

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-132
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (Civil)
Building Construction & Drawing
(OLD)

[Time: Three Hours]

[Max. Marks: 80]

- N.B Please check whether you have got the right question paper.
- i) Q.No.1 and Q.No.6 are compulsory.
 - ii) Solve any two questions from question no. 2 to 5 and any one from question no. 7 to 8
 - iii) Figures to right indicate the maximum marks.

SECTION A

- | | | |
|-----|--|---------------------|
| Q.1 | Attempt any FIVE | 10 |
| | <ol style="list-style-type: none"> a) Give the advantages of framed structure. b) What are the different factors which affect the orientation? c) Differentiate between shallow foundation and deep foundation. d) What are the sources of dampness? e) Enlist different chemicals with its concentration used in Anti-termite treatment. f) What are the forces and loads are taken into account for design of pile. g) Define building line and control line. | |
| Q.2 | <ol style="list-style-type: none"> a) Explain the different types of building as per NBC of INDIA 2005(SP 7:2005) b) What are the different causes of failure of foundation? Explain any two in detail. | <p>08</p> <p>07</p> |
| Q.3 | <ol style="list-style-type: none"> a) Discuss the points to be kept in mind while designing a footing in black cotton soil. b) Explain with neat sketch different types of raft foundations. | <p>07</p> <p>08</p> |
| Q.4 | <ol style="list-style-type: none"> a) Define construction joint. Explain with neat sketch joint detail in roof slab. b) Discuss the points to be observed during planning and construction for fire proof construction. | <p>07</p> <p>08</p> |
| Q.5 | Write a short note on(any three) | 15 |
| | <ol style="list-style-type: none"> a) High Density polyethylene(HDPE) wall panels b) Setting out of foundation c) Sound proof construction d) Waterproofing e) Submission drawing | |

SECTION B

- Q.6 Draw to the scale of 1:50 a working plan of residential bungalow, section through staircase front elevation for the data given below: 25
- (i) Plot size= 12m × 15m
 - (ii) Both side margins=1.0m
 - (iii) front margin=2.5m
 - (iv) rear margin=1.5 m, plinth height=0.45m
 - (v) FSI allowed=0.80
 - (vi) Required components: Ent. Verandah, Living room, Bedroom= 1 No, master bed =1No, separate W.C, bath, kitchen cum dining room, store room & stair case doglegged. Also show schedule of opening and Area statement (block plan calculations)
- Q.7 a) Discuss the different types of stairs and their suitability. 07
- b) Write a short note on shoring. 08
- Q.8 a) It is proposed to locate a suitable staircase in residential building measuring size 2.5m×5m. The vertical distance between the floors is 3.5m, design the staircase. 07
- b) Write a detailed note on wall cladding materials used in practice 08

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-131
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (Civil)
Building Construction & Drawing
(REVISED)

[Time: Three Hours]

[Max. Marks: 80]

Please check whether you have got the right question paper.

N.B

- 1) Q. No. 1 and Q. No. 6 is compulsory.
- 2) Solve any two questions from remaining of Section A & B.

Section A

- Q.1 Attempt any five of the following:- 10
- 1) Define building
 - 2) Explain sub structure
 - 3) Explain building line.
 - 4) Define control line
 - 5) Define built up area
 - 6) Define shallow foundation
 - 7) Define Underpinning
- Q.2 a) Classify building as per national building code and explain any two in detail. 08
- b) Differentiate between load bearing structure and frame structure. 07
- Q.3 a) List out principles of planning and explain any two in detail. 08
- b) Write a detailed note on energy efficient building. 07
- Q.4 a) Write detailed note on foundation in black cotton soil. 08
- b) Explain in length raft foundation. 07
- Q.5 a) Enlist the causes of failure of foundation. Explain any two in detail. 07
- b) Write a detailed note on underpinning with neat sketches. 08

Section B

- Q.6 Attempt any five of the following: 10
- 1) Define waterproofing.
 - 2) Define reverberation
 - 3) Define sound proof construction.
 - 4) Explain types of Joints in construction.
 - 5) What is waist slab?
 - 6) What is the purpose of landing?
 - 7) What are different types of stairs?
- Q.7 a) Explain various method of damp proofing with the help of neat sketch. 08
- b) Explain in length cavity walls & its features. 07
- Q.8 a) Explain the conditions for good acoustics of a hall. 05
- b) Plan a doglegged stair of building having height 3.6m and stair measures [2.5M×5M]. 10
- Q.9 Draw a plan of residential bungalow for a family in new Aurangabad. 15
- i) Plot size 12m× 18m
 - ii) Scale 1:50
 - iii) Plinth Height 0.8m.

Requirement :- Verandah, Hall, Bedroom, Master Bedroom, WC & Bath, Kitchen, Dining room, store, stairs.

Draw:-

- 1) Working drawing plan
- 2) Elevation
- 3) Section through Staircase
- 4) Schedule of Opening
- 5) Construction Notes.

- Q.10 a) Explain in length on shoring. 08
- b) Write a detailed note on importance of safety in construction. 07

Total No. of Printed Pages:05

SUBJECT CODE NO:- H-111
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (All Branches)
Engineering Mathematics - IV
(REVISED)

[Time: Three Hours]

[Max. Marks: 80]

N.B Please check whether you have got the right question paper.

- N.B
1. Q. No. 1 and 6 are compulsory
 2. Solve any two questions from the remaining questions of each section
 3. Figures to the right indicate full marks
 4. Assume suitable data, if necessary

Section A

Q.1 Attempt any five

10

1. Find the Laplace transform of $\sin 2t \sin 3t$
2. Find Laplace transform of $t^2 H(t-2)$
3. Find Laplace transform of $f(t) = (t-2)^2, t > 2$
 $= 0, t < 2$
4. Find the inverse Laplace transform of $\frac{s+2}{s^2-4s+13}$
5. Find the inverse Laplace transform of $\frac{s e^{-3s}}{s^2-1}$
6. Form the partial differential equation from

$$(x-h)^2 + (y-k)^2 = a^2 - z^2$$

OR

Find Z-transform of $\sin h\left(\frac{k\pi}{2}\right), k \geq 0$

7. Solve: $pq = p + q$

OR

Find the z-transform of $ke^{ak}, K \geq 0$

8. Solve $x \frac{\partial z}{\partial x} - 4y \frac{\partial z}{\partial y} = 0$
OR

Find the z -transform of $2^k \cos h \propto k, k \geq 0$

Q.2 a. Find the Laplace transform of $\int_0^t t \cos^2 t dt$ 05

b. Find the inverse Laplace transform of $\tan^{-1}(s)$ 05

c. Solve: $p^2 + q^2 = Z$ 05

OR

Find z -transform of $\cos\left(\frac{k\pi}{3} + 5\right)$

Q.3 a. Evaluate: $\int_0^\infty e^t \frac{\sin^2 t}{t} dt$ 05

b. Find the inverse Laplace transform by using convolution theorem 05

c. Solve $x^2 p + y^2 q + z^2 = 0$ 05
OR

Find the inverse z - transform of $\frac{z}{(z-2)(z+3)^2}, |z| > 3$

Q.4 a. Find the Laplace transform of periodic function 05

$$f(t) = E, 0 < t < \frac{p}{2}$$

$$= -E, \frac{p}{2} < t < p$$

And $f(t) = f(t + p)$

b. Solve by Laplace transform $y'' + 2y' + 5y = e^{-t} \sin t$; given that $y(0) = 0, y'(0) = 1$ 05

c. Obtain the solution of $\frac{\partial v}{\partial t} = k \frac{\partial^2 v}{\partial x^2}$ under the conditions 05

- i. $v \neq \infty, t \rightarrow \infty$
- ii. $v = 0, \text{ for } x = 0 \text{ and } x = \pi$
- iii. $u = \pi x - x^2$ as $t = 0$ in the range of $(0, \pi)$

OR

Find the z-transform of $k^2, k \geq 0$

- Q.5 a. Express the following function in terms of Heaviside unit step function and hence find its Laplace transform $f(t) = (t + 1), 0 < t < 2$
 $= 3, t > 2$ 05

- b. Solve the simultaneous L.D.E. by Laplace transform method 05

$$\frac{dx}{dt} + 4y = 0, \frac{dy}{dt} - 9x = 0, \text{ given}$$

$$x = 2, y = 1 \text{ at } t = 0$$

- c. Solve $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ which satisfies the conditions $u(0, y) = 0 = u(l, y)$ 05

$$\text{And } u(x, \infty) = 0, u(x, 0) = kx$$

OR

Solve the difference equation by using z- transform

$$6y(k + 2) - y(k + 1) - y(k) = 0, k \geq 0$$

$$\text{Given } y(0) = y(1) = 1$$

Section B

- Q.6 Attempt any five 10

- a. Prepare a forward difference table for the data

$$x : 2 \quad 4 \quad 6 \quad 8 \quad 10$$

$$y : 15 \quad 23 \quad 27 \quad 33 \quad 40$$

- b. Find the first approximate value of the root (i.e. x_1) by Newton Raphson method for $\log x - x + 3 = 0$

- c. Find the values of x, y, z in the first iteration of Gauss –Seidal method

$$83x + 11y - 4z = 95$$

$$7x + 52y + 13z = 104$$

$$3x + 8y + 29z = 71$$

- d. Find f(8) for the data

$$x : 5 \quad 6 \quad 9$$

$$f(x) : 12 \quad 13 \quad 14$$

- e. Find the residues at each of its poles of

$$f(z) = \frac{3z^2}{(z-1)(z+3)}$$

- f. Evaluate $\int_c \sinh z \, dz$, where $c : |z| = 1$
- g. Show that $\cosh z$ is analytic every where
- h. State Cauchy-Riemann equations in Cartesian and polar form

Q.7 a. Given that $\frac{dy}{dx} = 2 + \sqrt{xy}$ and $y(1)=1$. Find the approximate value of y at $x=1.2$ using Euler's modified method 05

b. Use runge-kutta fourth order method to find y at $x=0.2$. given that 05

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

c. Under the transformation $w = \frac{1}{z}$ find the image of $x^2 + y^2 - 6x = 0$ 05

Q.8 a. Find the root of the equation $x \log_{10} x = 1.2$ by Newton-Raphson method 05

b. Prove that $u = r^3 \cos 3\theta - r \sin \theta$ is harmonic and hence find its harmonic conjugate 05

c. Evaluate by cauchy's Residue Theorem 05

$$\oint_c \frac{z^2}{(z-1)(z+2)^2} dz, \quad c: |z| = \frac{3}{2}$$

Q.9 a. State cauchy's integral formula and hence evaluate 05

$$\oint_c \frac{z+1}{(z^3-4z)} dz, \text{ where } c: |Z + 2| = \frac{3}{2}$$

b. Find the bilinear transformation which maps the points $-1, 0, 1$ into the points $-1, -i, i$ of w -plane respectively 05

c. Fit a second degree parabola to the following data 05

x :	0	1	2	3	4
y :	-4	-1	4	11	20

Q.10 a. Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x=0$ for the data 05

x :	0	1	2	3	4
y :	2	5	10	14	19

b. Find the analytic function $f(z) = u + iv$ if $v = \left(r - \frac{1}{r}\right) \sin\theta$ 05

c. Evaluate $\int_0^{\pi - \pi i} e^{\bar{z}} dz$, along the curve $x = t, y = -t$ 05

SUBJECT CODE NO:- H-112
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (All Branches)
Engineering Mathematics -IV
(OLD)

[Time: Three Hours]

[Max.Marks:80]

- N.B Please check whether you have got the right question paper.
- i. Q.No.1 and 6 are compulsory.
 - ii. Solve any two questions from remaining of each section.
 - iii. Figures to the right indicate full marks.
 - iv. Assume suitable data, if necessary.

