

Total No. of Printed Pages:02

**SUBJECT CODE NO:- H-131**  
**FACULTY OF SCIENCE AND TECHNOLOGY**  
**S.E. (Civil) (Sem-II)**  
**Building Construction & Drawing**  
**[Revised]**

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

- N.B Please check whether you have got the right question paper.
1. Q. No. 1 and Q. No. 6 are compulsory.
  2. Solve any two questions from remaining questions from Section A and Section B.
  3. Assume suitable data, if necessary.
  4. Use separate drawing sheet for solving Q.No.7 of Section B.

**Section A**

- |     |   |          |
|-----|---|----------|
| Q.1 | Attempt any five:-  | 10       |
|     | <ol style="list-style-type: none"> <li>a) Enlist the different types of buildings as per the National building code of India.</li> <li>b) State the requirements to be fulfilled by partition walls.</li> <li>c) Enlist the various elementary principles of planning of a building.</li> <li>d) Define Built up area and carpet area.</li> <li>e) Define Safe bearing capacity of soil.</li> <li>f) Specify the soil condition where pile foundation is recommended.</li> <li>g) Explain – Privacy.</li> </ol> |          |
| Q.2 | <ol style="list-style-type: none"> <li>a) Explain Sun path diagram with its application in building planning.</li> <li>b) What do you understand by energy efficient building? Explain.</li> </ol>  | 08<br>07 |
| Q.3 | <ol style="list-style-type: none"> <li>a) What are the objects of providing foundations to the structure? Explain combined footing with neat sketch.</li> <li>b) What are the minimum areas for different rooms in residential building as per Bye laws?</li> </ol>   | 08<br>07 |
| Q.4 | <ol style="list-style-type: none"> <li>a) If one of the column lies just at the edge of property line (Plot boundary) then which foundation is more suitable? Explain with neat sketch.</li> <li>b) State the various types of structure and explain with sketch the framed structure.</li> </ol>   | 08<br>07 |
| Q.5 | Write a short note on :- (Any Three) <ol style="list-style-type: none"> <li>a) Building line and control line</li> <li>b) Roominess</li> <li>c) Setting out Foundation</li> <li>d) Building Bye-laws</li> </ol>   | 15       |

## Section B

- Q.6 Attempt any Five. 10
- What is head room?
  - What is purpose of providing cavity walls?
  - Define foundation and mention its objects.
  - What is a construction joint in building?
  - What are the causes of dampness?
  - When double scaffolding is used?
  - Enlist the factors affecting the acoustical design of an auditorium.
- Q.7 Draw a plan of residential bungalow for a family in new Aurangabad township. 15  
 Plot size- 11m×15m.  
 Scale- 1:50  
 Required Components- Drawing hall, Kitchen, Master bedroom- 1 No., Bedroom-1 No., Dog-legged staircase, WC and bath.  
 Draw-
- Working drawing plan
  - Elevation
  - Section through WC/bath and staircase
  - Schedule of opening
  - Construction notes
- Q.8 a) Design a Dog-legged staircase for a building in which the vertical distance between the floors is 3.6m. The stair hall measures 2.5m×3m. Draw a neat sketch explaining different components. 08
- b) Explain in details Acoustic defect. 07
- Q.9 a) Explain water proofing materials and methods involved in water proofing. 08
- b) Write a note on Escalators. 07
- Q.10 a) With the help of neat sketches write down the various types of stairs and their suitability. 08
- b) Write a detailed note on Shoring. 07

Total No. of Printed Pages:2

**SUBJECT CODE NO:- H-132**  
**FACULTY OF SCIENCE AND TECHNOLOGY**  
**S.E. (Civil) (Sem-II)**  
**Building Construction & Drawing**  
**[OLD]**

[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 from section A and section B.
  - iii) Assume suitable data, if necessary
  - iv) Use separate drawing sheet for solving Q.No.7 of section B.

**Section – A**

- |     |   |          |
|-----|---|----------|
| Q.1 | Attempt any Five.   | 10       |
|     | <ol style="list-style-type: none"> <li>a) What is FSI?</li> <li>b) Define safe bearing capacity.</li> <li>c) What is building line?</li> <li>d) When underpinning is done.</li> <li>e) What is the purpose of providing partition walls?</li> <li>f) Enlist the different components of a framed building in order of construction.</li> <li>g) What is the difference between floor area and carpet area?</li> </ol> |          |
| Q.2 | <ol style="list-style-type: none"> <li>a) Explain how principles of planning can be utilized while planning a residential building.</li> <li>b) Classify the buildings as per the National Building code-2005.Explain any two building in details.</li> </ol>   | 08<br>07 |
| Q.3 | <ol style="list-style-type: none"> <li>a) State the various types of structure and explain with sketch the load bearing structure</li> <li>b) Write a note on –Foundation in black cotton soil.</li> </ol>  | 08<br>07 |
| Q.4 | <ol style="list-style-type: none"> <li>a) What do you understand by energy efficient building? Explain.</li> <li>b) What are the causes of failure of Foundation? Explain any two in detail.</li> </ol>   | 07<br>08 |
| Q.5 | <ol style="list-style-type: none"> <li>a) Write a note on Building bye-laws.</li> <li>b) What do you understand by setting out foundation? Explain with neat sketch.</li> </ol>   | 08<br>07 |

**Section – B**

- |     |  |    |
|-----|--|----|
| Q.6 | Attempt any Five.  | 10 |
|     | <ol style="list-style-type: none"> <li>a) What is the purpose of shoring?</li> <li>b) When double scaffolding is used</li> <li>c) What is construction joint in building?</li> <li>d) Define reverberation of sound.</li> <li>e) What is Soffit?</li> <li>f) Enlist the safety gear which is essential for working on construction site.</li> <li>g) List out the different types of staircase?</li> </ol> |    |

- Q.7 Draw to scale of 1:50, working plan. Section through stair and front elevation for given data of a building- 15  
 Plot area = 11m X 13m  
 Requirements – Drawing hall Kitchen. Master bedroom-1 no, Bedroom- 1 no, Doglegged staircase, WC and bath.  
 Also show schedule of opening and construction note.
- Q.8 a) Write a note on Escalators. 08  
 b) Design a Dog-legged staircase for a building in which the vertical distance between the floors is 3.6m. The stair hall measures 2.5m X3m. 07
- Q.9 a) Discuss the importance of safety in construction. 08  
 b) Write a note on wall cladding. 07
- Q.10 a) Write a short on Raking Shoring. 08  
 b) Explain the usual provisions that may be made in making a building fire resistant. 07

Total No. of Printed Pages:2

**SUBJECT CODE NO:- H-166**  
**FACULTY OF SCIENCE AND TECHNOLOGY**  
**S.E. (Civil) (Sem-II)**  
**Fluid Mechanics- II**  
**[Revised]**

[Time: Three Hours]

[Max. Marks:80]

- N.B
- Please check whether you have got the right question paper.
- Question No's 1 and 6 are compulsory.
  - Answer any 2 questions from remaining each section.
  - Assume suitable data if necessary and state it clearly.
  - Figure to the right indicates full marks.

**SECTION – A**

- |     |   |          |
|-----|---|----------|
| Q.1 | Attempt any Five  | 10       |
|     | <ol style="list-style-type: none"> <li>Define steady and unsteady flow.</li> <li>What are the difference between pipe flow and open channel flow.</li> <li>State the difference between gradually varied flow and rapidly varied flow.</li> <li>Define specific energy.</li> <li>Define boundary layer thickness</li> <li>Define Froude number</li> <li>What do you mean by energy dissipation?</li> </ol>  |          |
| Q.2 | <ol style="list-style-type: none"> <li>Explain specific energy, alternate depth, subcritical flow and supercritical flow, critical depth with neat sketch.</li> <li>A channel, 8m wide, conveys <math>15\text{m}^3/\text{s}</math> of water at a depth of 1.2m. Calculate:               <ol style="list-style-type: none"> <li>Specific energy of the flowing water.</li> <li>Critical depth, critical velocity and minimum specific energy.</li> <li>Froude number and state whether flow is subcritical or supercritical.</li> </ol> </li> </ol> | 07<br>08 |
| Q.3 | <ol style="list-style-type: none"> <li>Define hydraulic jump and derive the expression for depth of hydraulic jump.</li> <li>Explain the most economical section of channel. In which situations, the rectangular channel section can become most economical? Derive the relations involved.</li> </ol>   | 08<br>07 |
| Q.4 | <ol style="list-style-type: none"> <li>Derive an expression for momentum equation applied to channel flow.</li> <li>Derive an expression for the discharge through a channel by chezy's formula.</li> </ol>   | 07<br>08 |
| Q.5 | Write short note on: (any three) <ol style="list-style-type: none"> <li>Characteristics of boundary layer</li> <li>Separation of boundary layer</li> <li>Drag Force</li> <li>Computation of GVF by direct step method</li> </ol>  | 15       |

## SECTION – B

- Q.6 Attempt any Five. 10
- Define dimensional homogeneity
  - State the classification of turbine
  - Define negative slip of reciprocating pump.
  - Give the formula for work done by double – acting reciprocating pump.
  - What do you mean jet propulsion?
  - Define Reynold's number
  - Differentiate between reaction turbine and impulse turbine.
- Q.7 a) Find an expression for force exerted by jet on stationary curved plate. 07  
 b) nozzle of 6cm diameter delivers a stream of water at 30m/s 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) Obtain an expression for work done by the centrifugal pump on water. 07  
 b) A centrifugal pump discharging 400 lit/sec, against – a head of 25m, runs at 1500 rpm. If the vane angle at outlet is  $30^\circ$ , and the diameter and width of impeller at outlet are 500mm and 15mm respectively, calculate the manometric efficiency. 08
- Q.9 a) Write short note on Pelton wheel turbine with neat sketch. 07  
 b) A pelton wheel is having a mean bucket diameter of 0.8m and is running at 1000r.p.m. the net head on the pelton wheel is 400m of the side clearance angle is  $15^\circ$  and discharge through nozzle is 150 liters/ sec, find 08  
 i) power available at the nozzle &  
 ii) Hydraulic efficiency of the turbine.
- Q.10 Write short note on (any three) 15  
 a) Buckingham's pi method  
 b) Rayleigh method  
 c) Cavitation in turbine  
 d) Draft tube

Total No. of Printed Pages:3

**SUBJECT CODE NO:- H-167**  
**FACULTY OF SCIENCE AND TECHNOLOGY**  
**S.E. (Civil) (Sem-II)**  
**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 question from each section
3. Assume suitable data if necessary.

