SARDAR PATEL COLLAGE OF ENGINEERING
[An Autonomous Institution Affiliated to University of Mumbai]

Class: S.E (CIVIL) [Sem. III]
Subject: Fluid Mechanics-I

Exam: KT-EXAM

Marks: 100 [3 hours]

Instruction:

DATE:
MASTER FILE.

1. Question no 1 is compulsory & attempt any four out of remaining six questions
2. Illustrate answer with neat sketches wherever required.
3. Make suitable assumptions where necessary and state them clearly

Marks/Module No./Co

Q.1 Write a short note on the following Terms (any Four)   [20/All/]

a) Vapour pressure   b) Capillary action

c) Buoyancy & floatation   d) Nozzle meter

e) Absolute, guage & atmosphere pressure   f) Boarda's Mouthpiece

Q.2 a) Derive expression for total pressure & Centre of pressure when it act

under fully submerged conditions.

b) Write short on: stable, unstable & Neutral equilibrium

c) State & Prove Pascal law when fluid is at rest.   (6/2/)

Q.3. a) A water flows through pipe AB 1.2 m diameter at 2.0 m/sec & then pass through a pipe BC 1.5 m diameter. At c, the pipe branches into CD & CE. The branch CD is 0.8 m diameter & carries one-third flow in AB. The flow velocity in branch CE is 2.0 m/sec. find the volume rate of flow in AB & also velocity in BC & CD?

b) Derive an expression for Eulers's equation of motion for fluids.   (8/3/)

c) Explain the Metacentre & Metacentric Height.   (6/3/)

Q.4. a) Explain the different hydraulic coefficient used in flow measurement with their values   (10/4/2)

b) Explain Rectangular Notch used for flow measurement

c) What are the advantages of triangular notch over the rectangular notch?   (5/4/~)

Q.5. a) Explain a Source & Sink in Uniform flow. (flow past Rankine oval). Also obtain expression for
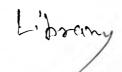
Following terms: (12/5/2)

i.   Stream & Velocity potential function.
ii.   Location of stagnation point.
iii.   Distance of the surface of the body from origin. (r)
iv   Length & Width of Rankine oval.

b) Discuss the following cases of ideal flow with their equation of stream & velocity potential

function.   A) Uniform Flow   B) sink flow   (8/5/2)

Q.6. a) Derive an expression for Hydraulic Coef. for external orifices   (8/6/~)

b) A 4.5 cm diameter orifice in the vertical side of the tank discharges water the wa...

the tank is at constant level of 2.5 m above the centre of orifice. A fluid ...

cm at its vena-contracta. The measured discharge is 8.5 lit/sec. determine C_v, C_c & ... for the

orifice?   (6/6/1&2)

c) Derive the discharge equation for Triangular weir?   (6/6/1&2)

Q.7 A) A rectangular tank 2.5 m wide, 4.0 m long & 2.4 m deep contains water to depth of 4 m ...
the horizontal acceleration which may be imparted to the tank in the direction of its length so that (a)
there is no spilling of water from the tank (b) the front bottom corner of the tank is just exposed (c) the
bottom of tank is exposed upto its mid-point. Calculate the volume of water that would spill out from
the tank in case of (b) & (c) Also calculate the total forces on each end of the tank in each of the ...
& show that difference between the forces equals the unbalanced force necessary to ...
liquid mass in the tank.   (12/7/&2)

B) A closed rectangular tank 1.4 m high, 3.0 m long & 1.5 m wide is two third full gasoline
(sp.gravity 0.8). Calculate the acceleration which may be imparted to the tank so that bottom front end
of the tank is just exposed. Also calculate the total forces on each end of the tank & show that
difference between the forces equals the unbalanced force necessary to accelerate the liquid mass in
the tank.   (8/7/1&2)

Bharatiya Vidya Bhavan's

Sardar Patel College of Engineering

(A Government Aided Autonomous Institute)
Munshi Nagar, Andheri (West), Mumbai – 400058.

End Semester Re-Examination
June 2017

Max. Marks: *100*

Class: *S.Y. Civil, Semester: III*   Program: *U.G. (B. Tech. Civil)*

Name of the Course: ***Engineering Geology***   Course Code : ***BTC205***

MASTER FILE.

