.	08	2	2	2.3.1
b.	Differentiate between Plastering and Pointing	04	2	2	1.2.1
c.	Explain different types of formwork used in construction.	08	3	1	1.1.2
7	***Write short Notes on (Any four)***				
a	Causes of dampness	05	1	3	1.3.1
b	Safe bearing capacity	05	1	1	1.3.1
c	Preservation of Stone	05	2	2	1.3.1
d	Block board and laminates	05	1	2	1.3.1
e	Types of defects in bricks	05	2	2	1.3.1
f	Discuss any two Special mortars	05	2	2	1.3.1