**Section -A**

- Q.1 Solve any five from following 10
- a) What are major and minor losses through pipe?
  - b) Give equation used to find diameter in case of equivalent pipe?
  - c) Find the loss of head due to sudden enlargement if  $V_1 = 7.96 \text{ m/s}$  &  $V_2 = 1.99 \text{ m/s}$ .
  - d) Draw neat sketch of Venturiflume
  - e) Define back water curve
  - f) Define steady flow and unsteady flow in open channels
  - g) Find the perimeter for channel rectangular in shape with depth 5.0M and width 7.0M.
- Q.2 07
- a) Show that the hydraulic mean depth of a trapezoidal channel having the best positions is half of the minimum depth.
- b) Find the most economical cross section of a rectangular channel to carry 400lit/sec of water when channel slope is 1 in 1000. Take  $C=50$ . 08
- Q.3 07
- a) A channel is to be designed to give a constant mean velocity of flow of 1.8 m/sec. at all depth of flow. The lower portion of the channel to carry the minimum discharge is rectangular and the best proportion, the bottom width being 1.5 m Determine the depth of flow when the width of water surface is 9 m. if Manning 's  $n=0.015$ , find the channel bed slope.
- 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 08
- Q.4 07
- a) What do you mean by dimensional analysis? How it is useful?
- b) A 6.2 m high and 15m long spillway discharges  $68 \text{ m}^3/\text{sec}$ . discharge under a head of 2.0m If 1:8 scale model of this spillway is to be constructed determine model dimensions, and head over spillway model and the model discharge . 08



Q.5 Write short notes on following (any three)

15

- 1) Dimensional homogeneity
- 2) Distorted and non- distorted model
- 3) Specific energy curve
- 4) Current meter

### Section – B

Q.6 Solve any five from following

10

- a) Define Impulse and Reaction Turbines?
- b) Specific Force, Critical Depth ,Critical Flow
- c) What is Specific Speed, Unit speed of turbine
- d) List the functions of draft tube
- e) Define Runway Speed
- f) Draw velocity triangle of pelton wheel turbine
- g) Give the range of specific speed values of the Kaplan, Francis turbines and pelton wheels

Q.7 a) Derive an expression for the force exerted by jet of fluid on a stationary flat plate.

07

- b) A jet of water having a velocity of 40 m/sec. strikes a curved vane which is moving with a velocity of 20m/sec. the jet makes an angle of  $30^\circ$  with the direction of motion of vane at inlet and leaves at an angle of  $90^\circ$  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) What is a draft tube? Why is it used in a reaction turbine? Describe with sketch two different types of draft tubes.

07

- b) A Francis turbine running at 400 r.p.m when head available is 60m. the inner and outer diameters are 50cm and 100 cm respectively. The constant velocity of the flow through the runner is 10m/sec and hydraulic efficiency is 80% Determine the inlet and outlet blade angles of the rotating blades.

08

Q.9 a) Draw neat sketch of

07

- 1) Vortex casing
- 2) Two- stage pumps with impeller in series

- b) A single acting reciprocating pump has piston of diameter 150 mm and stroke of length 250 mm the piston makes 50 double strokes per minutes. The suction and delivery heads are 5m and 15m respectively. Find :

08



- I) Discharge capacity of the pump in liters per minutes
- II) Force required to work the piston during the suction and delivery strokes if the efficiency of suction and delivery strokes are 60 % and 75% respectively.

Q.10 Write short notes on following (any three)

15

- I) Hydraulic ram
- II) Hydraulic press
- III) Hydraulic Accumulator
- IV) Hydraulic crane

Total No. of Printed Pages:2

**SUBJECT CODE NO:- H-201**  
**FACULTY OF SCIENCE AND TECHNOLOGY**  
**S.E. (Civil) (Sem-II)**  
**Surveying –II**  
**[Revised]**

[Time: Three Hours]

[Max. Marks:80]

Please check whether you have got the right question paper.

N.B.:1) Question No.01 and 06 are compulsory.

2) Solve any two questions from remaining questions from each section.

3) Figure to right indicates full marks.

Section – A

- |     |   |    |
|-----|---|----|
| Q.1 | Attempt the following (any five)  | 10 |
|     | a) What is relationship between radius and degree of curve?<br>b) Define compound curve with a neat sketch<br>c) Give the situations where reverse curve is used.<br>d) What is most probable value?<br>e) Give the theory of least square<br>f) What is principle of triangulation?<br>g) What is direct and indirect observation? |    |
| Q.2 | a) What are the elements of simple circular curve? Explain how simple curve is designated?  | 07 |
|     | b) Two curves having a deviation of $52^{\circ}30'$ are joined by a $8^{\circ}$ curve. Chainage at intersection is 7825m. Calculate necessary data and explain how to set curve by chain and offset only.   | 08 |
| Q.3 | a) Define Super elevation. Obtain expression for it as applicable on highway and railway. What is cant deficiency?  | 08 |
|     | b) Explain Bernoulli's lemniscate curve.  | 07 |
| Q.4 | a) Define satellite station Derive expression for satellite station reduction to centre.  | 07 |
|     | b) The following are the observed values of A,B and C at a station, the angles being subject to the condition that $A + B = C$<br>$A = 30^{\circ}12' 28.2''$<br>$B = 35^{\circ}48' 12.6''$<br>$C = 66^{\circ}0' 44.4''$ , Find the most probable values A, B and C.   | 08 |
| Q.5 | Write a short note on (any three)   | 15 |
|     | a) Reverse Curve<br>b) City Surveying<br>c) Triangulation figures<br>d) Signals and towers  |    |

## Section – B

- Q.6 Attempt the following (any five) 10
- Define Stereoscopy.
  - What is principle behind EDM?
  - Enlist equipment needed for sounding
  - What is active and passive remote sensing?
  - Give the four uses of hydrographic Surveying
  - Define vertical and tilted photograph
- Q.7 a) Derive the expression for relief displacement in aerial surveying 07
- b) A camera having focal length of 20cm is used to take a vertical photograph to a terrain having an average elevation of 1550m. What is the height above sea level at which an aircraft must fly in order to get a scale of 1:9000? 08
- Q.8 a) Explain key components of GIS 07
- b) Explain different types of spatial data used in remote sensing. 08
- Q.9 a) Explain any two methods of locating sounding 07
- b) What is procedure to conduct aerial survey? 08
- Q.10 Write a short note on (any three) 15
- Remotes sensing platforms
  - Fathometer
  - Terrestrial Photogrametry
  - Electromagnetic Distance Measurement (EDM)
  - Applications of GIS

Total No. of Printed Pages:2

**SUBJECT CODE NO:- H-202**  
**FACULTY OF SCIENCE AND TECHNOLOGY**  
**S.E. (Civil) (Sem-II)**  
**Surveying – II**  
**[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.
  - (v) Non-programmable Calculator is allowed.

**Section A**

- |     |   |    |
|-----|---|----|
| Q.1 | Answer the following questions (Any five)   | 10 |
|     | <ul style="list-style-type: none"> <li>a) What is meant by base net?</li> <li>b) Enlist various types of signals?</li> <li>c) Define setting out of the culverts?</li> <li>d) State different methods of correlates?</li> <li>e) What do you mean by signals and towers?</li> <li>f) Mention various kinds of errors in surveying?</li> <li>g) Enlist different types of Engineering Survey?</li> </ul> |    |
| Q.2 | (a) Define <ul style="list-style-type: none"> <li>i. Independent quantity</li> <li>ii. Conditioned quantity</li> <li>iii. Weight of an observation</li> <li>iv. Most probable value</li> </ul>  | 08 |
|     | (b) In Triangulation adjustment state laws of weights?  | 07 |
| Q.3 | (a) Find the most probable values of the angles A and B from the following observation of Station O<br>$A = 9^{\circ}50'26''$ weight 2<br>$B = 54^{\circ}39'38''$ weight 3<br>$A + B = 102^{\circ}4'18''$ weight 4  | 08 |
|     | (b) What is phase of signal? Derive formula for the correction to be applied to cylindrical signal when the bright portion is bisected.   | 07 |
| Q.4 | (a) The following values were recorded for a triangle ABC the individual measurement being uniformly precise.<br>$A=60^{\circ}29'16''$ : 6 observations<br>$B=54^{\circ}45'36''$ : 8 observations<br>$C=58^{\circ}46'50''$ : 6 observations<br>Find the correct values of the angles?   | 08 |

(b) Write step by step procedure of setting out of culverts?

07

Q.5 Write a short notes on (any Three)

15

- Satellite station and reduction to center.
- Differentiate between setting out of the building & setting out of the culvert.
- Weisbach triangle.
- Instruments used in geodetic surveying.

### Section B

Q.6 Answer the following questions (Any five)

10

- How to find out the tangent length of simple circular curve?
- What is vertical curve?
- Explain the principle of EDM?
- Enlist different types of trigonometrical leveling?
- What is the Geodimeter?
- What is difference in between setting out of the building & setting out of the culvert?
- Differentiate between EDN and total station?

Q.7 (a) What is single plane and double plane methods of trigonometrical leveling? Explain in brief?

08

(b) Find the elevation of the top of a Chimney from following data:

07

Inst. Stations	Reading of B.M.	Angle of Elevation	Remarks
A	1.862	20°36'	R.L. of B.M. = 421.380m Distance AB=50m.
B	2.222	08°12'	

Stations A and B and the top of the Chimney are in the same vertical plane.