Instructions:

1. Question *No.1 is compulsory*
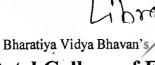2. Attempt *Any Four out of remaining* questions
3. Answer to each question to be started on the fresh page
4. Draw neat diagrams wherever necessary.

Q. No.	Questions	Max. Marks	Course Outcome Number	Module No.
Q.1A	With the help of seismic waves explain the internal structure of the earth with proper diagrams.	10	02	01
Q.1B	List down the preliminary geological investigations to be carried out during the selection of Tunnel site.	05	02	07
Q.1C	What is remote sensing? Write down the application of remote sensing in civil engineering.	05	02	05
Q.2A	With respect to the study of earthquakes, define the following terms: 1.Focus 2.Epicenter	04	01	01
Q.2B	What is Geological Time Scale? Explain it with diagram.	08	01	04
Q.2C (i)	What is unconformity? Write down types of unconformities with diagram. **OR**	08	02	04
Q.2C (ii)	List the geological problems that can cause failure of a Reservoir. Mention the solutions on it.	08	02	06
Q.3A	What is Fold? Write detail note on parts of folds and its classification with diagrams.	10	01	04
Q.3B	What is mineral? Explain five physical properties of minerals.	06	01	02
Q.3C	**Define the following:** 1.fossil 2.Weathering	04	01	04,01
Q.4A	Write a note on physiographical divisions of India with diagram.	05	01	04

Q.4B	Define igneous rock and write down its structures with diagrams.	10	02	03
Q.4C	Distinguish between normal fault and reverse fault. Draw diagrams	05	01	04
Q.5A	**Define and draw the following terms:** 1. Water table 2.Confined Aquifer 3.Unconfined Aquifer 4.Cone of Depression 5.Pearched Aquifer	10	01	06
Q.5B	What are the precautionary measures we can take for landslides?	04	03	07
Q.5C	What is sedimentary rock? Explain its four types of structures with diagram.	06	01	03
Q.6A	Explain four types of Aquifers with suitable diagram.	06	01	06
Q.6B	Write down three site improvement methods/treatments given to the structurally affected rocks.	06	03	07
Q.6C	Describe Wenner method used in resistivity survey. State any two uses of resistivity survey.	08	02	05
Q.7A	Define dam and its parts. Classify dams with diagram	10	02	06
Q.7B	Explain the erosional and depositional features formed by the action of river.	10	01	01

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RE EXAM

JUNE 2017

Program: Civil Engineering

S.E. Duration: 3 hr
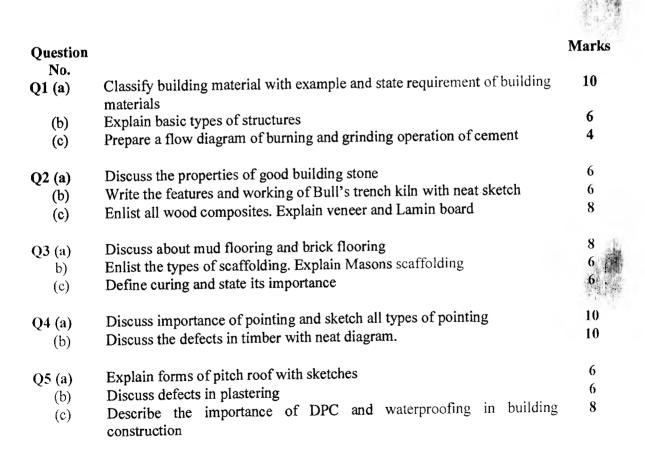
Course code: CE 204 Maximum Marks: 100

Name of the Course: Building Materials & Construction   Semester: III
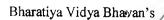
MASTER FILE.