SECTION-AQ.1 Solve any five from the following

10

- a) Find k such that $f(z) = \frac{1}{2} \log(x^2 + y^2) + i \tan^{-1} \left(\frac{ky}{x} \right)$ is analytic.
- b) Find the image of $|z| = 2$ under the mapping $W = z + 3 + 2i$.
- c) State Cauchy's integral theorem.
- d) Determine the singularity and the residue of the function $f(z) = \frac{\sin z}{z}$.
- e) Expand $f(z) = \cos z$ about $z = \frac{\pi}{2}$ by using Taylor's series.
- f) Evaluate $\int_0^{2i} \sin hz \, dz$.
- g) Solve: $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = 0$.

ORFind Z-transform of $F(k) = \frac{1}{k}, k \geq 1$

- h) Solve: $2x \frac{\partial z}{\partial x} - 3y \frac{\partial z}{\partial y} = 0$.

ORFind Z-transform of $F(k) = \frac{a^k}{k!}, k \geq 0$

- Q.2 a) Find the analytic function $f(z) = u(r, \theta) + iv(r, \theta)$ such that $v(r, \theta) = r^2 \cos 2\theta - r \cos \theta + 2$ 05
- b) Evaluate $\int_{(0,0)}^{(1,1)} (3x^2 + 4xy + 3y^2) dx + 2(x^2 + 3xy + 4y^2) dy$ along $y^2 = x$ 05
- c) Evaluate $\int_0^\infty \frac{dx}{(a^2+x^2)^2}$ by using residue theorem. 05

- Q.3 a) Evaluate $\oint_C \frac{\sin^6 z}{(z-\frac{\pi}{2})^3} dz$, where C is $|z| = 2$ by Cauchy's integral formula. 05
- b) Show that the real and imaginary part of analytic function $f(z) = u + iv$ is harmonic function. 05

- c) Obtain the solution of partial differential equation $\frac{\partial u}{\partial t} = a^2 \frac{\partial^2 u}{\partial x^2}$, with subject to the condition $u(0, t) = 0, u(l, t) = 0, u = 3 \sin \frac{\pi}{l} x$, when $t = 0$. For all values of $0 < x < l$. 05

OR

Find Z-transform of $F(k) = 3^k \cos\left(\frac{k\pi}{2} + \frac{\pi}{4}\right), k \geq 0$

- Q.4 a) Find and plot the image of triangular region with vertices (0,0), (0,1) and (1,0) under the transformation $w = (1 - i)z + 3$. 05
- b) Expand $f(z) = \frac{1}{(1-z)(z-2)}$ into Laurent series for $i) 1 < |z| < 2$ 05
- c) Solve $\frac{\partial^2 v}{\partial x^2} + \frac{\partial^2 v}{\partial y^2} = 0$, subject to the conditions 05
- i) $v = 0$ when $y \rightarrow \infty$
 - j) $v = 0$ when $x = 0$ for all values of y
 - k) $v = 0$ at $x = \pi$
 - l) $v = v_0$ when $y = 0$ for $0 < x < \pi$

OR

Solve $y(k + 2) - 5y(k + 1) + 6y(k) = u(k); y(0) = 0, y(1) = 1$

- Q.5 a) Find the bilinear transformation which maps the point $z = 0, -i, -1$ into the points $w = i, 1, 0$. 05
- b) Evaluate $\int_0^{2\pi} \frac{d\theta}{2 + \cos \theta}$ by calculus of residue. 05
- c) The vibration of an elastic string is governed by the partial differential equation $\frac{\partial^2 u}{\partial t^2} = \frac{\partial^2 u}{\partial x^2}$. The π and the ends are fixed. The initial velocity is zero and the initial deflection $u(x, 0) = 2(\sin x + \sin 3x)$. Find the deflection $u(x, t)$ of the vibrating sting for $t > 0$. 05

OR

Find inverse z-transform of $\frac{z^2+z}{z^3-3z^2+3z-1}, |z| > 1$

SECTION-B

- Q.6 Solve any five of the following 10
- a) Find Laplace transform of $e^{-t} \sin t H(t - 2\pi)$
 - b) Find inverse Laplace transform of $\frac{e^{-\pi s}}{s^2+9}$
 - c) Find inverse transform of $\frac{1}{(s+3)^2}$
 - d) State second shifting theorem of Laplace transform
 - e) Find Laplace transform of $t \cos 2t$.
 - f) State inverse convolution theorem of Laplace transform.

- g) Find Fourier transform of $f(x) = x, |x| \leq a$
 $= 0, \text{ otherwise}$
- h) Find Fourier sine transform of $\frac{1}{x}$

Q.7 a) Evaluate $\int_0^\infty \sin 4t \delta(t - \frac{\pi}{8}) dt$ 05

b) Find inverse Laplace transform of $\frac{1}{s} \log \sqrt{\frac{s^2+1}{s^2}}$ 05

c) Find Fourier sine and cosine transform $f(x) = ae^{-ax} - be^{-\beta x}$ 05

Q.8 a) Find Laplace transform of $\frac{\sin^2 t}{t}$ 05

b) Find inverse Laplace transform of $\frac{s^2}{(s^2+a^2)^2}$ 05

c) Solve the integral equation $\int_0^\infty f(x) \cos \lambda x dx = e^{-\lambda}, \lambda > 0.$ 05

Q.9 a) Express the function in terms of Heaviside unit step function hence find their Laplace transform of 05

$$f(t) = 4, \quad 1 < t < 2$$

$$= -2, \quad 2 < t < 3$$

$$= 5, \quad t > 3$$

b) Find f(x) if its Fourier sine transform is $\frac{\lambda}{\lambda^2+1}$ 05

c) Solve $\frac{d^2y}{dx^2} + 2\frac{dy}{dx} + 5y = e^{-x} \sin x$, where $y(0) = 0$ and $\frac{dy}{dx} = 1$ at $x = 0$ 05

Q.10 a) Find Laplace transform of 05

$$f(t) = 1, \quad 0 < t < 1$$

$$= 0, \quad 1 < t < 2 \quad \text{if } f(t) = f(t+3)$$

$$= -1, \quad t > 2$$

b) Solve $\frac{dx}{dt} - y = e^t; \frac{dy}{dt} + x = \sin t, x(0) = 1, y(0) = 0$ by Laplace transform method. 05

c) Using Fourier transform, solve the equation $\frac{\partial u}{\partial t} = k \frac{\partial^2 u}{\partial t^2}$ for $x \geq 0, t \geq 0$ under the given condition $u = u_0$ at $t = 0, t > 0$ and $u(x, 0) = 0, x \geq 0.$ 05

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-201
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (Civil)
Surveying - II
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

- N.B
- i) Q.No.1 from section A and Q.No.6 from section B are compulsory.
 - ii) Answer any two questions for the remaining in each section
 - iii) Figures the right indicates full marks
 - iv) Assume suitable data if necessary

Section-A

- Q.1 Answer the following (Any Five) 10
- 1) Define Geodetic survey
 - 2) Give the classification of signals
 - 3) Define Independent quantity
 - 4) Define weight of an observation
 - 5) Define Most probable value
 - 6) Define conditioned quantity
 - 7) What is the principle of triangulation
 - 8) Define conditioned quantity
- Q.2 A. What is meant by a satellite station & reduction to center? Derive an expression for reducing the angles measured at the satellite station to center 08
- B. What is figure adjustment in case of triangulation survey Explain in detail 07
- Q.3 A. Derive the formula for the correction to be applied when observation is made on the bright portion 08
- B. Find the most probable value of the angle A from the following observation equations 07
- $2A = 20^{\circ}12'20.4''$ weight 2
- $2A = 40^{\circ}24'42''$ weight 3
- Q.4 A. Explain adjustment of a quadrilateral with a central station by method of least squares 08
- B. The following are the observed values of an angle: 07
- | Angle | Weight |
|---------------------|--------|
| $40^{\circ}20'20''$ | 2 |
| $40^{\circ}20'18''$ | 2 |
| $40^{\circ}20'19''$ | 3 |
- Find
- a. P.E of single observation of unit weight
 - b. P.E of weighted arithmetic mean
 - c. P.E of single observation of weight 3

- Q.5 Write short note on (Any Three) 15
- 1) Topographic surveying
 - 2) Tunnelling
 - 3) Base line measurement
 - 4) Axis signal correction
 - 5) Setting out a bridge

Section-B

- Q.6 Answer the following(Any Five) 10
- 1) Define curve
 - 2) Explain relation between radius & degree of curve
 - 3) Explain types of curve
 - 4) Define compound curve
 - 5) What is meant by trigonometrical levelling
 - 6) Explain modulation in EDM
 - 7) Express mathematically of apex distance in curves

- Q.7 A. Explain setting of simple circular curve by offsets from long chord 07
- B. Two straight lines T_1I & T_2I 08
 Intersect at chainage [375+12] the angle of deflection being 110° calculate the chainage of the tangent points of a right handed circular curve of 400m radius, take chain length 20m

- Q.8 A. Explain the applications of EDM 07
 B. Explain phase comparison in detail 08

- Q.9 A. Derive the expression for compound curve 07
 B. Find the R.L of Q from the following observation: 08
 Horizontal distance between P&Q = 9290M
 Angle of Elevation from P to Q = $2^\circ 06' 18''$
 Height of signal at Q = 3.96M
 Height of instrument at P = 1.25M
 Coefficient of refraction = 0.07
 R sin $1'' = 30.88M$ R.L of P = 396.58M

- Q.10 Write short note on (Any Three) 15
- 1) Reverse curve
 - 2) Transition curve
 - 3) Geode meter
 - 4) Super Elevation
 - 5) Lemniscate curve

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-202
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (Civil)
Surveying - II
(OLD)

[Time: Three Hours]

[Max. Marks: 80]

Please check whether you have got the right question paper.

N.B

1. Q. No. 1 and Q. No. 6 are compulsory.
2. Solve any two questions from remaining of each section.
3. Assume suitable data if necessary.

Section A

- Q.1 Attempt the following:- (any five) 10
- a) Enlist types of vertical curve with a neat sketch.
 - b) What do you mean by shift of curve?
 - c) What do you mean by trigonometrical leveling?
 - d) Enlist modern surveying equipment.
 - e) What do you mean by base line?
 - f) What do you mean by photographic survey?
 - g) Enlist various types of horizontal curve with a neat sketch.
 - h) Explain function of transition curve.
 - i) What do you mean by modulation in EDM?
 - j) Explain coefficient of refraction.
- Q.2 Attempt the following:-
- a) Explain the field procedure for setting out curve by deflection angles. 07
 - b) What is transition curve? Derive an expression for ideal transition curve. 08
- Q.3 Attempt the following:-
- a) Describe briefly the elements of a compound curve. 07
 - b) Two tangents intersect at a Chainage of 1000 m, deflection angle being 30° . Calculate all the necessary data for setting out a circular curve of radius 200 m by method of offsets from chord produced. Taking peg interval of 20 m. 08
- Q.4 Attempt the following:-
- a) Explain the different methods of calculating the length of a transition curve? 07
 - b) What is EDM? How are electro-magnetic waves used in it? 08

- Q.5 Write short note on:- 15
- a) Reverse curve
 - b) Super-elevation
 - c) Lemniscate curve

Section B

- Q.6 Attempt the following: (any five) 10
- a) State the objectives of photogrammetry.
 - b) What do you mean by GIS?
 - c) Define tilt distortion?
 - d) What do you mean by electro-magnetic spectrum?
 - e) Draw a neat sketch of Idealized remote sensing system.
 - f) What do you mean by remote sensing?
 - g) Define Oblique photograph.
 - h) What do you mean by E.M.R.?
 - i) State the basic principle of Terrestrial photogrammetry.