Q.8 (a) Two tangents AB & BC intersect at a point B at a chainage 150 m. Calculate all necessary data for setting out of a circular curve of radius 100m & deflection angle 30° by the method of offsets from the long chord?

08

(b) Derive the equations of simple circular curve by using the method of offsets from the chord produced?

07

Q.9 (a) Enlist different types of Electronic distance measurement instruments? Explain any one?

08

(b) Write down the step wise procedure of setting out of the building?

07

Q.10 Write a short notes on (any Three)

15

- Trigonometrical leveling
- Difference in between simple circular curve & compound curve.
- Characteristics of curve.
- Advantages and dis-advantages of Total Station.

Total No. of Printed Pages:4

**SUBJECT CODE NO:- H-273**  
**FACULTY OF SCIENCE AND TECHNOLOGY**  
**S.E. (Civil) (Sem-II)**  
**Theory of Structure-I**  
**[Revised]**

[Time: Three Hours]

[Max.Marks:80]

N.B

- Please check whether you have got the right question paper.
- Q.No.1 from section A and Q.No.6 from section B are compulsory.
  - Solve any two questions from remaining from section A and B each.
  - Use of non-programmable calculator is permitted.
  - Assume suitable additional data if required and state it clearly.

## Section A

Q.1 Attempt any five of the below:

10

- Draw and explain different types of riveted joints.
- Draw and explain effective throat thickness in case of Fillet welds.
- State different geometric methods for analysis of slope and deflection.
- Draw conjugate beam of a cantilever beam fixed at left end and free at right end subjected to udl 'w' over entire span of 'l'.
- Draw deflected shape of simply supported beam over span 'l' subjected to point load 'w' at mid span. Show the points where slope and deflection are maximum.
- Draw deflected shape of the structure as shown in figure -1

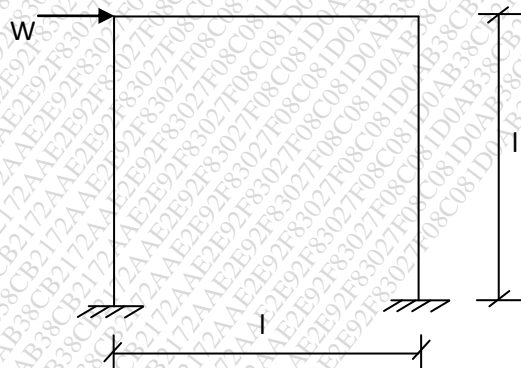


Figure 1

- Q.2 Determine the maximum load which can be applied to the fillet welds as shown in figure 2. Allowable shear stress in  $108\text{N/mm}^2$ .

15

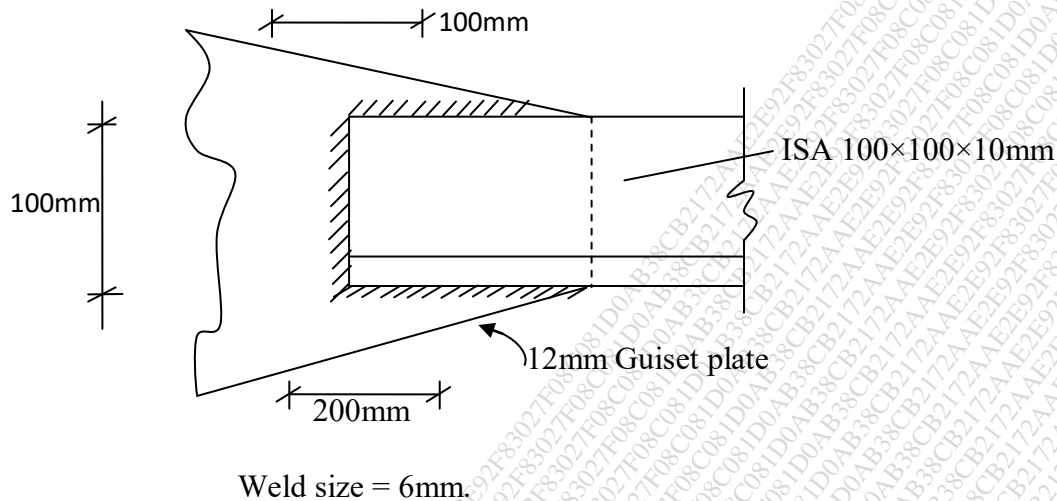


Figure 2

- Q.3 Analyze the beam as shown in figure 3 and draw BMD.

15

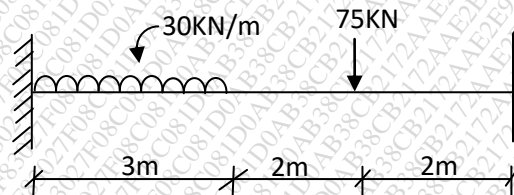


Figure 3

- Q.4 Analyse the beam as shown in fig.4 method using Macaulay's method and find maximum slope and deflection.  $E = 200\text{GPa}$ ,  $I = 80 \times 10^{-6}\text{m}^4$ .

15

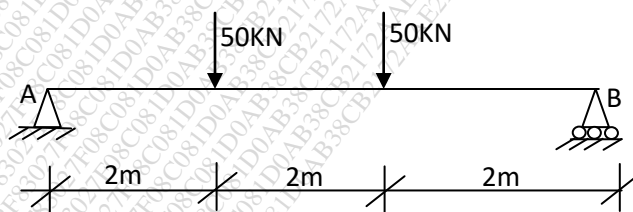


Figure 4



- Q.5 Analyse the beam as shown in figure 05. Using conjugate beam method and find maximum slope 15 and deflection.

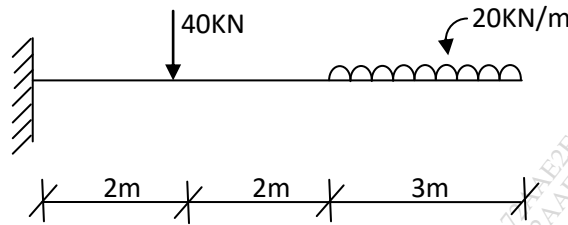


Figure 5

## Section B

- Q.6 Solve any five questions of the following: 10
- Write the three moment equation and explain the terms in the equation.
  - Draw influence line diagram for vertical reaction due to unit rolling load span of beam is 'l' fixed at A and free at B.
  - Define radial shear and normal thrust at a section in three hinged arch.
  - Define influence line.
  - State the equation to calculate equivalent udl in three hinged stiffening girder subjected to single rolling point load.
  - A three hinged parabolic arch has 16m span and 4m central rise. It carries a concentrated load of 150 kN at 4m from left support. Evaluate horizontal reactions.

- Q.7 Analyse the beam shown in fig.6 using Clapeyron's theorem and find support moments and reactions. Hence draw SFD and BMD.  $EI = \text{constant}$  15

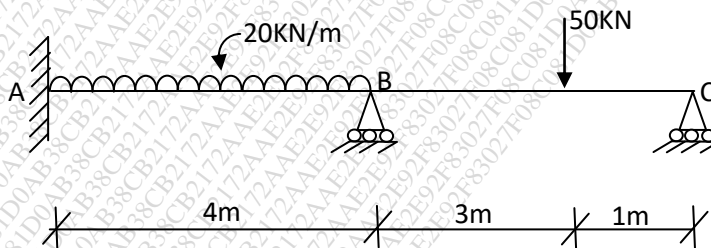


Figure 6

- Q.8 The load system shown in figure 7 crosses a girder 24m span. Find the maximum shear force and bending moment at a section 10m from the left support. 15

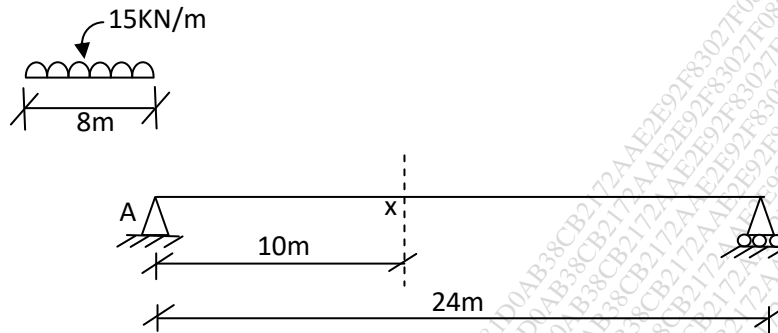


Figure 7

- Q.9 A three hinged stiffening girder of a suspension bridge has a span of 70m. the dip of the supporting cable is 7m. it carries two point loads 100kN and 120 kN at 15m and 30m from the left end. Find the shear force and bending moment on the girder at 40m from the left end. 15
- Q.10 A three hinged segmental arch has a span of 60m and rise of 6m. A 150kN load is acting at a point of 15m measured horizontally from the right hand support – find horizontal thrust, moment, normal thrust and radial shear at a section 15m from the left support. 15

Total No. of Printed Pages:3

**SUBJECT CODE NO:- H-274**  
**FACULTY OF SCIENCE AND TECHNOLOGY**  
**S.E. (Civil) (Sem-II)**  
**Theory of Structure-I**  
**[OLD]**

[Time: Three Hours]

[Max. Marks:80]

N.B:

Please check whether you have got the right question paper.

- i) Question No.1 and Question No.6 are compulsory.
- ii) Answer any two questions from the remaining four questions of each section.
- iii) Assume suitable data if necessary.