Instructions:

1. Attempt any five questions out of seven.
2. Neat diagrams must be drawn wherever necessary.
3. Figures to the right side indicate full marks.
4. Assume Suitable data if necessary and state it clearly

Question No.		Marks
Q1 (a)	Classify building material with example and state requirement of building materials	10
(b)	Explain basic types of structures	6
(c)	Prepare a flow diagram of burning and grinding operation of cement	4
Q2 (a)	Discuss the properties of good building stone	6
(b)	Write the features and working of Bull's trench kiln with neat sketch	6
(c)	Enlist all wood composites. Explain veneer and Lamin board	8
Q3 (a)	Discuss about mud flooring and brick flooring	8
b)	Enlist the types of scaffolding. Explain Masons scaffolding	6
(c)	Define curing and state its importance	6
Q4 (a)	Discuss importance of pointing and sketch all types of pointing	10
(b)	Discuss the defects in timber with neat diagram.	10
Q5 (a)	Explain forms of pitch roof with sketches	6
(b)	Discuss defects in plastering	6
(c)	Describe the importance of DPC and waterproofing in building construction	8

Q6 (a) Describe the importance of concrete blocks in masonry construction   6

   (b) Enlist the types of glass along with their properties   8

   (c) Discuss about slip form shuttering   6

Q7 (a) Describe in detail the different services required for a building.   10

   (b) Explain   10

       i. Thermal and sound insulating materials.

      ii. varnishes

     iii. Structural clay product

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RE-EXAM.

JUNE 2017

Program: Civil Engineering

S.Y. B. Tech.   Duration: 3 hr

Course code: BTC 206   **Maximum Marks: 100**

Name of the Course: Building Construction   Semester: III

MASTER FILE.

Instructions:
1. **Attempt any 5 questions**
2. **Neat diagrams must be drawn wherever necessary.**
3. **Figures to the right side indicate full marks.**
4. **Assume Suitable data if necessary and state it clearly**

Question No.		Maximum Marks	Course Outcome Number	Module No.
Q1 (a)	Classify the building on the type of the building and discuss it.	10	CO1	1
(b)	Describe foundations in special conditions	10	CO1	2
Q2 (a)	Differentiate stone and brick masonry	6	CO1	2
(b)	Describe with help of sketches various forms of stone brick composite masonry	10	CO1	2
(c)	Describe the importance of circulation in buildings	4	CO1	3
Q3 (a)	Draw neat and labeled sketch of Flemish bond	5	CO1	2
(b)	Define shuttering and discuss requirements of good shuttering	10	CO1	5
(c)	Explain Mud flooring	5	CO1	4
Q4 (a)	Sketch partly glazed and partly paneled double leaf door.	7	CO1	3
(b)	Discuss the fire hazards	8	CO3	6
(c)	Define the following terms regarding stairs i) Scotia ii) Soffit iii) Baluster iv) Hand rail v) Nosing	5	CO1	3
Q5 (a)	Describe the importance of DPC and waterproofing in building construction	8	CO3	6
(b)	State the water requirements of building other than residential building	7	CO1	6

(c)	Discuss green building along with its advantages	5	CO1	7
Q6 (a)	Discuss the requirements of good stair	8	CO3	3
(b)	Draw neat and labeled sketch of Queen post roof truss.	8	CO1	4
(c)	Discuss defects in plastering	4	CO1	3
Q7 (a)	Discuss the advantages of acoustical treatment in building	8	CO2	6
(b)	Discuss about the components of buildings	6	CO1	1
(c)	Explain water supply service connection with help of sketch	6	CO1	6

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END SEMESTER EXAMINATION

June 2017

RE-EXAM

Program:B.Tech

Program: Civil Engineering

Course code: BTC 204

Name of the Course: Engineering Materials

Date:1 July 2017

Duration: 3hr

Maximum Marks: 100

Semester: III

MASTER FILE

Instructions:

1.Question no. 1 is compulsory
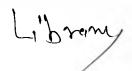
2.Attempt any FOUR questions out of remaining SIX.

3. ANSWER THE QUESTIONS POINT-WISE.

4.Draw neat sketches wherever necessary

5.Assume suitable data if necessary

Question No.	Question	Maximum Marks	Course Outcome Number	Module No.
Q.1.				
A	Describe any five physical properties of building material. Also, write their significances of each property.	10	CO1	1
B	Write down characteristics behavior of building materials under stress. Explain all of them with suitable examples.	10	CO2	1
Q.2.				
A	Which properties of stones should be looked before selecting them for engineering work? Explain all of them.	10	CO2	2
B	What are ingredients of good brick earth. In what proportion they should be added to prepare standard brick. Also, write function of each ingredient.	10	CO1	2
Q.3.				
A	Describe and explain Bouge's compound.	8	CO2	3
B	I. Match appropriate pair for the following;	12	CO1	3