- Q.7 Attempt the following:-
- a) Write an application of GIS in Civil Engineering. 07
 - b) Explain practical application of remote sensing. 08

- Q.8 Attempt the following:-
- a) Derive an expression for the height displacement in a vertical photograph. 07
 - b) What do you understand by EMR spectrum? State the wave length region with them uses 08 for remote sensing.

- Q.9 Attempt the following:-
- a) Explain Stereoscopic vision. 07
 - b) Explain Remote sensing observations platforms. 08

- Q.10 Write short notes on following:- 15
- a) Types of photographs.
 - b) Electro-magnetic energy used for remote sensing.
 - c) Nautical Extent.

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-166
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (Civil)
Fluid Mechanics – II
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B

- i) Q.No.1 and Q.No.6 are compulsory.
- ii) Solve any two questions from remaining questions of each section.
- ii) Assume suitable data if necessary.

Section: A

- | | | |
|-----|--|-------------------------------|
| Q.1 | Attempt the following(any five) | 10 |
| | <ol style="list-style-type: none"> i. What is open channels flow? ii. What is Hagen poiseuille's formula? iii. What do you mean by Froude's Number? iv. Define laminar and turbulent flow. v. What is the dimension of the viscosity and pressure? vi. Define specific energy and Critical Flow? vii. What are Standing Wave Flume and Venturiflume? viii. Enlist the forces acting on immersed bodies in flowing fluids. ix. Define Lift and Drag force. x. Write Bernoulli's Equation in case of open channel. | |
| Q.2 | <ol style="list-style-type: none"> a) Explain with a neat sketch, the procedure of measurement of discharge in rivers. b) Find the specific energy of flowing water through a rectangular channel of width 6.5m when the discharge is $20\text{m}^3/\text{sec}$ and depth of water is 4.0m. | <p>07</p> <p>08</p> |
| Q.3 | <ol style="list-style-type: none"> a) Derive an expression for back water curve in open channel. b) An open channel is V-shaped, each side is being inclined at 45° to the vertical. If it carries a discharge of $0.04\text{ m}^3/\text{sec}$ with the depth of flow at the center is 22.5 cm, calculate the slope of the channel. Take $C=50$. | <p>07</p> <p>08</p> |
| Q.4 | <ol style="list-style-type: none"> a) Derive an expression for momentum thickness. b) Derive an expression Drag force on a flat plate by momentum equation. | <p>07</p> <p>08</p> |
| Q.5 | <ol style="list-style-type: none"> a) Explain with neat sketch depth-energy relationships in open channel. b) Describe Energy Dissipaters. c) Define: i) Subcritical flow ii) Supercritical flow. | <p>05</p> <p>05</p> <p>05</p> |

Section: B

- Q.6 Attempt the following (any five) 10
- i. Draw velocity triangle for Francis turbine.
 - ii. What is subcritical and supercritical flow?
 - iii. What do you mean by axial flow turbine?
 - iv. Define unit speed and unit power.
 - v. What is runaway speed?
 - vi. Draw neat sketch of Indicator diagram.
 - vii. Write function of draft tube.
 - viii. Classify the various types of pump.
 - ix. What is dimensional homogeneity?
 - x. Draw neat sketch of two-stage pumps with impeller in series.
- Q.7 a) Derive an expression for the force exerted by jet of fluid on a moving flat plate when the plate is Inclined to the jet. 07
- b) A jet of water having a velocity of 40 m/sec. strikes a curved vane which is moving with velocity of 20 m/sec. The jet makes an angle of 30° with the direction of motion of vane at inlet and leaves at an angle of 90° then direction of motion of vane outlet. Draw the velocity triangles at inlet and outlet and determine the vane angles at inlet and outlet so that the water enters and leaves the vane without shock. 08
- Q.8 a) Explain with a neat sketch the working of Kaplan turbine. 07
- b) A Kaplan turbine produces 60,000 kw under a net head of 25 m with an overall efficiency of 90%. Taking the value of speed ratio k_u as 1.6, flow ratio Ψ as 0.5 and the hub diameter as 0.35 times the outer diameter, find the diameter and speed of turbine. 08
- Q.9 a) With a neat sketch, explain the working of single acting and double acting reciprocating pump. 07
- b) A 6.2 m high and 15 m long spillway discharges $68 \text{ m}^3/\text{sec}$ discharge under a head of 2.0 m. If 1:8 scale model of this spillway is to be constructed, determine model dimensions, head over spillway model and the model discharge. 08
- Q.10 Write short notes on following. 15
- i. Model investigation
 - ii. Governing of turbines
 - iii. Air vessel and its function.

FACULTY OF ENGINEERING AND TECHNOLOGY

S.E. (Civil)

Fluid Mechanics – II

(OLD)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
1. Q.No.1 and Q.No.6 are compulsory.
 2. Solve any two questions from remaining questions from each section.
 3. Assume suitable data, if necessary.

Section-A

- Q.1 Solve any five from following. 10
- i) State Buckingham π theorem.
 - ii) Define hydraulic jump.
 - iii) Define dimensional homogeneity.
 - iv) Define Froude number.
 - v) Define specific energy.
 - vi) Define distorted model.
 - vii) What do you mean by energy dissipation.
 - viii) Define the terms major energy losses and minor energy losses in pipe.
 - ix) What do you mean by repeating variables?
 - x) What do you meant by water hammer?
- Q.2 a) Obtain an expression for velocity distribution in terms of average velocity for 08
- i) Smooth pipe
 - ii) Rough pipe
- b) A smooth pipe of 0.4m diameter and 1000m long carries the water at the rate of 100 lit/sec. 07
find out the following:-
- i) Head lost in friction
 - ii) Shear stress at the wall surface
 - iii) Centre line velocity
- Q.3 a) Explain the most economical section of channel. In which situations, the rectangular channel 07
section can become most economical? Derive an equation.
- b) At sudden enlargement of water main from 240mm to 480mm diameter the hydraulic gradient 08
rises by 10mm. calculate the rate of flow.
- Q.4 a) In lin 50 model of a spillway, the velocity and discharge are 4m/sec and 3000 lit/ sec. find the 07
corresponding velocity and discharge in the prototype.
- b) Work out the dimensions of the following physical quantities. 08
- i) Discharge
 - ii) Momentum

- Q.5 Write short notes on any three 15
- i) Merit and demerit of distorted models
 - ii) Expression for the length of back water curve
 - iii) Specific energy diagram
 - iv) Slope profiles

Section-B

- Q.6 Solve any five 10
- i) Draw a neat diagram of Pelton wheel turbine.
 - ii) Define Jet propulsion
 - iii) Define hydraulic ram
 - iv) Define cavitation's
 - v) Define unit power & unit discharge
 - vi) Define turbine & pumps
 - vii) Define speed ratio & flow ratio
 - viii) If $C_d = 0.92$ determine the % slip of reciprocating pump.
 - ix) Name any five hydraulic devices.
 - x) Give the formula for work done by double acting reciprocating pump.

- Q.7 a) Find an expression for force exerted by a jet on stationary curved plate? 07
- b) A nozzle of 6cm diameter declines a stream of water at 30m/sec perpendicular to a plate that moves away from the jet at 8m/s. find 08
- i) The force on the plate
 - ii) The work done
 - iii) The efficiency of jet

- Q.8 a) Explain different types of draft tubes. 06
- b) For a Kaplan turbine with runner diameter 4.0m, the discharge is $60\text{m}^3/\text{sec}$ and the hydraulic and mechanical efficiencies are stated to be 90% and 94% respectively. The diameter of boss is 0.3 times the runner diameter and the speed ratio is 2.0. Calculate the net available head on the turbine, the power developed and specific speed. Take $V_2 = V_{+2}$ 09

- Q.9 a) Obtain an expression for the work done by impeller of a centrifugal pump on water per second for unit weight of water. 07
- b) A single acting reciprocating pump has the plunger diameter of 20cm and stroke of 30cm. the pump discharging 0.53 m^3 of water puminate at 60 rpm. Find Q^{th} , C_d , slip and % slip. 08

- Q.10 Write short notes on:- 15
- i) Hydraulic press
 - ii) Hydraulic lift
 - iii) Hydraulic ram

Total No. of Printed Pages:04

SUBJECT CODE NO:- H-322
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (Civil)
Strength of Materials
(OLD)

[Time: Three Hours]

[Max.Marks: 80]

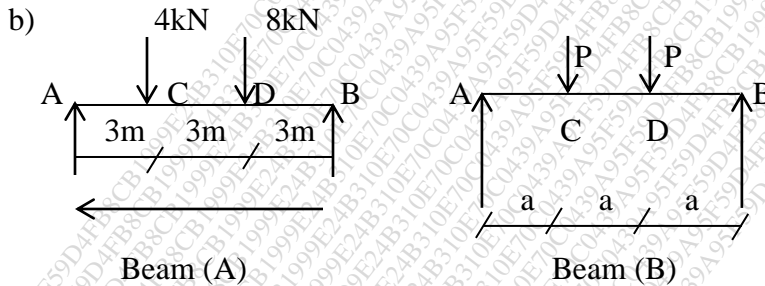
Please check whether you have got the right question paper.

- N.B
- 1) Q.1 & Q.6 are compulsory from Section A & B respectively. Solve any two questions from remaining in each Section.
 - 2) Assume suitable data if required & state it clearly.
 - 3) Figure to the right indicate full marks.

Section A

Q.1 Attempt any five:- 10

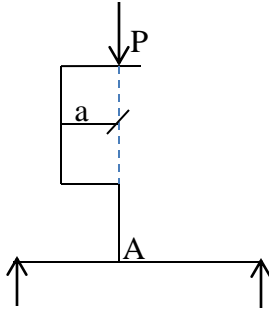
- a) A simply supported beam subjected to uniformly varying load w kN/m. The maximum bending moment will lie at a distance of-----



Which beam is subjected to pure bending justify answer briefly.

- c) Derive $\delta_L = \frac{PL}{AE}$
- d) Draw stress-strain curve for concrete subjected to tensile force.
- e) Enlist the all elastic constant. Write down the all relationship exist between them.
- f) Define Poisson's ratio.
- g) Define elastic limit.

h) What is the value of bending moment at point A?