**Section A**

- Q.1 Attempt any five of following: 10
- i) Explain statically determinate and statically indeterminate structure.
  - ii) Explain assumptions made in the riveted connections.
  - iii) Explain Maxwell's Reciprocal Theorem.
  - iv) Explain moment Area method.
  - v) State the first theorem of Castigliano..
  - vi) Differentiate between statically determinate and statically indeterminate structure.
  - vii) What are advantages of welded connections?
- Q.2 a) Design a single riveted butt joint to resist the load of 200 KN, then the plates are 16 mm thick and connected by power driven shop rivet. The member is tension member. Tensile stress in the member of plate is  $0.6 P_y$ . Where  $P_y = 250 \text{ N/mm}^2$ . 10
- b) Explain different types of welded joint with sketch. 05
- Q.3 Find the maximum slope and deflection for the beam shown in fig.1. Use Macaulay's method. 15

$$\text{Take } E = 200 \times 10^3 \text{ N/mm}^2$$

$$I = 7 \times 10^7 \text{ mm}^4$$

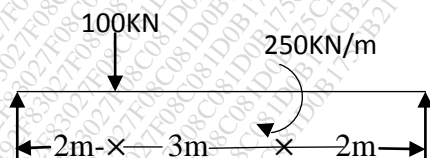


Fig.1

- Q.4 A truss shown in fig – 2 is so designed that under the given loading all tension members are stressed to  $150 \text{ N/mm}^2$  and all compression members to  $120 \text{ N/mm}^2$ . Find the vertical deflection of joint E.  $E = 200 \text{ KN/mm}^2$ . Find also the horizontal deflection of roller at end D. 15

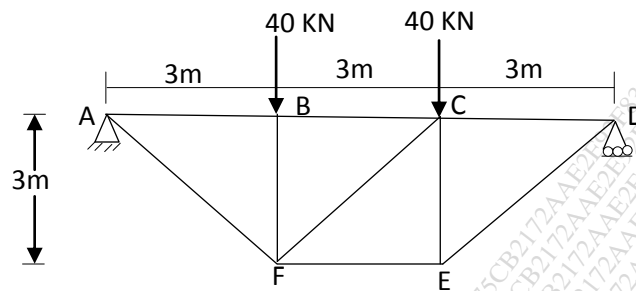


Fig.2

- Q.5 A fixed beam of span 8m is carrying a uniformly distributed load of 20kN/m over the entire beam. The support B sinks down by 10mm. Determine the fixed end moment at A and B, if the moment of inertia of the beam is  $9875 \times 10^4 \text{ mm}^4$  and  $E = 2 \times 10^5 \text{ N/mm}^2$  15

## Section B

- Q.6 Attempt any five of the following: 10
- Draw the neat sketch of suspension bridge and shown all its necessary components.
  - Explain advantages of continuous beam over fixed beam.
  - Explain the effect on a continuous beam, when one of the intermediate support sinks down.
  - What are the different uses of influence line
  - Explain the term
    - Normal thrust
    - Radial shear
  - Define strain energy different end conditions.
  - Explain williot diagram.

- Q.7 A continuous beam ABCD is fixed at A and simply supported at B and C, the beam CD is overhanging. The span AB=6m, BC=5m and overhanging CD=2.5m. The moment of inertia of the span BC is 2 I and that of AB and CD is I. The beam is carrying u.d.l of 2kN/m over the span AB, a point load of 5 kN in BC at a distance of 3m from B and a point load of 8 kN at the free end. Determine fixed moment at A,B,C & plot BMD. 15

- Q.8 A symmetrical three hinged parabolic arch has a horizontal span 20 m with central size of 3m. Both the support are at same level. Determine the max positive and maximum negative bending moment at a quarter span due to uniform moving load of 28 kN/m. 15

- Q.9 A train of a wheel load as shown in fig.3 crosses a simply supported beam of span 20m from left to right with 24 kN load leading. Using I.L.D. determine the maximum bending moment under central load. 15

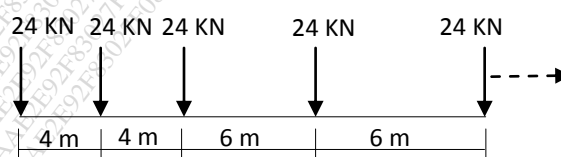


Fig.3

Q.10

- a) Explain the mode of failure of riveted joint.
- b) Prove Clapeyron's theorem of three moments.
- c) A three hinged parabolic arch of span 28 m and central rise of 5m is loaded with point load of 12 KN at 8m from left end, calculate the horizontal thrust 'H' on the arch.

05

05

05

Total No. of Printed Pages:3

**SUBJECT CODE NO:- H-322**  
**FACULTY OF SCIENCE AND TECHNOLOGY**  
**S.E. (Civil) (Sem-I)**  
**Strength of Materials**  
**[OLD]**

[Time: Three Hours]

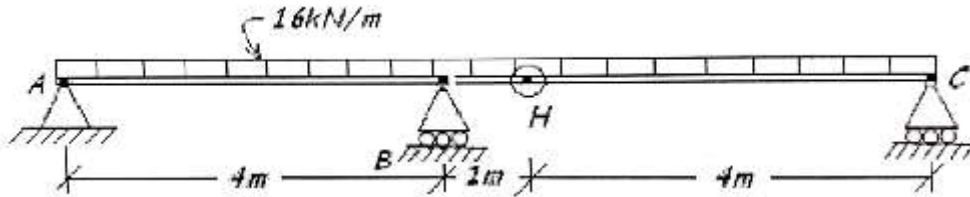
[Max. Marks:80]

Please check whether you have got the right question paper.

- N.B.: 1) Question no.01 and 06 are compulsory and Attempt any two questions from remaining questions from each section.  
 2) Non –Programmable calculator is allowed.  
 3) Figure to right indicate full marks.

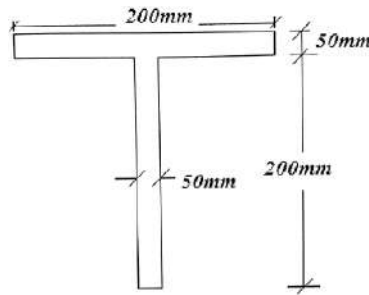
## SECTION – A

- Q.1 Attempt any five of the following: 10
- What is Complimentary Shear stress?
  - Define Modulus of Rigidity.
  - Define lateral strain.
  - What are the assumptions in pure bending?
  - Explain what Compound member is?
  - Define and explain Hook's Law.
  - Differentiate Elastic & Solid Bodies.
  - Write the Flexural formula and meaning of each word.
  - Explain Thermal Stress & Thermal Strain.
  - Enlist the types of loadings that may act on beam.
- Q.2 A horizontal beam 9m long is supported at A, B & C. The 'H' is an internal hinge. The beam carries UDL of 16kN/m throughout its length. Determine supports reaction. How much is the value of S. F. at the hinge 'H'. Plot SF & BM diagrams. Refer following figure. 15



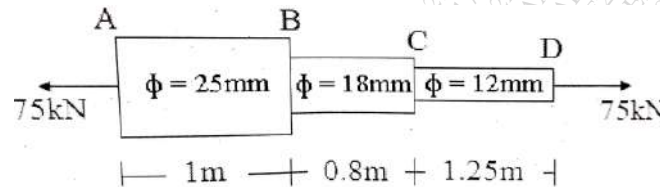
- Q.3 Derive the relation  $\frac{M}{I} = \frac{F}{Y} = \frac{E}{R}$  15
- Q.4 a) A T shaped cross section of a beam in following figure, is subjected to a vertical shear force of 120kN. Calculate the shear stress at the neutral axis and at the junction of the web and flange. 08





07

- b) Find the elongation be bar shown in figure. Take  $E=210\text{kN/m}^2$ .



- Q.5 A bar of steel is  $50 \times 40$  mm in section and 100 mm long. A compressive load of  $f_z=525\text{kN}$  act on  $40 \times 100\text{mm}$  face, compressive load  $f_y=650\text{kN}$  act on  $50 \times 100\text{mm}$  face and a tensile load of  $f_x=210\text{kN}$  act on  $50 \times 40$  mm face. Find the change in dimensions of bar and change in volume. Also find what axial longitudinal load alone can produce the same longitudinal strain as in first part. Take  $E=200\text{GPa}$  &  $\mu = 0.25$ . 15

## SECTION – B

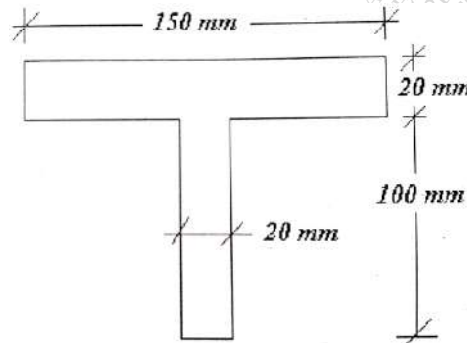
- Q.6 Attempt any five of the following: 10
- Define Proof resilience.
  - What is limit of eccentricity for hallow circular section.
  - Define the term Torsional Moment and What is angle of twist?
  - Define longitudinal stress.
  - Define angle of obliquity.
  - Enlist the different end conditions for columns.
  - What is polar moment of inertia for hollow rectangular section?
  - What are the assumptions in theory of torsion?
  - Explain core or Kernel of section.
- Q.7 a) A circular shaft is required to transmit 52 kw power at 242 rpm. The maximum torque may be 1.5 times the mean torque. The shear stress in shaft should not exceed  $41\text{ N/mm}^2$  and twist  $1.2^\circ$  / meter. Determine the diameter required if, i) The shaft is solid. ii) The shaft is hollow with external diameter twice the internal diameter. Take  $G=80\text{ GPa}$ . 08
- b) A load of 105N falls through a height of 2.8cm onto collar rigidly attached to the lower end of a vertical bar 1.3m long and of  $1.5\text{cm}^2$  cross sectional area. The upper end of the vertical bar is fixed. Determine: 07
- Maximum instantaneous stress induced in the bar.
  - Maximum instantaneous elongation. And
  - Strain energy stored in the vertical rod.
- Q.8 A rectangular strut is 160 mm wide & 120 mm thick. It carries a load of 22 kN at an 15



eccentricity of 10 mm in a plane bisecting the thickness. Find the maximum & minimum intensities of stress in the section.

- Q.9 The T – section as shown in figure is used as strut of length 6m. One end is hinged & other fixed, calculate Buckling load using Euler's formula Take  $E=200\text{GPa}$ .