	List I	**List II**			
	No fine concrete	Repair of bridges			
	Self-compacting concrete	Vicat's plunger			
	Caustic lime	Dams			
	Rapid hardening cement	Fibre Reinforced Cement			
	Consistency test of cement	High powder component			
	Low heat cement	Quick lime			
	II. What are good properties of mortar mix.				
Q.4.					
A	What are roofing tiles and state its desirable properties.		8	CO1	4
B	Explain preparation of cement concrete.		12	CO2	4
Q.5.					
A	I. Explain defects in timber. II. Write properties and uses of cast iron.		12	CO1	5
B	Write about injection moulding and fibre reinforced plastic.		8	CO2	5
Q.6.					
A	Distinguish between asphalt, bitumen and tar.		10	CO1	6
B	What are essential constituents of paint. Explain all of them.		10	CO2	6
Q.7.					
A	I. What is Linoleum. Write its properties and uses. II. Write applications of Geosynthectics.		10	CO1	7
B	I. What are advantages and disadvantages of adhesives. II. Write uses and examples of water proof and damp proof materials.		10	CO2	7

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End Semester Re-Exam, June-2017

Q. P. Code:
Duration: 3 hour

Max. Marks: 100

Class: S.Y.B.Tech.   Semester: III   Program: Civil

Name of the Course: Surveying-I   Course Code : ETC-202

Instructions:

1. Question No 1 is compulsory.
2. Attempt any four questions out of remaining six.
3. Draw neat diagrams
4. Assume suitable data if necessary

Question No		Maximum Marks	Course Outcome Number	Mod. No.
Q1	(a) What do you mean Reciprocal ranging?	05	C.O.1	7
	(b) Explain Back Ray Method in Plane Tabling.	05	C.O.1	7
	(c) Explain the procedure for the construction of plain scale.	05	C.O.1	1
	(d) Discuss curvature correction in Levelling.	05	C.O.3	3
Q2	(a) Describe with neat sketch the method of differential levelling in detail.	10	C.O.3	3
	(b) Determine the area of zero circle from following: Length of anchor arm = 15.61 cm; Length of tracing arm = 3.35 cm; Distance between pivot and wheel = 3 cm, Assume when the wheel is inside the pivot and tracing point.	10	C.O.1	5
Q3	(a) Balance the table using Bowditch rule for a closed traverse ABCDEA from the following observations:	10	C.O.3	6
	(b) How will you measure Sensitivity of bubble tube?	05	C.O.1	3
	(c) Distinguish between plain and geodetic surveying.	05	C.O.1	1

Q3 (a) table:

Line	AB	BC	CD	DE	EA
Length	247	184	251	178	152
Bearing	64^0	125^0	228^0	265^0	315^0

Q4	**(a)** The following is the page of a level field book. Determine the reduced levels of different points. Also apply usual checks. Use any method.	**10**	C.O.3 3

Sl. No	B.S.	I.S.	F.S.	HI	Rise	Fall	R.L.	Remark
1	0.375						200.00	B.M.
2		1.265						
3			1.125					
4	0.845		1.765					
5		1.880						
6	0.435		0.680					
7		2.815						
8	2.615		2.220					
9			1.090					

(b) Explain in detail reiteration method with neat sketch and observation table.   **10**   C.O.1   6

Q5

(a) The following bearings were observed from a closed traverse PQRSP.   **08**   C.O.1   3
Find (i) Corrected angles (ii) Corrected bearings

Line	Fore bearing	Back bearing
PQ	$31^0\ 20'$	$213^0\ 20'$
QR	$122^0\ 40'$	$301^0\ 25'$
RS	$187^0\ 20'$	$07^0\ 20'$
SP	$294^0\ 20'$	$113^0\ 20'$

(b) Explain the radiation method of plane table survey   **06**   C.O.3   7
(c) Describe process of interpolation of contour by graphical method.   **06**   C.O.3   4

Q6

(a) Explain the procedure for ranging of line using Theodolite.   **06**   C.O.1   6

(b) The offset taken from a survey line to a boundary are given below. Find the area by Trapezoidal rule and Simpson's rule.   **06**   C.O.3   5