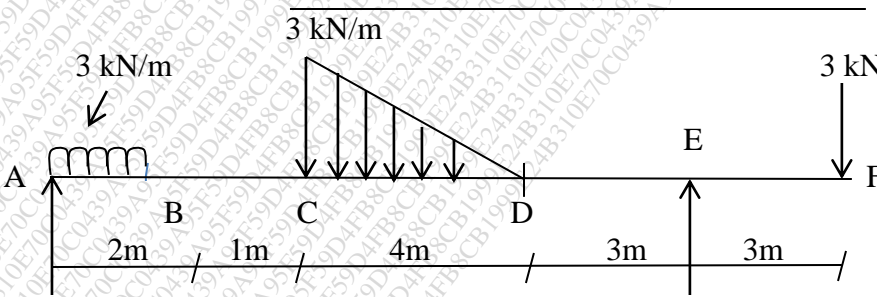
Q.2 a) Derive $q = \frac{SAY}{Ib}$ 07

b) A fitted beam consist of a timber joist 150mm wide & 250 mm deep strengthened by two steel plate 10 mm thick & 200mm deep each on either side of the joist. If the stresses in timber & steel are not to exceed $7N/mm^2$ & $120 N/mm^2$. Find the value of moment of resistance for the Section. Take E_s Youngs modulus of steel = 20 E_c Youngs Modulus of timber. 08

Q.3 a) What are the assumptions made in theory of pure bending? Justify any three of them. 07

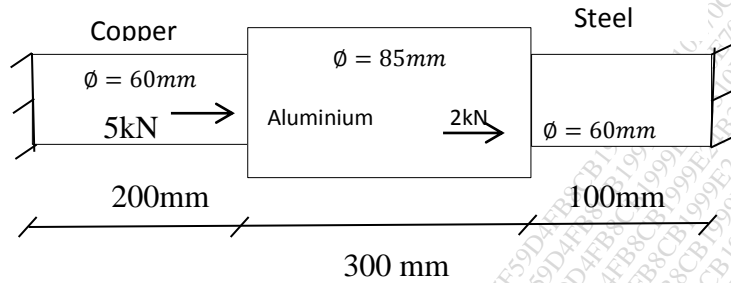
b) A hollow rectangular section $150mm \times 250mm$ (outside) & 20mm thick is subjected to 08 shear force of 150 kN. Draw shear stress distribution diagram for the section. Find ratio of average shear stress & maximum shear stress.

Q.4 Draw SFD & BMD for the beam as shown in fig. Locate point of contrashear & contraflexure. 15



Q.5 a) Find the value of Poisson's ratio for an isotropic elastic material for no change in volume. If it is subjected to like stresses in all direction. i.e. x,y, & z. 05

b) $\phi \rightarrow$ diameter, $E_c = 100 GPa$, $E_{al} = 80 GPa$, $E_{st} = 200 GPa$ 10
Find stresses in each material.



Section B

Q.6 Attempt any five: 10

- What is combined stresses?
- What is torsional rigidity?
- Define buckling load and crushing load.
- Define strain energy. Enlist types of load used to calculate strain energy.
- Define principle stress & strain.
- What is effective length? Write down effective length for different end conditions.
- Write down the expression of stresses for calculating the strain energy for gradually applied, suddenly applied & impact load.
- Enlist the stresses induced in thin cylinder subjected to internal pressure 'P'. Define any one.

Q.7 a) Derive the expression of stress due to impact load. 05

b) A rectangular column. $300\text{mm} \times 450\text{mm}$ is carrying an eccentric load of 700 kN. The eccentricity of the load with respect to axes parallel to 300mm & 450 mm side is 60mm & 45 mm respectively. Determine the stress at each corner. 07

c) Derive $e \leq \frac{Z}{A}$ i.e maximum value of eccentricity for no tension condition. 03

Q.8 At a point in a elastic material under strain, there are normal stress of 50N/mm^2 & 30N/mm^2 respectively at right angles to each other with shearing stress of 25N/mm^2 . Find the principle stresses position of principal planes, maximum shear stress & its plane if 15

- 50N/mm^2 is tensile & 30N/mm^2 is also tensile.
- 50N/mm^2 is tensile & 30N/mm^2 is compressive.

Q.9 a) Derive Rankine's formula to find the load carrying capacity of column. 08

b) What is effective length? What is the effect of effective length on load carrying capacity of column. 03

c) Find the value of Slenderness ratio for which Euler's formulae are valid if column material is made up of mild steel. 04

Q.10

- a) Derive the expression for volumetric strain for thin cylindrical shell subjected to internal 07 pressure.
- b) Derive torsional formula. 08

Total No. of Printed Pages:05

SUBJECT CODE NO:- H-323
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (Civil) (CGPA)
Strength of Materials
(REVISED)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

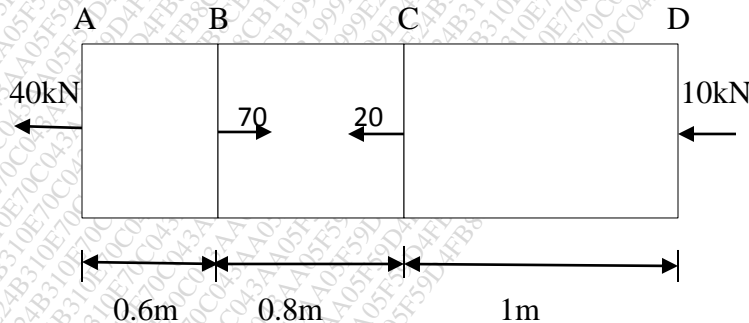
- N.B
- 1) Question No. 1 and 6 are compulsory. Attempt any two from remaining for each Section.
 - 2) Figures to the right indicate full marks.
 - 3) Assume suitable data, if necessary.

Section A

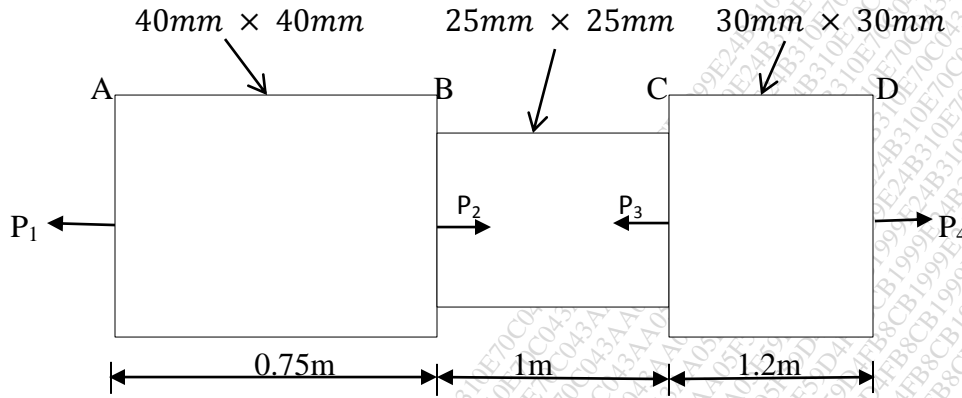
Q.1 Answer the following:- (any five) 10

- a) What are the types of stresses?
- b) Draw stress-strain diagram for mild steel.
- c) Define Poission's ratio.
- d) Enlist types of beams.
- e) What are the assumptions in theory of pure bending?
- f) Write flexure formula.
- g) Define point of contraflexure.
- h) Define bulk modulus.

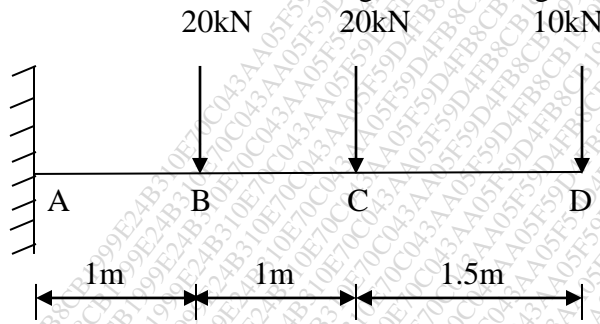
Q.2 a) A brass bar, having cross-section area of 900mm^2 , is subjected to axial forces as shown in fig. Find the total elongation of the bar. Take $E = 1 * 10^5\text{N/mm}^2$. 07



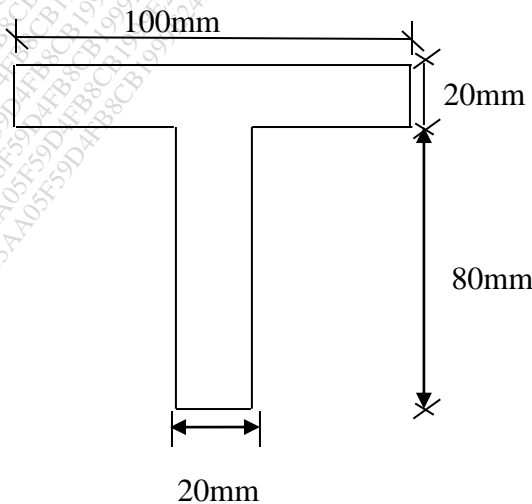
b) A member ABCD is subjected to point loads P_1, P_2, P_3 and P_4 as shown in figure. 08
 Calculate the force P_3 necessary for equilibrium if $P_1 = 120\text{ kN}$, $P_2 = 220\text{kN}$ and $P_4 = 160\text{kN}$. Determine also the net change in the length of member.



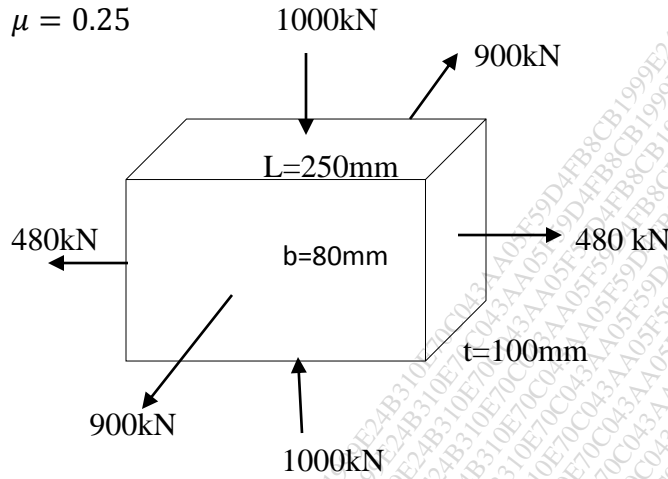
- Q.3 a) Define Types of loads. 03
 b) Draw shear force and bending moment diagram for cantilever beam shown in fig. 12



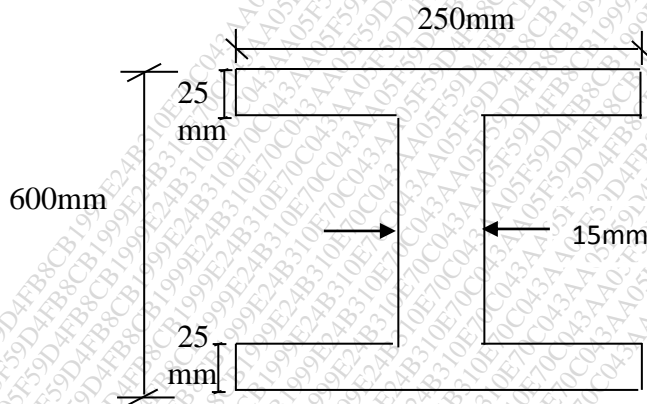
- Q.4 A cast iron beam is to T-Section as shown in fig. The beam is simply supported on a span of 8m. 15
 The beam carries a u.d.L. of 1.5 KN/m length on the entire span. Determine the maximum tensile and compressive stresses.