15



- Q.10 A seamless cylindrical shell of 290mm diameter, 2.9m long and 6mm thick is subjected to an internal pressure of  $3.15\text{ N/mm}^2$ . Calculate the change in length, diameter and volume of cylinder under that pressure? Assume  $E = 2 \times 10^5\text{ N/mm}^2$ ,  $\mu = 0.3$ .

15

Total No. of Printed Pages:3

**SUBJECT CODE NO:- H-323**  
**FACULTY OF SCIENCE AND TECHNOLOGY**  
**S.E. (Civil) (Sem-I)**  
**Strength of Materials**  
**[Revised]**

[Time: Three Hours]

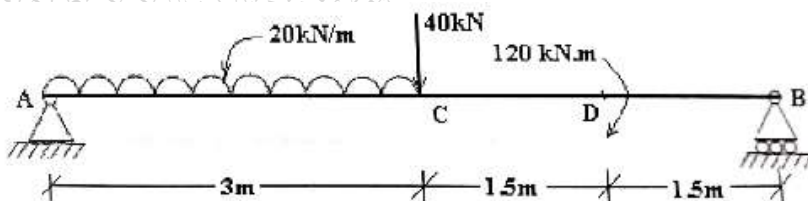
[Max. Marks:80]

Please check whether you have got the right question paper.

- N.B.: 1) Question no.01 and 06 are compulsory and Attempt any two questions from remaining questions from each section.  
 2) Non –Programmable calculator is allowed.  
 3) Figure to right indicate full marks.

## SECTION – A

- Q.1 Attempt any five of the following. 10
- Define and explain Hook's Law.
  - Define Modulus of Elasticity.
  - Write the Shear stress formula and meaning of each word.
  - Explain Volumetric Stress & Strain.
  - Enlist types of stresses & strain.
  - Define Neutral Axis.
  - Derive the formula for the Temperature stress in a bar.
  - What are the assumptions in pure bending?
  - Explain what Composite member is?
  - Define Poisson's ratio.
- Q.2 A steel block 500x400x200mm is subjected to tri-axial loading A force of 8200kN compressive on 500x400mm face. A force of 690 kN tensile on face of 400x200mm and a force of 310kN compressive on face of 500x200mm. Determine the change in volume. What change must be made in 8200kN load so that the volume will remain unaltered? Take  $E=200\text{kN/mm}^2$  and Poisson's ration of 0.25. 15
- Q.3 Draw Shear Force and Bending Moment diagram for beam as shown. Locate Point of Contra flexure. 15

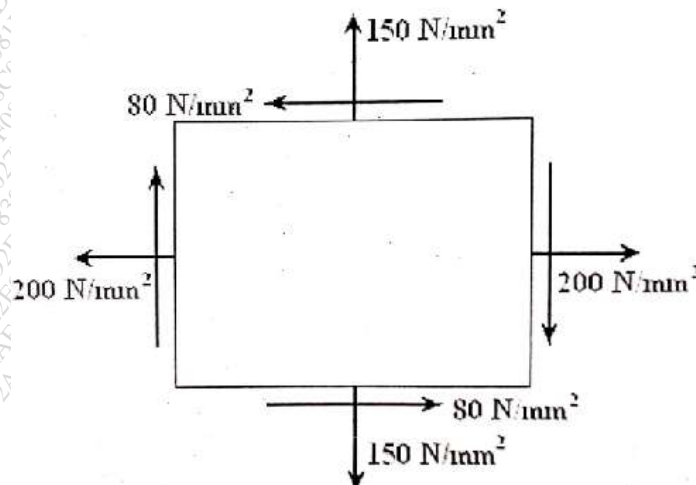


- Q.4 a) Show that for a rectangular section of a beam. The maximum value of shearing stress is 1.5 times the average value. 07
- b) A beam 500mm deep of a symmetrical section has  $I=1 \times 10^8 \text{ mm}^4$  and is simply supported over a span of 10m. Calculate: 08
- The udl it may carry if maximum bending stress is not to exceed  $150 \text{ N/mm}^2$ .
  - The maximum bending stress if the beam carries a central point load of 25kN.

- Q.5 a) A steel rod 1.5m long is subjected to rise in temperature  $35^{\circ}\text{C}$ . Find amount of elongation in the length of rod. Also calculate the magnitude & nature of stress developed in rod, if rod is rigidity connected at both ends. Take  $E=200 \text{ KN/mm}^2$  and  $\alpha=12 \times 10^{-6}/^{\circ}\text{C}$ . 08
- b) A simply supported beam of 2m span carries udl  $140 \text{ kN/m}$  on whole span. The cross section of T section is flange width  $120 \text{ mm}$ , thickness  $20 \text{ mm}$  throughout section and overall depth  $160 \text{ mm}$ . Determine the maximum shear stress and draw the shear stress distribution diagram. 07

## SECTION – B

- Q.6 Attempt any five of the following. 10
- What is limit of eccentricity for hallow circular section.
  - State torsion formula and write the meaning of each word.
  - Define Proof resilience.
  - Define longitudinal stress.
  - Define direct and bending stresses and write their formulas.
  - Enlist types of stresses in thin cylindrical shell and write the formula of it.
  - What is polar moment of inertia for hollow rectangular section?
  - Explain major axis & minor axis in principal stresses & strain.
  - What are the assumptions in theory of torsion?
- Q.7 a) A hollow circular shaft  $190 \text{ mm}$  external diameter &  $155 \text{ mm}$  internal diameter, transmitting power at  $178 \text{ rpm}$  and the angle of twist at a length of  $2 \text{ m}$  is found to be  $0.55^{\circ}$ . Calculate power transmitted & maximum shear stress. Take  $G = 0.8 \times 10^5 \text{ N/mm}^2$ . 08
- b) A vertical bar of uniform c/s area  $400 \text{ mm}^2$  and  $1.5 \text{ m}$  long is fixed at top end & is provided with a circular disc at the bottom if a weight of  $500 \text{ N}$  falls on the disc from a height of  $100 \text{ mm}$ . Determine the stress developed in the bar & what will be the strain energy stored in bar.  $E=200 \text{ GPa}$ . 07
- Q.8 A rectangular element in a strained element is subjected to tensile stress of  $200 \text{ N/mm}^2$  &  $150 \text{ N/mm}^2$  on mutually perpendicular planes together with a shear stress of  $80 \text{ N/mm}^2$ . Find i) Principal stress. ii) Principal planes. iii) Maximum shear stress. iv) Plane of maximum shear stress. 15





- Q.9 A column of hollow cylindrical section 5m long, with ends firmly built in, has to carry an axial load of 300kN. Determine the section if the internal diameter is to be 0.8 of the external diameter. Take Factor of Safety =8, 15
- Crushing Stress  $f_c = 56.7 \text{ kN/cm}^2$ ,
  - Rankine constant =  $1/1600$ .
- Q.10 A thin cylindrical steel vessel has hemispherical ends with overall length of vessel 500mm. The outside diameter of the cylinder is 100mm with thickness of metal 5mm. Calculate the change in volume of the vessel, when it is subjected to an internal pressure of 15MPa. Take  $E=200 \text{ GPa}$  &  $\mu = 0.3$ . 15

Total No. of Printed Pages:2

**SUBJECT CODE NO:- H-357**  
**FACULTY OF SCIENCE AND TECHNOLOGY**  
**S.E. (Civil) (Sem-I)**  
**Fluid Mechanics-I**  
**[Old]**

[Time: Three Hours]

[Max. Marks:80]

Please check whether you have got the right question paper.

- N.B.: 1) Question No.1 and No. 6 are compulsory.  
 2) Solve any two questions are from each section.  
 3) Non-Programmable calculator is allowed.  
 4) Assume suitable data if necessary.

**Section A**

- Q.1 Answer the following (any five): 10
- Define the fluid properties i) Weight Density ii) Specific gravity of a fluid.
  - Differentiate between real fluid and ideal fluid.
  - Differentiate between simple manometer and differential manometer.
  - How the manometer is being classified.
  - State the expression of total pressure and centre of pressure for vertical plane surface submerged in liquid.
  - What are the conditions of equilibrium of a sub-merged body.
  - Define the equation of continuity for compressible and incompressible flow.
  - Define turbulent flow and give one practical example for it.
- Q.2 Answer the following:
- Derive an expression for the pressure variation in a fluid at rest.
  - If the velocity profile of a fluid over a plate is parabolic with the vertex 20 cm from the plate, where the velocity is 120 cm/sec. Calculate the velocity gradients and shear stresses at a distance of 0,10 and 20 cm from the plate. If the viscosity of the fluid is 8.5 poise. 07  
08
- Q.3 Answer the following:
- Derive an expression for the meta centric height by analytical method. 10
  - Determine the total pressure on a circular plate of diameter 1.5 m which is placed vertically in water in such a way that the centre of the plate is 3 m below the free surface of water. Find the position of centre of pressure also. 05
- Q.4 Answer the following:
- Explain in brief forced and free vortex flow.
  - A 30 cm diameter pipe, conveying water, branches into two pipes of diameters 20 cm and 15 cm respectively. If the average velocity in the 30 cm diameter pipe is 2.5 m/s. find the discharge in this pipe. Also determine the velocity in 15 cm pipe if the average velocity in 20 cm diameter pipe is 2 m/s. 07  
08
- Q.5 Answer the following:
- A hydraulic press has a ram of 20 cm diameter and a plunger of 3 cm diameter. It is used for lifting a weight of 30 KN. Find the force required at the plunger. 05
  - Derive an expression for total pressure acting on vertical plane surface submerged in liquid. 05
  - A rectangular pontoon is 5 m long, 3 m wide and 1.20 m high. The depth of 05

immersion of the pontoon is 0.80 m in sea water. If the centre of gravity is 0.6 m above the bottom of the pontoon, determine the meta-centric height. The density of sea water =  $1025 \text{ kg/m}^3$ .