Chainage (m)	0	20	40	60	80	100	120
Offset (m)	2.54	2.17	3.58	4.25	3.45	2.98	3.17

(c) Explain types of vernier scale?   **08**   C.O.1   2

Q7

Write short notes on any four   **20**
(i) Fundamental lines of theodolite   C.O.1   3
(ii) Types of declination   C.O.1   2
(iii) stepping method of sloping distance   C.O.1   1
(iv) Characteristics of contour   C.O.1   4
(v) Refraction correction   C.O.1   6
(vi) correction to chain length   C.O.1   2

Re-Exam - June 2017

Program: 2nd Yr B.Tech

Program : Civil Engineering

Course code : BTC203

Name of the Course : Strength Of Material

Date : 30/06/2017

Duration : 3 hrs

Maximum Marks :100

Semester : III

MASTER FILE

Instructions:

1. Attempt any FIVE questions out of SEVEN questions
2. Answer to sub questions must be grouped together
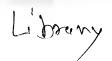3. Assume suitable data wherever required and mention it clearly

Question No		Maximum Marks	CO No.	Module No.
Q1 (a)	Draw SF and BM diagrams for beam under loading as shown below . Indicate and locate all salient points on beam.	15	01	01
(b)	Draw stress-strain curve for mild steel and indicate (a) Elastic Limit (b) Yield stress (c) Ultimate stress (d) Breaking point (e) Strain hardening region.	05	01	01
Q2. (a)	A member ABCDE of varying circular cross-section is subjected to axial loads at different locations as shown in fig. Determine a) the force P for the equilibrium of the member b) the total change in the length of the member. Take $E = 2 \times 10^5$ N / mm2	10	02	02

(b)	A flat steel bar of aluminium alloy 24 mm wide and 6 mm thick is placed between two steel bars rach 24 mm wide and 9 mm thick to form a composite bar 24 mm x 24 mm as shown. The three bars are fastened together at either ends when the temperature is 10^0C .Find the stress in each of the materials when the temperature of the whole assembly is raised to 50^0C	10	02	02

Q3.(a)	Thin closed cylindrical shell of diameter 1200 mm , thickness 12 mm, length 2 m , is filled with a fluid at a pressure 1.5 N/mm². Modulus of elasticity (E) = 2 x 10^5N/mm², poissons ratio (1/m) = 0.3 Calculate (a) Circumferential stress (b) Longitudinal stress (c) Change in diameter (d) Change in length	10	02	02
(b)	The cross section of a beam is shown below.If the tensile stress is not to exceed 90 MPa and compressive stress is not to exceed 120MPa. What is the maximum intensity of UDL the beam can carry over a simply supported span of 5m ?	10	02	03

Q4. (a)	Plot the shear stress variation across the cross section given in question 3.b where shear force is 50 kN.	10	02	04
(b)	Determine the diameter of the shaft which will transmit 100 kW at 180 rpm. Also determine the length of shaft if the twist must not exceed 10° over the entire length. The maximum shear stress is limited to 70 N/mm². Take the value of modulus of rigidity as 8 x 10^4 N/mm².	10	02	04

Q5.(a)	A point in a strained material is subjected to stresses as shown, Using Mohr's circle method calculate the value of normal, tangential and resultant value of stresses acting at the plane AC shown, Also calculate the value of major, minor principal stresses and orientation. Sketch the stresses on properly oriented planes.	12	02	06
(b)	A T-section has a flange 200 mm wide, 30 mm thick and a web of 160 mm depth and 30 mm thickness .Determine the area of kernel for given section	08	02	05
Q6. (a)	A masonary chimney 24 m high of uniform circular cross section, 3.5 m external diameter and 2 m internal diameter is subjected to a horizontal wind pressure of 1 kN/Sq.m of projected area . Find the maximum and minimum stress intensities at the base , if the specific weight of masonry is 22 kN/Cu.m	10	02	05
(b)	Derive the Simple Bending Theory equation in detail	10	02	03
Q7. (a)	Locate shear centre for the given section. All dimensions in mm	10	02	04
(b)	Determine the maximum deflection and slope at A and B for the beam shown below	10	03	07

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Re-Examination
June 2017

Maximum Marks: **100**   Duration: **3 hours**
Class: **S.Y.B.Tech**   Semester: **III**   Program: **Civil Engineering**
Name of the Course: **Engineering Mathematics III**   Course Code : BTC201

Instructions:

- Attempt any FIVE questions out of SEVEN questions.
- Answers to all sub questions should be grouped together.