- Q.5 a) Determine change in each dimension and change in volume of block shown in fig. 08
 Take $E = 2 \times 10^5 \text{ N/mm}^2$
 $\mu = 0.25$



- b) A steel beam of I-section as shown in fig is subjected to shear force of 500 kN . Determine the shear stress distribution for the beam section. 07



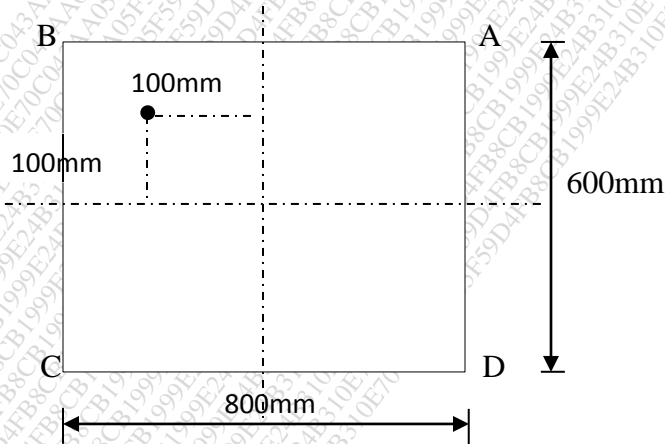
Section B

- Q.6 Answer the following. (any five)

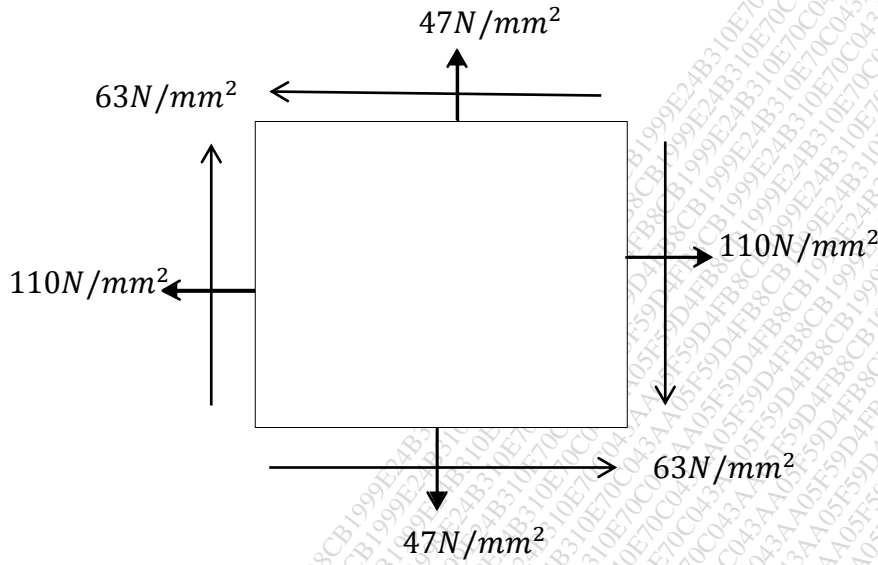
10

- Define strain energy.
- Write down the formula for longitudinal and hoop stress.
- What are the assumptions in theory of torsion?
- Write down Euler's formula for all end conditions of columns?
- Define resilience and modulus of resilience.
- Define Principle stress and strain.
- Define polar modulus.
- Define direct and bending stresses.

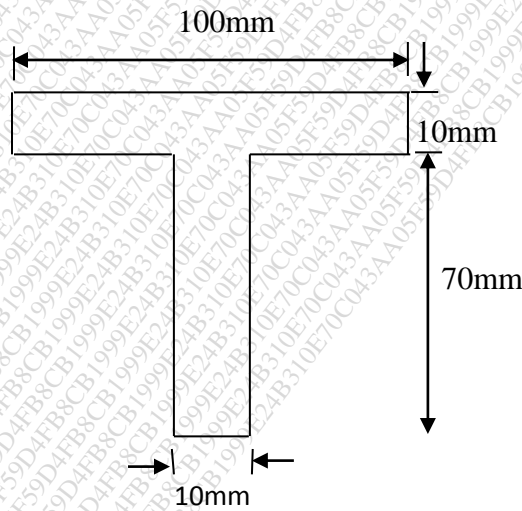
- Q.7 a) Determine the diameter of a solid shaft which will transmit 90kw at 160 RPM. If the shear stress in the shaft is limited to $60N/mm^2$. Find also the length of shaft, if the twist must not exceed 1° over the entire length. Take $C = 8 \times 10^4 N/mm^2$. 08
- b) A steel bar 3m long and $2500mm^2$ in area hangs vertically which is securely fixed on collar at its lower end. If a weight of 15kN falls on the collar from height of 10mm. Determine the stress developed in the bar/ What will be strain energy stored in bar? Take $E = 200 GPa$. 07
- Q.8 a) A cylindrical shell 300 mm diameter and 3m long is 6mm thick subjected to an internal pressure of $2N/mm^2$. Calculate 08
- I) Change in length.
 - II) Change in diameter
 - III) Change in volume of cylinder
- Take $E = 200 GPa$
 $\mu = 0.28$
- b) A column $800mm \times 600mm$ is subjected to eccentric load of 60kN as shown in Fig. 07
- Determine the stress intensities on all the four corners of column.



- Q.9 At a point in a strain material there are two mutually perpendicular stresses of $110 N/mm^2$ and $47 N/mm^2$ both tensile. They are accompanied by shear stress of $63 N/mm^2$. Find 15
- i) Principle stresses
 - ii) Position of principle plane
 - iii) Maximum shear stress.



Q.10 Calculate the buckling load for a strut of T-Section the width being 100mm, overall depth being 150mm and both flange and web being 10 mm thick as shown in fig. The strut is 3m long and hinged at both ends. Take $E=200 \text{ GPa}$. By Euler's formula



Total No. of Printed Pages:4

SUBJECT CODE NO: H-273
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (Civil)
Theory of Structure-I
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

- N.B
- i. Q.no1 and Q.no 6 are compulsory.
 - ii. Attempt any two questions from remaining question from each section.
 - iii. Assume suitable data wherever necessary.

Section A

Q.1 Attempt any five. 10

1. Write down the fixed end moment for a fixed beam with UDL over entire span.
2. What is Macaulay's method?
3. Give advantages and disadvantages of welded connections.
4. Define rivet value, pitch of rivet.
5. What are the assumptions made in the theory of riveted joints?
6. Give the strength of rivet in tearing and bearing.
7. State Castiglione's theorem.

Q.2 a. Find the maximum load carrying by any of the rivet for riveted connection as shown in figure (1). 10

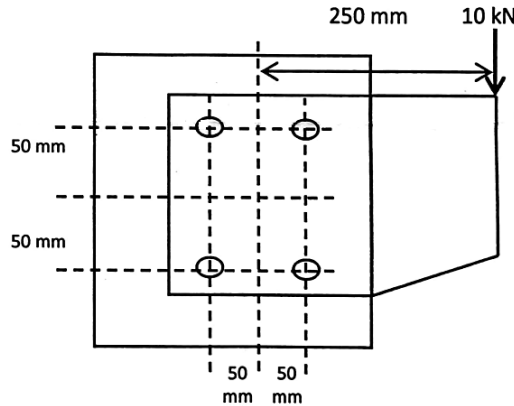


Fig.1

b. Explain different types of welded joints with neat sketch. 05

Q.3 Determine the fixed end moments for the beam as shown in figure (2). Also draw SFD and BMD. 15

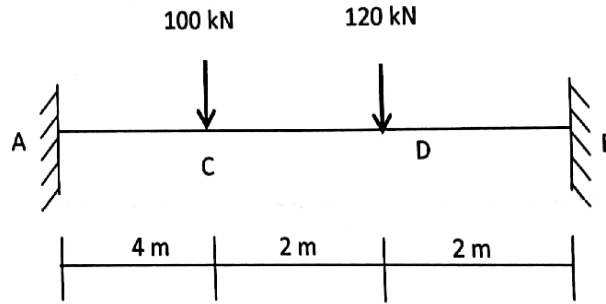


Fig.2

Q.4 Find vertical deflection of C. take area of member AB as 1000mm^2 and of AC and BC as 1500mm^2 . $E = 200 \text{ kN/mm}^2$. 15

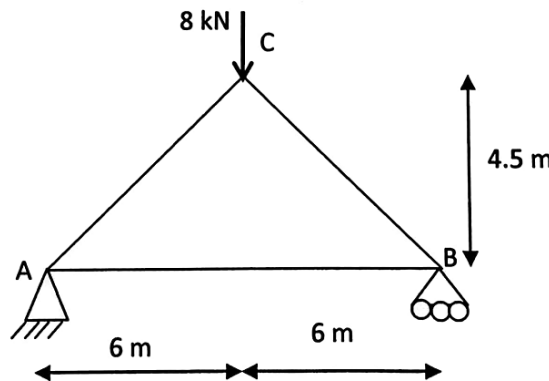


Fig.3

Q.5 Calculate deflection of beam under loads C and D by using Macaulay's method. Take $E = 200 \text{ GPa}$ and $I = 160 \times 10^6 \text{ mm}^4$. 15

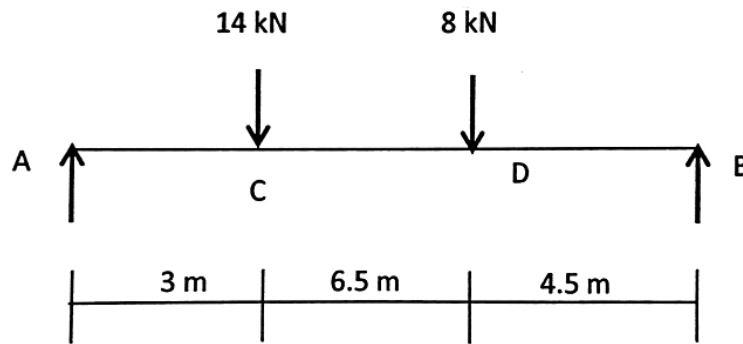


Fig.4

Section B

Q.6 Attempt any five. 10

1. What do you understand by horizontal thrust? Give expression for it.
2. Define linear arch.
3. State Clapeyron's theorem of three moments.
4. What is normal thrust in parabolic arches?
5. A three hinged parabolic arch of span 31m and central rise of 6m loaded with point load of 12kN at 12m from left end. Calculate horizontal and Normal thrust of the arch.
6. What are the advantages of continuous beam?
7. What are stiffening girders?

Q.7 Analyze the continuous beam and determine moments over beam and reactions at the supports. Also draw SFD and BMD. 15

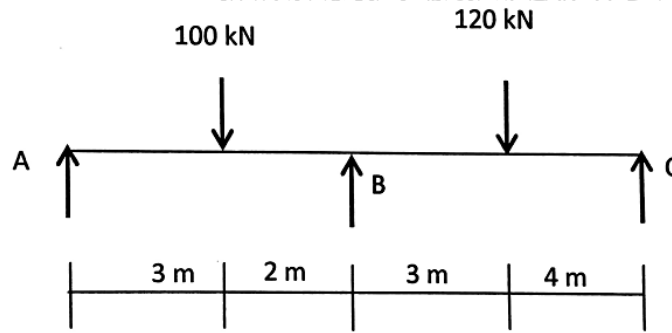


Fig.5

Q.8 For the span shown in figure 6, obtain bending moment at section P, 20m from A due to loads in the position indicated. Also determine position and value of maximum bending moment. 15

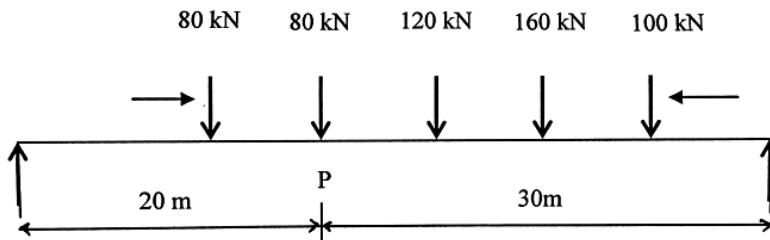


Fig.6

Q.9 A three hinged parabolic arch of span 21m has rise of 5m. The arch carries point load of 80kN at 6m from left support. Find the reactions at support A and B. draw bending moment for arch and indicate position of maximum bending moment. 15

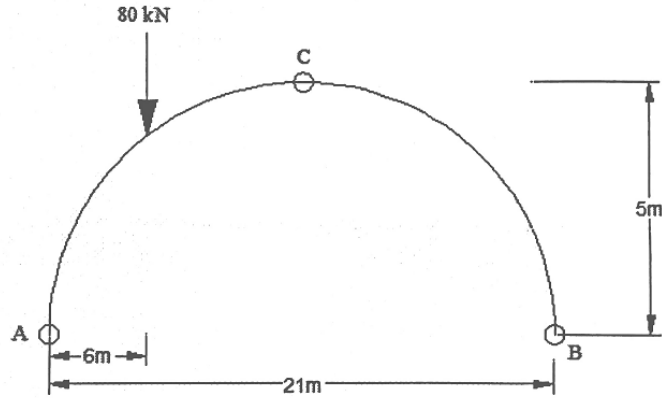


Fig.7

Q.10 The three hinged stiffening girder of a suspension bridge of span 120m is subjected to 2 point loads 15 of 220kN and 260kN at distance of 25m and 80m from left end. Find S.F. and B.M. at distance of 40m from left of girder. The cable has a dip of 12m at center. Also find maximum tension in cable and draw B.M. for girder.