## Section B

- Q.6 Answer the following (any five): 10
- State the expression of Euler's equation.
  - State the assumptions of Bernoulli's equation.
  - Draw the diagram pitot-tube with a vertical piezometer tube.
  - Discuss the relative merits of venturi meter with respect to orifice meter.
  - Define coefficient of discharge.
  - Enlist the types of weirs.
  - Define laminar boundary layer.
  - State the expression of Drag coefficient and Lift coefficient
- Q.7 Answer the following:
- Derive Bernoulli's equation from Euler's equation.
  - What is flowing through a pipe of 5 cm diameter under a pressure of  $29.43 \text{ N/cm}^2$  and with mean velocity of 2 m/s. Find the total head or total energy per unit weight of the water at a cross-section, which is 5 m above a datum line? 10  
05
- Q.8 Answer the following:
- Derive an expression for rate of flow through venturimeter. 10
  - Write a short note on hydraulic coefficients. 05
- Q.9 Answer the following:
- Define displacement thickness. Derive an expression for the displacement thickness.
  - A thin plate is moving in still atmospheric air at a velocity of 5 m/s. the length of the plate is 0.6 m and width 0.5 m. Calculate i) the thickness of the boundary layer at the end of the plate and ii) drag force on one side of the plate. Take density of air as  $1.24 \text{ kg/m}^3$  and kinematic viscosity 0.15 stokes. 09  
06
- Q.10 Answer the following:
- Write a short note on forces acting on fluids in motion.
  - Determine the height of a rectangular weir of length 6 m to be built across a rectangular channel. The maximum depth of water on the upstream side of the weir is 1.8 m and discharge is 2000 liters/s. Take  $C_d=0.6$  and neglect end contractions. 05  
05
  - A circular disc 3 m in diameter is held normal to a 26.4 m/s, wind of density  $0.0012 \text{ gm/cc}$ . What force is required to hold it at rest. Assume coefficient of drag of disc=1.1 05

Total No. of Printed Pages:2

**SUBJECT CODE NO:- H-358**  
**FACULTY OF SCIENCE AND TECHNOLOGY**  
**S.E. (Civil) (Sem-I)**  
**Fluid Mechanics-I**  
**(Revised)**

[Time: Three Hours]

[Max.Marks:80]

N.B

Please check whether you have got the right question paper.

- 1) Question no.1 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 Relative Density.
  - (b) Define real fluid and Ideal fluid.
  - (c) What do you mean by vacuum pressure.
  - (d) What do you understand by: "Total pressure and Centre of Pressure".
  - (e) Explain the term path line and streak line.
  - (f) Define the equation of continuity.
  - (g) Define Absolute pressure and gauge pressure.
- Q.2 A) Derive an expression for the depth of centre of pressure from free surface of liquid of an inclined plane surface submerged in the liquid. 08
- B) A rectangular plane surface 3m wide and 4m 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 2m below the free surface. 07
- Q.3 A) Show that distance between the meta-centre and centre of buoyancy is given by  $BM = \frac{I}{V}$  08
- Where I= Moment of inertia of the plan of the floating body at water surface about longitudinal axis, V= 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 40 cm diameter pipe conveying water, branches into two pipe of diameters 30 cm and 20 cm respectively. If the average velocity in the 40 cm diameter pipe is 3m/s. Find the discharge in this pipe. Also determine the velocity in 20 cm pipe if the average velocity in 30 cm diameter pipe is 2m/s. 06
- B) Define and Obtain an expression for velocity potential function and stream function. 09



Q.5 Answer the following question.

- A) What is the difference between U-Tube differential manometer and inverted U-tube differential manometers? Where are they used? 05
- B) Define the compressible and in-compressible flow give one practical example for each. 05
- C) Find an expression for the loss of head of a viscous fluid flowing through a circular pipe. 05

### Section B

Q.6 Attempt any Five

- a) State Bernoulli's theorem.
- b) Define small and large orifice.
- c) Define Vena – contracta
- d) Define kinetic energy correction factor.
- e) Define Hydraulic gradient line.
- f) What do you mean by “Magnus effect”?
- g) Enlist various minor losses in pipes.

- Q.7 (A) Write Euler's equation of motion along a streamline & integrate it to obtain Bernoulli's equation. State all assumption made in it? 07
- (B) A Pipe through which water is flowing is having diameter, 20 cm and 10 cm at the cross-section 1 & 2 respectively. The velocity of water at section 1 is given 4 m/s. find the velocity head at section 1&2 and also rate of discharge. 08

- Q.8 (A) Obtain an expression for time of emptying a tank through an orifice at its bottom. 08
- (B) A horizontal venturimeter with inlet diameter 20 cm and throat diameter 10 cm is used to measure the flow of oil of specific gravity 0.8. The discharge of through venturimeter is 60 lit/sec. find the reading of the oil mercury differential manometer, Take  $C_d = 0.98$  07

- Q.9 (A) Find an expression for the discharge over triangular notch or weir in terms of head of water. 08
- (B) A Cippolletti weir of crest length 60 cm discharges water. The head of water over the weir is 360 mm. Find the discharge over the weir, if the channel is 80 cm wide and 50 cm deep. Take  $C_d = 0.60$ . 07

Q.10 Write short note

- (A) What are the different methods of preventing the separation of boundary layers? 06
- (B) Differentiate between Broad crested weir and Narrow crested weir. 03
- (C) General equation for lift and drag. 06

Total No. of Printed Pages:03

**SUBJECT CODE NO:- H-391**  
**FACULTY OF SCIENCE AND TECHNOLOGY**  
**S.E. (Civil) (Sem-I)**  
**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 for each Section.  
 3) Assume suitable data if necessary.  
 4) Figures to the right indicate full marks.

**Section A**

- Q.1 Attempt any five:- 10
- 1) What is the objective of Surveying?
  - 2) What are the uses of surveying?
  - 3) Explain the primary classification of surveying.
  - 4) Enlist the accessories used in chain surveying.
  - 5) What is a whole circle bearing and Quadrantal bearing?
  - 6) What is the angular check of the closed traverse?
  - 7) What are the sources of errors in compass surveying?
  - 8) Enlist the methods of contouring.
  - 9) List out the accessories used in Plane table survey.
  - 10) Explain G.T.S bench marks.
- Q.2 a) Explain the theory and working principle of an optical square. 07  
 b) Explain the sources of errors in chaining. 08
- Q.3 a) Explain the field procedure for compass traversing. 07  
 b) The following bearings were observed in running a compass traverse 08

Line	Fore bearing	Back bearing
AB	45°15'	225°15'
BC	125°15'	303°15'
CD	181°	1°
DA	289°30'	109°30'

Calculate the included angles of the traverse.

- Q.4 a) The following consecutive readings were taken with a level and 4m staff on a continuously sloping ground. 08  
 0.780, 1.535, 1.955, 2.430, 2.985, 3.480, 1.115, 1.960, 2.365, 3.640, 0.935, 1.045, 1.630 and 2.545. The R.L of 1<sup>st</sup> point was 500.00m. Rule out a page of level field book and enter the above readings. Calculate the reduced levels of all the points by height of instrument method.
- b) Explain:- 1) Curvature and refraction 2) Back sight and foresight 07

- Q.5 a) Explain the advantages & disadvantages of Plane Table survey. 08  
b) Explain the process of locating a point by method of intersection. 07

## Section B

- Q.6 Attempt any five: 10
- 1) What do you mean by a transit theodolite?
  - 2) What are deflection angles?
  - 3) State the trapezoidal rule.
  - 4) What are temporary adjustments?
  - 5) What is meant by 'zero circle'?
  - 6) Explain: Latitude and departure.
  - 7) Name the parts of a telescope.
  - 8) What do understand by virtue of change in face of a theodolite?
  - 9) What is lead and lift?
  - 10) What are tacheometric constants?

- Q.7 a) A tacheometer was set up at a station C and the following readings were obtained on a staff held vertically. 08

Inst st <sup>n</sup>	Staff station	vertical angle	Hair reading			Remark
			Lower	Middle	Upper	
c	B.M	-5°40'	1.35	2.100	2.560	R. Lol
c	D	+8°	0.820	1.555	2.310	BM=150.00m

- b) Explain the theory of anallatic lens. 07

- Q.8 a) Derive an expression with the help of a neat sketch. An area of a level section. 07  
b) An embankment of width 12 m and side slopes of 1 ½ : 1 is required to be made on a ground which is level in a direction transverse to the centre line. The central heights at 30 cm intervals are as follows: 08  
1.00, 1.30, 2.35, 2.70, 1.60, 1.40 and 0.900.  
Calculate the volume of earthwork according to  
1) The trapezoidal formula  
2) Prismoidal formula

- Q.9 a) Explain the procedure for measurement of magnetic bearing using a theodolite. 07  
b) Explain the Gales Traverse table. 08

Q.10

- a) The record of a closed traverse is given below, with two distances missing.

08

Line	Length (m)	Bearing
AB	105	$30^{\circ}30'$
BC	?	$135^{\circ}$
CD	79	$220^{\circ}30'$
DE	55	$240^{\circ}$
EA	?	$319^{\circ}45'$

Calculate the length of BC and EA.

- b) Explain the Beamans Stadia arc.

07

Total No. of Printed Pages:3

**SUBJECT CODE NO:- H-392**  
**FACULTY OF SCIENCE AND TECHNOLOGY**  
**S.E. (Civil) (Sem-I)**  
**Surveying-I**  
**[Revised]**

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B

1. Questions no.1 and question no.6 is compulsory.
2. Attempt any two questions from the remaining questions of Section A and section B respectively.
3. Draw neat sketches wherever necessary
4. Figures to the right indicate full marks.

**Section -A**

Q.1 Answer the following (any five) 10

- a) Define i) Subsidiary stations ii) Tie station
- b) Differentiate between chain surveying and compass surveying.
- c) Define True Meridian and Magnetic Meridian.
- d) Write the statement of three –point problem.
- e) Explain the accessories used in plane table surveying.
- f) What is magnetic declination?
- g) What is local attraction? How to detect it?
- h) What are the advantages of plane table surveying
- i) Define the independent and consecutive coordinate
- j) Explain Bowditch rule for balancing a closed traverse.