Q		Marks	CO	Module
1(a)	Obtain Half Range Fourier Sine Series of $f(x) = x(2-x),\ 0 < x < 2$	6	2	3
(b)	Evaluate $L^{-1}\left\{\dfrac{s+1}{s^2(s-2)}\right\}$	6	1	2
(c)	Verify Cayley Hamilton Theorem for $A = \begin{bmatrix} 2 & 3 & -4 \\ -1 & -2 & -1 \\ 1 & 0 & 1 \end{bmatrix}$	8	3	6
2 (a)	Determine constants α, β, γ if $A = \begin{bmatrix} 0 & 2\beta & \gamma \\ \alpha & \beta & -\gamma \\ \alpha & -\beta & \gamma \end{bmatrix}$ is orthogonal.	6	3	6
(b)	If $\displaystyle\int_0^\infty e^{-2t}\sin(t+\alpha)\cdot\cos(t-\alpha)\,dt = \dfrac{3}{8}$, find the value of α (Use Laplace Transforms)	6	1	1
(c)	Verify Gauss Divergence Theorem for $\overline{F} = (x^2 - yz)\hat{i} + (y^2 - xz)\hat{j} + (z^2 - xy)\hat{k}$ over the surface of the cuboid $0 \le x \le a,\ 0 \le y \le b,\ 0 \le z \le c$.	8	3	7

1

3 (a)	Find unit normal vector to the surface $\phi(x,y,z)=x^2y-2z^2=1$ at $P(1,3,1)$	6	3	7
(b)	If A and B are non-singular matrices of same order, then prove that $[AB]^{-1}=B^{-1}A^{-1}$	6	3	5
(c)	Using Convolution Theorem, evaluate $L^{-1}\left\{\dfrac{s}{\left(s^2+4\right)^2}\right\}$	8	1	2
4 (a)	Evaluate $\int\limits_C (3x+7y)dx+(2x+9y)dy$ where C is the circle $x^2+y^2=4$	6	3	7
(b)	Show that the set $S=\left\{\sin\left(\dfrac{\pi x}{2L}\right),\ \sin\left(\dfrac{3\pi x}{2L}\right),\ \sin\left(\dfrac{5\pi x}{2L}\right),\cdots\right\}$ is Orthogonal over $(0,L)$.	6	2	4
(c)	For the following matrix A, find two non-singular matrices P and Q such that PAQ is in the normal form, where $A=\begin{bmatrix}1 & -1 & 3 & -4\\2 & -3 & 0 & 1\\1 & -1 & 3 & 3\end{bmatrix}$	8	3	5
5 (a)	Evaluate $L^{-1}\left\{\dfrac{s}{(s-1)(s-2)(s-3)}\right\}$	6	1	2
(b)	Evaluate $\int\limits_C \overline{F}\cdot d\overline{r}$ where $\overline{F}=2x\hat{i}+(xz-y)\hat{j}+2z\hat{k}$ and C is the straight line joining the points $A(1,2,-3)$ to $B(2,1,4)$.	6	3	7
(c)	Obtain Fourier Series expansion of $f(x)=x\sin x,\ \ x\in[0,2\pi]$	8	2	3
6(a)	Evaluate $L\left\{\dfrac{\sin 2t}{t}\right\}$	6	1	1
(b)	Using Fourier Cosine Integral, prove that $e^{-x}\cos x=\dfrac{2}{\pi}\int\limits_0^\infty \dfrac{(\omega^2+2)\cos\omega x}{\omega^4+4}d\omega$	6	1	4
(c)	Find Eigen Values and corresponding Eigen Vectors of A, where $A=\begin{bmatrix}3 & -1 & 1\\-1 & 5 & -1\\1 & -1 & 3\end{bmatrix}$	8	2	6

7(a)	Test the consistency of the following equations and solve them, if they are consistent. $x + y + z = 6$ $x - y + 2z = 5$ $3x + y + z = 8$ $2x - 2y + 3z = 7$	6	3	5
(b)	Obtain complex form of Fourier series of $f(x) = \cosh 5x + \sinh 5x \quad x \in (-\pi, \pi)$	6	2	4
(c)	Using Laplace Transforms, Solve the differential equation $\dfrac{d^2 y}{dt^2} + 4\dfrac{dy}{dt} + 4y = 1$ where $y(0) = 0, y'(0) = 1$	8	1	2

SARDAR PATEL COLLAGE OF ENGINEERING
[An Autonomous Institution Affiliated to University of Mumbai]

Class: S.E (CIVIL) [Sem: III]
Subject: Fluid Mechanics-I

Exam: KT-EXAM   Marks: 100. (3 hours.)