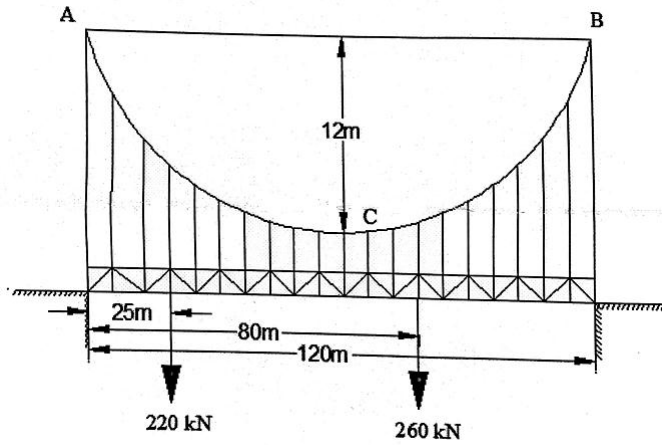


Fig.8

Total No. of Printed Pages:03

SUBJECT CODE NO: H-274
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (Civil)
Theory of Structure-I
(OLD)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B
- i. Attempt any three questions from each section.
 - ii. Figures to right indicate the maximum marks.
 - iii. Non – programmable calculator is allowed.
 - iv. Assume suitable data, if any.

Section A

Q.1 Draw the SFD & BMD for the fixed beam as shown in figure 1. 13

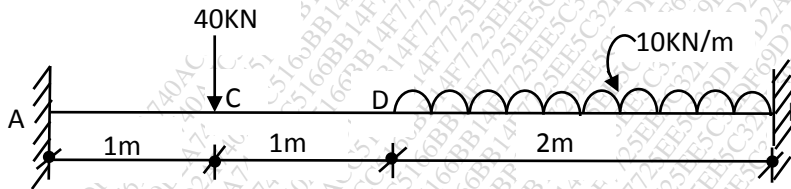


Figure No. 1

Q.2 A beam of length 10m is simply supported at its ends as shown in following figure 2. Determine the deflection of the beam at its midpoint and also the position of maximum deflection. Take $E = 200 \times 10^3 N/mm^2$ and $I = 5.0 \times 10^8 mm^4$. 13

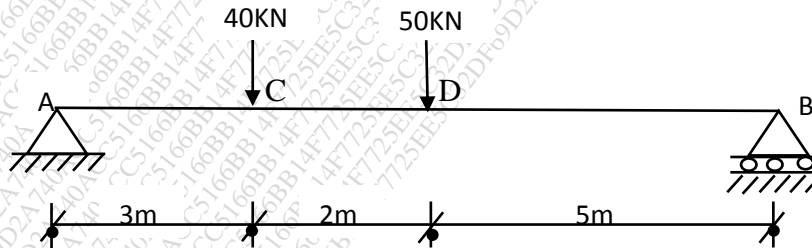


Figure No. 2

Q.3 Two rod AC & BC are hinged at C and carrying a load of 80 kN at C as shown in fig.3. Determine vertical & horizontal deflection at joint C. area of $AC = 1000 mm^2$ & of $BC = 1500 mm^2$ $E = 210 GPa$ 13

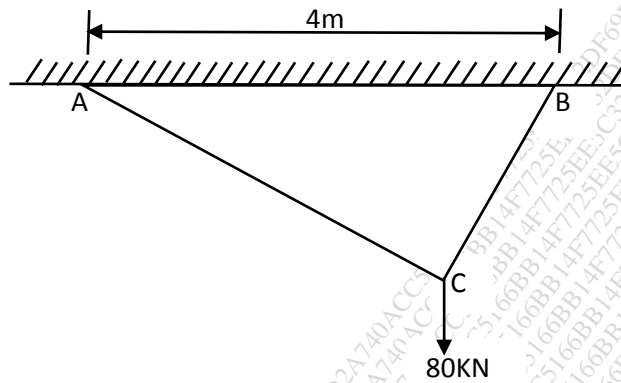


Figure No. 3

- Q.4
- a) Explain difference in between riveted and welded connections? 05
 - b) Find the size of the fillet weld required to connect the back d plate to the column as shown in fig: 04. The permissible stress in weld is 150 N/mm^2 . 08

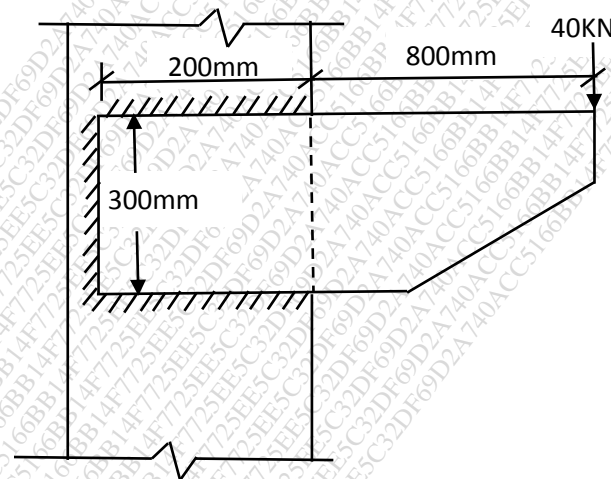


Figure No. 4

- Q.5 Write a short notes on (Any four) 14
- a) Different types of welded connections. 04
 - b) Write down the fixed ends moments of fixed beam subjected to
 - i) Point load 04
 - ii) udl
 - iii) uvl
 - c) Williot diagram 03
 - d) Advantages and disadvantages of riveted joints 03
 - e) Difference in between fixed and simply supported beam. 03

Section B

Q.6 Draw BMD of fixed beam as shown in figure 5 by using three moment theorem. 14

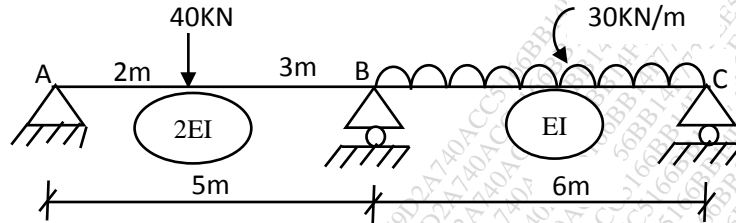


Figure No.5

Q.7 A train of a wheel load as shown in fig.6 crosses a simply supported beam of span 40m from left to right with point loading. Using influence line diagram, determine the maximum bending moment under central load.

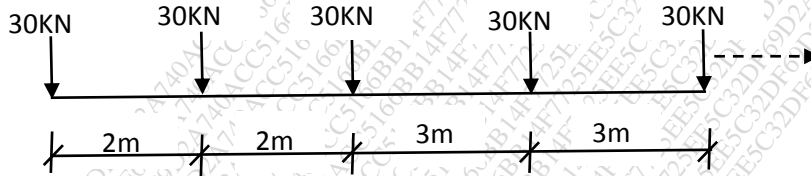


Figure No.6

Q.8 A three hinged parabolic arch of span 30m and central rise of 5m carry UDL of 20 kN/m over the left half span and a point load of 125 kN at 16m from left support. Find normal thrust, radial shear, & BM at distance of 6m from left support. 13

Q.9 For a cable suspension bridge with span 350m & central dip 35m, which is stiffened by three hinged 13 stiffening girder? The girder carries two point load of 60kN and 70kN at distance of 70m & 250m from left support. Draw the bending moment diagram.

Q.10 Write a short notes on (any four) 14

- a) Normal thrust and Radial shear. 04
- b) Influence line diagram. 04
- c) Difference between fixed beam and continuous beam. 03
- d) Construction feature of suspension bridge 03
- e) Difference between straight beam and arch beam. 03

Total No. of Printed Pages:3

SUBJECT CODE NO:- H-357
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (Civil)
Fluid Mechanics-I
(OLD)

[Time: Three Hours]

[Max.Marks:80]

- N.B Please check whether you have got the right question paper.
- i) Question No.1 & 6 are compulsory.
 - ii) Attempt any two questions from remaining question in each section.
 - iii) Draw neat sketches wherever necessary.
 - iv) Assume suitable data, if necessary.

Section A

- Q.1 Attempt any Five 10
- 1) Define Newton Law of Viscosity and give its expression?
 - 2) Define Pressure and Centre of Pressure.
 - 3) Define Compressible and Incompressible Flow
 - 4) The diameter of a pipe at Section 1 & 2 are 15 cm & 20 cm respectively.
Find the discharge through pipe if velocity of water at Section 1. is 5m/sec.
 - 5) One litre of Crude Oil weighs 10.6 N Calculate its Specific Mass.
 - 6) Draw the neat diagram of U-tube differential manometer when two pipes are at different levels.
 - 7) Define local acceleration
 - 8) Define the Momentum correction factor.
 - 9) Define the specific volume & give its S.I. units.
 - 10) State Pascal laws.
- Q.2 (a) Derive an expression for the force exerted on a submerged vertical plane surface by static liquid and locate the position of centre of pressure. 10
 (b) A single column vertical Manometer is connected to a pipe containing liquid of specific gravity 0.8. The area of reservoir is 90 times the area of manometer tube. The reservoir contains mercury. The level of mercury in the reservoir is at height of 30 cm below the centre of pipe and difference of mercury levels in the reservoir and right limb is 50 cm. Find the pressure in a pipe.
- Q.3 (a) Show that the distance between the metacentric and centre of buoyancy is given by 08

$$BM = \frac{I}{\nabla}$$
 Where
 I= Moment of Inertia of a plan of Floating body at water surface about longitudinal axis.
 ∇ = Volume of the body submerged in liquid.