Q.2 a) Explain the method of repetition for the measurement of Horizontal angle. 07

b) In traverse, following observation are taken. At which station do you suspect the local attraction and find out the corrected fore bearings and back bearing of the lines. 08

Line	FB	BB
AB	68°15'	248°15'
BC	148°45'	326°15'
CD	224°30'	46°00'
DE	217°15'	38°15'
EA	327°45'	147°45'

Q.3 a) A line was measured by 20m chain which was accurate before starting the day's work. After chaining 900m the chain was found to be 6cm too long. After chaining the total distance of 1575 m the chain was found to be 14cm too long, find the true distance of the line. 08

b) Explain the various methods of orientation in plane table survey. 07

- Q.4 a) Write the statement of Two- point problem. Explain the solution of Two-point problem in 07 detail. 08
- b) Explain the methods of traversing by using theodolite. 08
- Q.5 a) Explain the procedure for measurement of magnetic bearing by using theodolite. 07
- b) The measured lengths and bearings of the sides of traverse ABCDEA in an anticlockwise direction are as follows calculate the lengths of CD and DE. 08

Line	Length	Bearing
AB	298.7	$0^{\circ}0'$
BC	205.7	$N25^{\circ}12'W$
CD	?	$S75^{\circ}6'W$
DE	?	$S56^{\circ}24'E$
EA	231.4	$N35^{\circ}36'W$

### Section – B

- Q.6 Answer the following (any five) 10
- Explain the prismatic rule and trapezoidal rule
  - Explain the principle of stadia method.
  - Explain the zero circle of the planimeter.
  - What are the tachometric constants?
  - What is the mass diagram?
  - What are the leads and lifts?
  - Why is an anallatic lens provided in tachometer?
  - What are contours.
  - Define the following (1) line of collimation (2) Bench mark.
- Q.7 a) Explain the terms in details: Profile leveling and Cross sectional leveling. 07
- b) The following consecutive readings were taken with a level on a continuously sloping ground at common intervals of 30m. 08
- 0.905, 1.745, 2.345, 3.125, 3.725, 0.545, 1.390, 2.055, 2.955, 3.455, 0.595, 1.015, 1.850, 2.655, 2.945. The RL of A was = 395.500m. Calculate the RLs of different points and apply the usual check.

Q.8 a) Explain the constructional details of planimeter.

07

b) An embankment of width 10m and side slope 1.5:1 is required to be made on a ground which is level in a direction transverse to the centre line. The central height at 40m intervals are as follows. 0.90, 1.25, 2.15, 2.50, 1.85, 1.35, 0.85. Calculate the volume of earthwork according to i) The Trapezoidal rule. ii) The Prismoidal rule.

08

Q.9 a) The following observations were taken with tachometer fitted with an anallatic lens, the staff being held vertically. Determine the distances PQ and QR and the RL's of P, Q, and R

07

Inst. station	HI	STAFF STATION	VERTICAL ANGLE	HAIR READINGS	REMARK
P	1.45	BM	$-6^{\circ}12'$	0.98, 1.54, 2.1	RL of BM=384.25m
P	1.45	Q	$+7^{\circ}5'$	0.83, 1.36, 1.89	
Q	1.57	R	$+12^{\circ}21'$	1.89, 2.48, 3.07	

b) Explain the reciprocal leveling with neat sketch.

08

Q.10 Write short notes on (any three)

15

- 1) Gales traverse table
- 2) Tracheometric contouring
- 3) Interpolation of contours
- 4) Methods of locating contours



Total No. of Printed Pages:02

**SUBJECT CODE NO:- H-426**  
**FACULTY OF SCIENCE AND TECHNOLOGY**  
**S.E. (Civil) (Sem-I)**  
**Concrete Technology**  
**[OLD]**

[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 questions from remaining questions of each sections.

2) Non-Programmable calculator is allowed.

3) Figure to right indicates full marks.

**Section A**

- |     |  |                |
|-----|--|----------------|
| Q.1 | Answer the following questions (any five)  | 10             |
|     | <ul style="list-style-type: none"> <li>a) What are the major ingredients of cement. Give their percentages?</li> <li>b) What are different grades of concrete &amp; how they are designated?</li> <li>c) What are different types of tests carried out on cement?</li> <li>d) Define Fineness Modulus and write the formula.</li> <li>e) Define flakiness index and elongation index of an aggregate</li> <li>f) What is men by workability of concrete?</li> <li>g) What is bulking of sand?</li> <li>h) Enlist the types of admixtures.</li> <li>i) What is mean by curing?</li> <li>j) What is difference between air entrained and air entrapped?</li> </ul> |                |
| Q.2 | <ul style="list-style-type: none"> <li>a) What is curing &amp; its significances. Explain various methods of curing.</li> <li>b) Explain dry process of manufacturing of Portland cement. Also draw a flow chart of this method.</li> </ul>  | 08<br>07       |
| Q.3 | <ul style="list-style-type: none"> <li>a) What is sieve analysis? For which material it is carried out &amp; enlist different IS sieves used.</li> <li>b) What are creep, shrinkage &amp; elasticity of concrete? Explain significance of all the in detail.</li> </ul>  | 08<br>07       |
| Q.4 | <ul style="list-style-type: none"> <li>a) Describe the types of vibrators used for compaction of concrete.</li> <li>b) What is destructive and Non-destructive testing for concrete? Explain the conditions under which we can opt these method.</li> <li>c) Why compaction of concrete essential? Explain the method of compaction.</li> </ul>  | 05<br>05<br>05 |
| Q.5 | Write a short note on:   |                |
|     | <ul style="list-style-type: none"> <li>a) Alkali-aggregate reaction</li> <li>b) Swelling of concrete</li> <li>c) Properties of aggregates.</li> </ul>  | 05<br>05<br>05 |

## Section B

- Q.6 Answer the following questions (any five) 10
- Define permeability and durability.
  - What is mixing of concrete? What are the different types of mixtures used for mixing?
  - What is the concept of mix design?
  - What is sulphate attack?
  - What are factors affecting freezing & thawing?
  - What are factors affecting high strength concrete?
  - What does it mean by polymer concrete?
  - List out the types of vibrators and mixers.
  - What is high density concrete? Where it can be used?
  - List out methods of concrete mix design.
- Q.7 a) What do you mean by concrete mix design why it is necessary? Explain in detail. 08  
b) Explain sulphate attack by sea water and chloride attack. 07
- Q.8 a) Design a concrete mix of Grade M40 to suit following data as per IS 10262. 15
- Type of cement OPC 53 grade
  - Max nominal size of aggregate 20mm
  - Water cement ratio 0.40
  - Workability 100mm slump
  - Method of Conc (pumping) placing
  - Max. cement content 450 kg/m<sup>3</sup>
  - Chemical admixture superplasticizer
  - Sp. Gravity cement 3.15
  - Sp. Gravity of C.A. 2.74
  - Sp. Gravity of F.A. 2.70
  - Water absorption: coarse agg- 0.5%  
Fine agg-1.0%
- Q.9 a) What is carbonation & explain its significance. 05  
b) Write a note on corrosion of reinforcement and its remedial measures. 05  
c) What is cold weathering concrete? Explain with respect to low temp about 0°C & low temp below 0°C. 05
- Q.10 Write a short note on:-
- Special concretes and special concreting equipment's 05
  - Self compacting concretes 05
  - Under water concreting 05

Total No. of Printed Pages:02

**SUBJECT CODE NO:- H-427**  
**FACULTY OF SCIENCE AND TECHNOLOGY**  
**S.E. (Civil) (Sem-I)**  
**Concrete Technology**  
**[Revised]**

[Time: Three Hours]

[Max. Marks:80]

Please check whether you have got the right question paper.

- N.B.: 1) Q.1 and Q.6 are compulsory.  
 2) Attempt any two questions from each section from remaining.  
 3) Draw neat sketches wherever necessary.  
 4) Figure to right indicate full marks.

**Section A**

- |     |  |    |
|-----|--|----|
| Q.1 | Answer the following questions (any five)  | 10 |
|     | a. What are the causes of segregation in concrete?<br>b. Enlist types of vibrators.<br>c. Define deleterious substance.<br>d. Define accelerators and retarders.<br>e. What is bulking of aggregate?<br>f. What are different types of tests carried out on cement?<br>g. What is formwork? Where they are used?<br>h. Define bleeding and segregation.<br>i. What is soundness of aggregate?<br>j. What is workability of concrete? |    |
| Q.2 | a) Explain dry process of manufacturing of Portland cement. Also draw a flow chart of this method.   | 08 |
|     | b) What is sieve analysis? For which material it is carried out & enlist different IS services used.   | 07 |
| Q.3 | a) What are the different types of pozzolanic material? Explain any two in details.  | 08 |
|     | b) Explain the importance of water/cement ratio on strength of concrete.   | 07 |
| Q.4 | a) What are the factors affecting workability of concrete?   | 05 |
|     | b) Explain the relation between tensile and compressive strength.  | 05 |
|     | c) What are the various methods of curing?   | 05 |
| Q.5 | Write short note on (Any three)  | 15 |
|     | a) Quality of water required for mixing and curing   |    |
|     | b) Compaction of concrete  |    |
|     | c) Batching of concrete  |    |
|     | d) Compaction factor test on concrete  |    |
|     | e) Strength of concrete  |    |