Instruction: DATE:

1. Question no 1 is compulsory & attempt any four out of remaining six questions.
2. Illustrate answer with neat sketches wherever required.
3. Make suitable assumptions where necessary and state them clearly.

MASTER FILE

Marks/Module No./Co

Q.1. Write a short note on the following Terms (any Four)   (20/All/1&2)

a) Vapour pressure   b) Capillary action

c) Buoyancy & floatation   d) Nozzle meter

e) Absolute, guage & atmosphere pressure   f) Boarda's Mouthpiece

Q.2. a) Derive expression for Total pressure & Centre of pressure, when it acts on inclined plane surface

under fully submerged conditions.   (8 /2/1)

b) Write short on: stable, unstable & Neutral equilibrium.   (6 /2/1)

c) State & Prove Pascal law when fluid is at rest.   (6/2/1)

Q.3. a) A water flows through pipe AB 1.2 m diameter at 2.0 m/sec & then pass through a pipe BC 3.5 m diameter. At c, the pipe branches into CD & CE. The branch CD is 0.8 m diameter & carries one-third flow in AB. The flow velocity in branch CE is 2.0 m/sec. find the volume rate of flow in AB & also velocity in BC & CD?   (6/3/1)

b) Derive an expression for Eulers's equation of motion for fluids.   (8/3/1)

c) Explain the Metacentre & Metacentric Height.   (6/3/1)

Q.4. a) Explain the different hydraulic coefficient used in flow measurement with their ranges?

(10/4/2)

b) Explain Rectangular Notch used for flow measurement?   (5/4/2)

c) What are the advantages of triangular notch over the rectangular notch?   (5/4/2)

Q.5. a) Explain a Source & Sink in Uniform flow. (flow past Rankine oval). Also obtain expression for

Following terms:
                                                                                      (12/5/2)

i.   Stream & Velocity potential function.
ii.   Location of stagnation point.
iii. Distance of the surface of the body from origin. (r)
iv.   Length & Width of Rankine oval.

b) Discuss the following cases of Ideal flow with their equation of stream & velocity potential

function.   A) Uniform Flow   B) sink flow
                                                                                      (8/5/2)

Q.6. a) Derive an expression for Hydraulic Coef. for external orifices?
                                                                                      (8/6/1&2)

b) A 4.5 cm diameter orifice in the vertical side of the tank discharges water. The water surface in

the tank is at constant level of 2.5 m above the centre of orifice. A fluid jet has diameter of 3

cm at its vena-contracta. The measured discharge is 8.5 lit/sec. determine C_i, C_v & C_d for the

orifice?
                                                                                      (6/6/1&2)

c) Derive the discharge equation for Triangular weir?
                                                                                      (6/6/1&2)

Q.7. A) A rectangular tank 2.5 m wide, 4.0 m long & 2.4 m deep contains water to depth of 1.4 m. find
the horizontal acceleration which may be imparted to the tank in the direction of its length so that (a)
there is no spilling of water from the tank (b) the front bottom corner of the tank is just exposed (c) the
bottom of tank is exposed upto its mid-point. Calculate the volume of water that would spill out from
the tank in case of (b) & (c) Also calculate the total forces on each end of the tank in each of the cases
& show that difference between the forces equals the unbalanced force necessary to accelerate the
liquid mass in the tank.
                                                                                      (12/7/1&2)

B) A closed rectangular tank 1.4 m high, 3.0 m long & 1.5 m wide is two-third full of gasoline
(sp.gravity 0.8). Calculate the acceleration which may be imparted to the tank so that bottom front end
of the tank is just exposed. Also calculate the total forces on each end of the tank & show that
difference between the forces equals the unbalanced force necessary to accelerate the liquid mass in
the tank.
                                                                                      (8/7/1&2)