- (b) A solid cylinder of diameter 4.0m and a height of 6.0 m. Find the meta centric height of cylinder if the specific gravity of material of cylinder is 0.7 & it is floating in water with its axis. Vertical state whether the equilibrium is stable or unstable. 07
- Q.4 (a) Enlist the types of flow & explain each in detail. 08
 (b) The velocity vector in a fluid flow is given $V = 4x^3i - 10x^2Yj + 2tk$ Find the velocity and acceleration of a fluid particle at (2,1,3) at time t=1. 07
- Q.5 (a) Derive the expression for the velocity distribution for viscous flow through a circular pipe. Also sketch the velocity distribution and shear stress distribution across the section of a pipe. 08
 (b) Show and Explain the following types of fluid in Rheological diagram:- 07
 (i) Ideal Fluid
 (ii) Newtonian Fluid
 (iii) Non Newtonian Fluid
 (iv) Ideal Plastic Fluid
 (v) Real Fluid

Section B

- Q.6 Attempt any Five 10
 (i) Enlist the different forces present in fluid flow. For the Euler's equation of motion, which forces are taken into consideration.
 (ii) Define "Notch" and "Weir"
 (iii) Give the Bernoulli's equation for real fluid.
 (iv) Draw a neat sketch of Pitot –Tube.
 (v) Define the Hydraulic gradient Line and Total energy line.
 (vi) What is meant by water hammer.
 (vii) Define co-efficient of velocity of co-efficient of contraction.
 (viii) What do you mean by equivalent Pipe.
 (ix) What is Syphon.
- Q.7 (a) State the Bernoulli's theorem and derive the Bernoulli' equation from Euler's equation. 10
 (b) The rate of flow of water through a horizontal pipe is $0.4\text{m}^3/\text{sec}$. The diameter of pipe is suddenly enlarged from 300mm to 600mm. The pressure intensity in a smaller pipe is 14.734 N/cm^2 . Determine
 (i) Loss of head due to sudden Enlargement.
 (ii) Pressure intensity in the large pipe.
 (iii) Power lost due to enlargement.
- Q.8 (a) What is venturimeter? Derive an expression for a discharge through venturimeter? 08
 (b) The head of water over an orifice of diameter 100mm is 10m. The water coming out from Orifice is collected in a circular tank of diameter 1.5m. The rise of water level in this tank is 1.0m in 25 seconds. The co-ordinates of a point on the jet, measured from vena – Contracta are 4.3 m horizontal and 0.5 m Vertical. Find the co-efficient C_d , C_v and C_c . 07

- Q.9 (a) Obtain an expression for discharge over rectangular weir by using Francis Formula. Also consider velocity approach. 07
- (b) Find the discharge through a trapezoidal notch which is 1.2 m wide at the top and 0.50 m at the bottom and is 40 cm in height. The head of water on the notch is 30 cm. Assume C_d for rectangular portion as 0.62 while for triangular portion is 0.60. 08
- Q.10 (a) Derive an expression for head loss due to : 07
- (i) Sudden enlargement
- (ii) Sudden contraction.
- (b) A syphon of diameter 200mm connects two reservoirs having a difference in elevation of 20m. The length of syphon is 500m and the summit is 3.0 m above the water level in the upper reservoir. The length of the pipe from upper reservoir to the summit is 100mm. Determine the discharge through the syphon and also pressure at the summit. Neglect minor losses. The co-efficient of friction, $f=0.005$. 08

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-358
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (Civil) (CGPA)
Fluid Mechanics-I
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B

- 1) Question no1 and 6 are compulsory.
- 2) Attempt any two questions from each section.
- 3) Draw neat sketches whenever necessary.
- 4) Assume suitable data if necessary.

Section A

- Q.1 Answer the following (any five) 10
- (a) Define Weight Density and it's SI Units.
 - (b) Define Newtonian and Non-Newtonian fluid
 - (c) Define pressure and enlist different pressures.
 - (d) What do you mean by Buoyancy?
 - (e) Explain the term steady and un-steady flow.
 - (f) State Pascal law and give it's field application.
 - (g) Define Capillarity.
- Q.2 A) Prove that the vertical component of the resultant pressure on a sub-merged curved surface is equal to the weight of the liquid supported by the curved surface. 08
- B) A rectangular plane surface 2m wide and 3m deep lies in water in such a way that it's plane makes an angle of 30 degree with the free surface of water. Determine the total pressure force and position of centre of pressure, when the upper edge is 1.5m below the free surface. 07
- Q.3 A) Show that distance between the centre of gravity of floating body and meta-centre of floating body is given by $GM = \frac{I}{\nabla} - BG$, 08
- Where I= Moment of inertia of the plan of the floating body at water surface about longitudinal axis. ∇ = Volume of the body sub-merged in liquid.
- B) With neat sketches, explain the conditions of equilibrium for floating bodies and submerged bodies. 07
- Q.4 A) A 50 cm diameter pipe conveying water, branches into two pipes of diameters 40 cm and 30 cm respectively. If the average velocity in the 50 cm diameter pipe is 4 m/s. Find the discharge in this pipe. Also determine the velocity in 30 cm pipe if the average velocity in 40 cm diameter pipe is 3m/s. 06

B) Define the equation of continuity. Obtain an expression for continuity equation for a three dimensional flow. 09

Q.5 Answer the following question.

- (a) Distinguish between manometer and mechanical gauges. What are the different types of mechanical pressure gauges. 05
- (b) Define laminar and turbulent flow. Give one practical example of each. 05
- (c) What is Hagen Poiseuille's formula? Derive an expression for Hagen Poiseuille's Formula. 05

Section B

Q.6 Attempt any Five 10

- (a) Enlist the practical application of Bernoulli's Equation.
- (b) What do you mean by Pitot-Tube?
- (c) What are hydraulic co-efficient? Name them.
- (d) Define momentum correction factor.
- (e) Define Boundary layer thickness.
- (f) Define the term: Drag & Lift.
- (g) What is mean by boundary layer separation?

Q.7 (A) What is Euler's equation of motion? How will you obtain Bernoulli's equation from it. 08
 (B) A pipe of diameter 400mm carries water at a velocity of 25 m/s. the pressure at the points A and B are given as 29.43 N/cm² and 22.56 N/cm² respectively while the datum head at A and B are 28m and 30m. Find the loss of head between A and B. 07

Q.8 (A) Obtain an expression for time of emptying a tank through an orifice at its bottom 08
 (B) A 20 cm x 10 cm Venturimeter is inserted in a vertical pipe carrying oil of specific gravity 0.8 the flow of oil is in upward direction. The difference of levels between the throat and inlet section is 50 cm. The oil mercury differential manometer gives a reading of 30 cm of mercury. Find the discharge of oil. Neglect losses. 07

Q.9 (A) Find an expression for the discharge over triangular notch or weir in terms of head of water. 08
 (B) The head of water over a rectangular notch is 900 cm. The discharge is 500 lit/min. Find the length of the notch when Cd=0.62 07

Q.10 Write short note

- 1. What is difference between Notch and Weir 06
- 2. Discuss the end contraction of weir. 06
- 3. What is magnus effect? 03

Total No. of Printed Pages:3

SUBJECT CODE NO:- H-391
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (Civil)
Surveying-I
(OLD)

[Time: Three Hours]

[Max.Marks: 80]

Please check whether you have got the right question paper.

- N.B
- 1) Q.No.1 and Q.No.6 are compulsory.
 - 2) Solve any two questions from the remaining questions from each section.
 - 3) Figures to right indicate the maximum marks.
 - 4) Assume suitable data if necessary.

Section A

- Q.1 Attempt any five. 10
- a) State principal of compass surveying.
 - b) Differentiate between a plan and map.
 - c) Explain tape corrections.
 - d) What is local attraction?
 - e) Differentiate between triangulation and traversing.
 - f) What is declination?
 - g) What is intersection, when it is required?
 - h) What do you mean by transiting?
 - i) What type of orientation would you prefer and why?
 - j) What is well conditional triangle? Why it is prefer?
- Q.2 a) Explain with neat diagram of working of line ranger describe how you would range a chain line between two point which are not intervisible. 07
- b) Chain line intersect a pond two point A and B are taken on the chain line on opposite sides of the pond a line AC 250m long is set out on left of AB and another line AD 300m long is set out on right of AB points C, B and D are in same straight line lone CB and BD are 100m and 150m long respectively Calculate length of AB. 08
- Q.3 a) Explain surveyor compass and prismatic compass in details. 07
- b) Determine values of included angle in closed compass traverse PQRS in clock wise direction. Given fore bearing of their respective line are 08

Lines	FB
PQ	40°
QR	70°
RS	210°
SP	280°

Apply the check

- Q.4 a) Explain procedure for measurement for horizontal angle by repetition method using theodolite. 07
 b) Explain the field procedure for prolonging a line by double sighting using transit theodolite. 08
- Q.5 a) Explain in details procedure for solving a Two Point Problem. 08
 b) Explain following method of plain table survey. 07
 i. Intersection.
 ii. Resection.

Section B

- Q.6 Attempt any Five. 10
 a) Explain basic principle of anallatic lens.
 b) Explain consecutive coordinates and independent coordinate.
 c) What are the tacheometric constant?
 d) Enumerate fundamental line of transit theodolite.
 e) How is parallax eliminated?
 f) Define direct angle and deflection angle.
 g) Explain Bowditch rule for balancing closed traverse.
 h) State Different type of cross section.
 i) What is the object of preparing counter map?
 j) What is substance bar?
- Q.7 a) Describe dumpy level along with sketch. 07
 b) Write details note on profile levelling. 08
- Q.8 a) When Reciprocal levelling is done describe method along with sketch. 08
 b) What are the characteristics of counter line? 07
- Q.9 a) Derive an expression for finding out area with help of planimeter. 08
 b) An Embankment of width 10m and side slopes 1.5: 1 is required to be made on a ground which is level in a direction transverse to the centre line. The central heights at 40m intervals are as follows: 0.90, 1.25, 2.15, 2.50, 1.85, 1.35 and 0.85. 07
 Calculate the volume of earth work according to
 i. The trapezoidal formula and
 ii. The prismoidal formula.

Q.10

- a) Enumerate errors in stadia surveying. 07
- b) Techeometer is set up at a station A in the following reading where obtain on vertically held staff calculate the horizontal distance from A to B and RL of B, K=100 and C=0. 08

Station	Staff station	Vertical angle	Hair reading	Remarks
A	BM	-2°18	3.225,3.550,3.870	RL of BM=500m
	B	+8°36	1.650,2.515,3.310	

Total No. of Printed Pages:4

SUBJECT CODE NO:- H-392
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (Civil) (CGPA)
Surveying-I
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

N.B

Please check whether you have got the right question paper.

- i) Q. No.1 & Q. No.6 are compulsory.
- ii) Solve any two questions from the remaining questions from each section.
- iii) Assume suitable data if necessary.
- iv) Figures to the right indicate full marks.

Section A

Q.1 Solve any Five

10

- 1) What are the principles of Surveying?
- 2) Explain Indirect Ranging?
- 3) What are the classification based upon Instruments used.
- 4) What are the uses of surveying?
- 5) Define prism square? What is the principle of Prism square?
- 6) Define compass surveying?
- 7) What are the classifications of traversing, Explain?
- 8) What do you mean by Face left.
- 9) Define (i) Telescope normal
(ii) Swinging the telescope.
- 10) Define orientation? What are the personal Errors?

Q.2

- A) What are Instruments used in setting out right angles. Explain Briefly. 07
- B) A steel tape was exactly 30m long at 20°C when supported throughout its length under a pull of 10 Kg a line was measured with this tape under a pull of 15 Kg & at a mean temperature of 32°C & found to be 780M long the cross-sectional area of the tape =0.03 cm² & its total Weight = 0.693 kg and for steel =11 x 10⁻⁶ per °C & E for steel = 2.1 X 10⁶ Kg/cm² compute the true length of the line if the tape was supported during measurement 08
 - (i) At every 30m
 - (ii) At every 15m

Q.3

- (A) Explain field procedure for measurement of vertical angles with the help of neat sketch. 07
- (B) The following are the observed bearings of the line of a traverse ABCDEA with a Compass at a place where local attraction was suspected. 08

Line	F.B	B.B
AB	191°45'	13°0'
BC	39°30'	222°30'
CD	22°15'	200°30'
DE	242°45'	62°45'
EA	330°15'	147°45'

Find the correct Bearings of the lines

- Q.4 (A) Explain field Procedure for Measurement of Magnetic Bearing with the help of neat sketch 07
 (B) The following are length & bearing of a line the travers PQRS calculate SP. 08

Line	Length (M)	Bearings
PQ	248	30°
QR	320	140°
RS	180	210°
SP	?	?

- Q.5 (A) Enlist Accessories of plane table surveying. Explain Briefly with neat sketch 07
 (B) Explain Field procedure of plotting Few points by radiation method with neat sketch. 08

Section B

- Q.6 Solve any Five 10

- (1) Define Height of Instrument
- (2) What are different types of Bench Marks.
- (3) What are the objects of levelling
- (4) Define (i) I.S. (ii) F.S.
- (5) Define (i) B.M. (ii) Horizontal line
- (6) Define Differential levelling.
- (7) Give the Area formula by – Trapezoidal rule.
- (8) Give the volume formula by Prismoidal rule
- (9) Define Stadia? What are the uses of Contour Map?
- (10) Define (i) Level Surface
(ii) Vertical line.

- Q.7 (A) What are the temporary adjustments of a Dumpy levels? Explain the procedure in detail. 07
 (B) The following consecutive reading were taken with a level & 5 metre leveling staff on 08
 continuously sloping ground at a common interval of 20 metres 0.385, 1.030, 1.925, 2.825,
 3.730, 4.685, 0.625, 2.005, 3.110, 4.485. The reduced level of the first point was 208.125 on
 rule out a page of a level field book & enter the above readings. Calculate the reduced levels of
 the points by rise & Fall method & also the gradient of the line joining the first and the last
 point.

Q.8 (A) What are the Errors in levelling. Explain in detail. 07

(B) Following is the page of a level field book. Fill in the missing reading & calculate the reduced level of all the points. Apply the usual checks. 08

Station	B.S	I.S	F.S	Rise	Fall	R.L	Remarks
1.	3.250					_____	
2.	1.755		_____		0.750	_____	C.P.1
3.		1.950				_____	
4.	_____		1.920			_____	
5.		2.340		1.500		_____	
6.		_____		1.000		_____	
7.	1.850		2.185			250.000	C.P.2
8.		1.575				_____	
9.		_____		1.330		_____	
10.	_____		1.895		1.650	_____	CP.3
11.			1.350	0.750		_____	

Q.9 (A) Derive an expression for the Simpson’s rule 07

(B) A topographical map the areas enclosed within the contour lines and along the face proposed dam are given below 08

Contour	Area (m ²)
300	30.5
295	27.85
290	21.10
285	18.05
280	13.45
275	8.80
270	5.20
265	0.80
260	0.05

Calculate the volume of water Stored in the reservoir formed when the water level is at an elevation of 25 m using

- (i) Trapezoidal Formula
- (ii) Prismoidal Formula

Q.10 (A) Explain the procedure Field Measurement of Determination of tachometric constants with neat sketch 07

(B) The following observations were taken with a tacheometer fitted with an anallatic lens the staff 08 being held vertically the constant of the tacheometer is K=100 C=0

Instrument Station	H.I	Staff Station	Vertical angle	Staff Readings (m)	Remark
P	1.255	B.M	-4°20'0"	1.325 1.825 2.325	R.L. of B.M.
P	1.255	A	+6°30'0"	0.850 1.600 2.350	255.750M
B	1.450	A	-7°24'0"	1.715 2.315 2.915	

Calculate the R.L of B' & the distance between A & B.

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-427
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (Civil) (CGPA)
Concrete Technology
(REVISED)

[Time: Three Hours]

[Max.Marks:80]

- N.B Please check whether you have got the right question paper.
- i) Q. No.1 and Q.No.6 are compulsory. Attempt any two questions from each section from remaining.
 - ii) Draw Neat Sketch wherever necessary.
 - iii) Figure to the right indicates full marks.

Section A

- | | | |
|-----|--|----------------|
| Q.1 | Answer the following questions (Any five) | 10 |
| | <ol style="list-style-type: none"> (a) What is the reason behind unsoundness occurrence in cement. (b) What is Formwork where they are used. (c) What is the effect of moisture content in Aggregate. (d) Differentiate between Argillaceous and calcareous materials. (e) What are the factors promoting Alkali Aggregate reactions. (f) What is Laitance in concrete when it is occurred. (g) Differentiate between destructive and Non destructive Testing of concrete. (h) What is shrinkage and how it can be reduced. (i) What is robustness of concrete. (j) What is alkali aggregate reaction. | |
| Q.2 | <ol style="list-style-type: none"> (a) Enlist the type of cement and Explain any four with merit and demerits. (b) When the use of admixture is recommended. Explain the functions of any four Admixtures | 07
08 |
| Q.3 | <ol style="list-style-type: none"> (a) What are the various oxides present in cement. Explain the permissible limit of oxides in cement. (b) Why curing is necessary. Explain different type of curing used. (c) What is Bogue's compound. Explain the functions of Bogue's compound. | 05
06
04 |
| Q.4 | <ol style="list-style-type: none"> (a) What is gel-space ratio in concrete. Determine the theoretical strength of gel space ratio of a concrete made with 750 gm of cement with w/c ratio 0.47 for full Hydration and for 83% Hydration. (b) What are the Test conducted on concrete to know its strength. Explain Flexural Test with Neat sketch. | 08
07 |
| Q.5 | <ol style="list-style-type: none"> (a) Write a short note on Transporting of concrete (b) What is non destructive Testing of concrete. Explain ultrasonic pulse velocity Test. (c) Why bleeding occurred in concrete. Suggest some preventive measure to control bleeding and segregation in concrete. | 04
06
05 |

Section – B

- Q.6 Answer the following Questions (any five) 10
- What are the Factors to be considered in a mix design.
 - What is carbonation of concrete. How can reduced it.
 - What are the different methods of manufacturing of concrete. How they are different with each other.
 - What are the various causes of Failure of Formwork.
 - What is roller compacted concrete.
 - Enlist different type of repair used in concrete.
 - What is polymer concreting.
 - Factors affecting cracks in concrete.
 - What is mix design of concrete
 - Enlist material used for light weight concrete.
- Q.7 (a) Explain the mechanism of corrosion of reinforcement. 05
 (b) Write short Note on Symptoms and diagnosis of distress. 05
 (c) What is durability of concrete. Explain Factor affecting on durability of concrete. 05
- Q.8 (a) What are the data required for mix design of concrete. Explain step by step procedure for mix design of concrete. As per ACI211. 10
 (b) Which method is more suitable in under water concreting. Explain under water concreting with Neat sketch. 05
- Q.9 (a) Obtained a mix design of a concrete with Ingredient used in concrete shows the following properties [Grade of concrete M-35] Cement – opc 53 grade with specific gravity 3.15, w/c ratio – 0.47.
 Fine Aggregate conforming to zone –II with Finness Modulus 2.89 having specific gravity 2.73 with water absorption 1.79% and Moisture content is Nil.
 Coarse aggregate to be used 10mm NMSA with water absorption Nil and moisture content is 2.1% C.A. shows specific gravity 2.92. [Further suggested to Assume data if required and mention at right location].
 (b) What is ready mix concrete, what are the Advantages and ready mix concrete. 03
- Q.10 (a) Differentiate between High Strength concrete and High Performance concrete. 05
 (b) Explain Factors affecting on mix design with its role. 06
 (c) What is self compacted concrete. Where it is to be used. Write its advantages. 04

Total No. of Printed Pages:3

SUBJECT CODE NO: H-426
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E. (Civil)
Concrete Technology
(OLD)

[Time: Three Hours]**[Max.Marks: 80]**

Please check whether you have got the right question paper.

- N.B
- i) Solve any two questions from question No. 2 to 5 and any two from question no. 7 to 10
 - ii) Question No. 1 and Question No. 6 are compulsory
 - iii) Figures to right indicate the maximum marks
 - iv) Assume suitable data, If any

Section A

- Q.1 Answer the following questions (Any five) 10
- a) What are different grades of concrete & how they are designated?
 - b) What are methods of compaction of concrete?
 - c) What is formwork where they are used?
 - d) What are field tests conducted on cement?
 - e) What is curing? What are various methods?
 - f) What are water reducers?
 - g) Enlist the different types of non-destructive testing?
 - h) What is bulking of aggregate?
 - i) Enlist properties of hardened concrete.
 - j) What the classification of aggregates?
- Q.2 08
- a) What are physical properties of hardened concrete?
 - b) What are the factors affecting workability of concrete? 07
- Q.3 08
- a) Enlist the types of cement? Explain any two.
 - b) Explain accelerators & retarders admixtures? 07
- Q.4 08
- a) Explain importance of size, shapes & texture of aggregate in strength of cement.
 - b) What is non-destructive testing? Explain ultrasonic pulse Velocity. 07
- Q.5 Write a short note on (any three) 15
- a) Types of Formwork
 - b) Initial & final setting time importance & why they are necessary
 - c) Destructive & non-destructive testing of concrete
 - d) Slump test on concrete
 - e) Workability of concrete

Section B

- Q.6 Answer the following questions (Any five) 10
- What is self-compacting concrete?
 - What is the concept of mix design?
 - What are steel fibers? Enlist three types.
 - What is aerated concrete?
 - What does it mean by polymer concrete?
 - What is carbonation of concrete?
 - Define permeability & durability
 - What is modulus of rupture?
 - Enlist the wastage used in concrete
 - How chemical attack & acid attack will occur on concrete?
- Q.7 Design a concrete mix of grade M40 to suit following data as per IS 10262 15
- Type of cement OPC 43 grade
 - Specific gravity of cement-3.15
 - Max nominal size of aggregate-20mm
 - Types of aggregates-crushed angular aggregates
 - Min. cement content – $320\text{kg}/\text{m}^3$
 - Water cement ratio- 0.45
 - Workability : 150 mm slump
 - Method of concrete placing-pumping
 - Max. cement content- $450\text{ kg}/\text{m}^3$
 - Chemical Admixture type – Plasticizers
 - Sp. Gravity of C.A. 2.8
 - Sp. Gravity of F.A. 2.6
 - Water absorption : Coarse agg- 0.5%
Fine agg. – 1.0%
- Q.8 a) What is fiber reinforcement concrete? Explain in detail different types of fibers? 08
b) Explain high density concrete? 07
- Q.9 a) What is cold weathering concrete? Explain will respect to low temp above 0°C & low temp below 0°C ? 08
b) What does it mean strength, mean strength, variance, standard deviation & coefficient of variance in Mix design? 07
- Q.10 Write a short note on (Any three) 15
- Roller compacted concrete
 - Factors affecting corrosion of concrete
 - Self-compacting concrete
 - Evolution of cracks
 - Special concrete

Table 1: maximum water content per Cubic Meter Concrete for Nominal Max. Size of Aggregates
(25 to 50 mm slump)

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

Table 2: volume of coarse Aggregates per unit Vol. of Total Aggregates for different Zones of Fine Aggregates

Sr. No.	Nominal Max. Size of Aggregates (mm)	Vol. of Coarse Aggregates per Unit volume of total Aggregates for Different Zones of Fine Aggregates			
		Zone IV	Zone III	Zone II	Zone I
i.	10	0.50	0.48	0.46	0.44
ii.	20	0.66	0.64	0.62	0.60
iii.	40	0.75	0.73	0.71	0.69