## Section B

- Q.6 Answer the following (any 5) 10
- What does it mean by polymer concrete?
  - Mention disadvantages of self compacting concrete.
  - What do you mean by repair? What are the common types of repair?
  - What is roller compaction concreting?
  - What quality control should be adopted while mix design of concrete?
  - What are the different grades of concrete as per IS 456:2000? Specify proportion of materials used.
  - What are field tests conducted on cement?
- Q.7 a) What are the symptoms of distress? Explain its diagnosis in detail. 08  
b) What do you understand by chloride attack? 07
- Q.8 Design a concrete mix of grade M30 to suit following data as per IS 10262. 15
- Type of cement DPC 53 grade as for 158112
  - Max nominal size of aggregate : 20mm
  - Water cement ratio: 0.45
  - Workability: 100mm slump
  - Method of Concrete placing: Pumping
  - Max. cement content: 450 kg/m<sup>3</sup>
  - Chemical admixture: super plasticizer
  - Sp. Gravity cement: 3.15
  - Sp. Gravity of C.A.: 2.74
  - Sp. Gravity of F.A.: 2.74
  - Water absorption: coarse agg-0.7%  
Fine agg-0.9%
- Q.9 a) What is fibre reinforced concrete? Explain in detail various types of fibre. 06  
b) What is the influence of cracks on the ultrasonic pulse velocity of concrete? 05  
c) Discuss the ACI method of mix design. 04
- Q.10 Write short note: [Any three] 15
- Selection of repair procedure
  - Statistical quality control
  - Hot weathered concreting
  - Low temperature concreting
  - Use of wastes in concrete

Total No. of Printed Pages:2

**SUBJECT CODE NO:- H-1024**  
**FACULTY OF SCIENCE AND TECHNOLOGY**  
**S.Y.B.Tech. (Civil ) (Sem IV)**  
**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 from section A and Q.No.6 from section B is compulsory.  
 2) Solve any two questions from remaining questions from Section – ‘A’ and Section – ‘B’ each.

## Section A

- |     |   |    |
|-----|---|----|
| Q.1 | Answer the following questions (any five)   | 10 |
|     | a) What are different types of horizontal curves?<br>b) What are initial and final sub-chords?<br>c) How is gradient expressed?<br>d) What are the classification of triangulation system?<br>e) Write down the properties of electromagnetic waves?<br>f) What are the types of EDM instrument?            |    |
| Q.2 | a) What is trigonometrical leveling? What are possible error and mistakes in leveling? Draw neat diagram?   | 07 |
|     | b) Derive an expression for an ideal transition curve?  | 08 |
| Q.3 | a) What is electronic distance measurement (EDM)? Give classification and principle of functioning?   | 07 |
|     | b) Describe the procedure of base of the object inaccessible?   | 08 |
| Q.4 | a) Describe the procedure of horizontal curve by deflection angle method?   | 07 |
|     | b) Two straight lines AB and BC intersects at a chainage of 510.23 m, the angle of intersection being $126^{\circ} 48'$ . The radius of the curve is 300 m. calculate all data necessary for setting out the curve by the method of offsets from the chord produced. Assume a peg interval of 30 m.         | 08 |
| Q.5 | a) Explain the geodimeter with a neat sketch?   | 07 |
|     | b) An instrument was set up at P and the angle of elevation to a vane 4 m above the foot of the staff held at Q was $9^{\circ} 30'$ . The horizontal distance between P and Q was known to be 2000 meters. Determine the R.L of the staff station Q, given that the R.L of the instrument axis was 2650.38. | 08 |

## Section B

- Q.6 Answer the following questions (any five) 10
- What is photogrammetric surveying?
  - Define camera axis and focal length?
  - What do you mean by passive remote sensing and active remote sensing?
  - What does idealize remote sensing system consist of?
  - What are the application of remote sensing?
  - What do you mean by vertical photograph and tilted photograph?
- Q.7 a) Explain the assembly of aerial camera with a neat sketch? 07
- b) The distance from two points on a photographic point to the principle line are 68.24 mm to the left, and 58.48 mm to the right. The angle between the points measured with a transit is  $44^{\circ}30'$ . Determine the length of the lens? 08
- Q.8 a) What is relief displacement of vertical photograph? Derive expression for the same? 07
- b) Derive the basic formula of the parallax equation for determining heights from a pair of vertical photograph? 08
- Q.9 a) What is GIS? Write down components of GIS and application of GIS? 07
- b) Three points A, B and C were photographed and their co-ordinates with respect to the lines joining the collimation marks on the photograph are: 08

Point	X	Y
a	-35.52 mm	+21.43mm
b	+8.48 mm	-16.38 mm
c	+48.26 mm	+36.72 mm

The focal length of the lens is 120.80 mm. determine the azimuth of the lines OB and OC, if that of OA is  $354^{\circ}30'$ . The axis of the camera was level at the time of the exposure at the station O.

- Q.10 a) Write a note on crab and drift? 07
- b) Explain the advantages of raster and vector data? 08



Total No. of Printed Pages:2

**SUBJECT CODE NO:- H-1025**  
**FACULTY OF SCIENCE AND TECHNOLOGY**  
**S.Y.B.Tech. (Civil ) CBC & Grading Sys (Sem-IV)**  
**Fluid Mechanics -II**  
**[Revised]**

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

- N.B Please check whether you have got the right question paper.
- 1) Q.No.1 from section A and Q.No.6 from section B are compulsory.
  - 2) Solve any two from remaining questions from each section.
  - 3) Explain with diagram, if required.

**Section A**

- |     |  |    |
|-----|--|----|
| Q.1 | Answer the following question:<br><ol style="list-style-type: none"> <li>1) Explain hydro dynamically smooth and rough pipes.</li> <li>2) Define, 'friction velocity' for turbulent flow in pipe.</li> <li>3) Define equivalent pipe.</li> <li>4) What is meant by alternate depths?</li> <li>5) Define siphon.</li> </ol>                     | 10 |
| Q.2 | a) Describe Reynold's experiment to demonstrate the types of flow.   | 07 |
|     | b) Compare between open channel flow and flow through pipes.   | 08 |
| Q.3 | a) Show that for a trapezoidal channel of given area of flow, the condition of maximum flow requires that hydraulic mean depth is equal to one half the depth of flow.   | 07 |
|     | b) A rectangular channel 4m wide has a depth of 1.5m. The slope of the channel is 1 in 1000 and value of Chezy's constant $C = 55$ . It is desired to increase discharge to maximum by changing dimensions of the section. Keep area of cross-section, bed slope & roughness of channel constant. Find new dimensions and increase in channel. | 08 |
| Q.4 | a) A 7.5m wide rectangular channel conveys, $12 \text{ m}^3/\text{s}$ of water with a velocity 1.5 m/s calculate<br><ol style="list-style-type: none"> <li>i) Specific energy</li> <li>ii) Depth if water for critical condition</li> <li>iii) Critical velocity</li> </ol>  | 07 |
|     | b) An irrigation channel of trapezoidal section, having side slopes 3 horizontal and 2 vertical, is to carry a flow of 10 cumec on a longitudinal slope of 1 in 5000. The channel is to be lined for which the value of friction coefficient in Manning's formula is $n = 0.012$ . Find the most economic section of the channel.              | 08 |

- Q.5 Write a short note on (any three) 15
- 1) Energy losses in pipes.
  - 2) Types of flow
  - 3) Applications of CFD in civil engineering
  - 4) Moody's diagram
  - 5) Specific energy curve

### Section B

- Q.6 Answer the following questions: 10
- 1) What is meant by turbine?
  - 2) What is meant by pumps?
  - 3) Give the classification of turbines.
  - 4) What is range of specific speed of Francis turbine?
  - 5) What is meant by jet propulsion?
- Q.7 a) Derive an expression for force exerted by a fluid jet on moving flat plate. 07
- b) A jet of water 75 mm diameter having a velocity of 20 m/s, strikes normally a flat smooth plate. Determine the thrust on the plate 08
- a) If the plate is moving
  - b) If the plate is moving in the same direction as the jet with a velocity of 5 m/s.
- Also find the work done per second on the plate in each case and the efficiency of the jet when the plate is moving.
- Q.8 a) A pelton wheel has to develop a shaft power of 1180kW at an overall efficiency of 85% under a head of 200mt, find the diameter of jet. Take  $C_v = 0.95$ . 07
- b) A hydraulic turbine has an output of 600 kW when it works under a head of 25 m and runs at 100 rpm. What is the type of turbine? What would be its speed? And what power will it develop when working under a head of 16m? 08
- Q.9 a) Explain with neat sketches the working of reciprocating pump. 07
- b) The impeller of a centrifugal pump is 350mm outside dia and 175mm internal dia. The vane angles of the impeller at inlet and out are 30 and 25 degrees respectively. The pump runs @ 1400 rpm. The velocity of flow through impeller is constant find the work done by impeller per second per N of water. 08
- Q.10 Write a short note on (any three) 15
- 1) Draft tube and its type
  - 2) Cavitation phenomenon
  - 3) Priming of pumps
  - 4) Hydraulic ram
  - 5) Centrifugal Pump

Total No. of Printed Pages:2

**SUBJECT CODE NO:- H-1049**  
**FACULTY OF SCIENCE AND TECHNOLOGY**  
**S.Y.B.Tech. (Civil ) (Sem IV)**  
**Fluid Mechanics-II**  
**[OLD]**

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

Please check whether you have got the right question paper.

N.B

1. Question no.1 from section A and question no.6 from section B are compulsory.
2. Solve any two from remaining questions from each section.
3. Assume suitable data, if required.

**Section A**

- Q.1 Answer the following questions. 10
- a) List out major and minor losses in pipes.
  - b) What do you mean by energy dissipation?
  - c) Define Specific Energy.
  - d) What do you mean by pipes in series and pipes in parallel?
  - e) What do you mean by Hydraulic energy line?
- Q.2 a) Explain Prandtl Mixing Length Theory for Turbulent Shear stress. 08
- b) Show that the hydraulic mean depth of trapezoidal channels having the best positions is half of the minimum depth. 07
- Q.3 a) A rectangular channel 4m wide has a depth of 1.5m. The slope of the channel is 1 in 1000 and value of Chazy's constant  $C = 55$ . It is desired to increase discharge to maximum by changing dimensions of the section. Keep area of cross section, bed slope and roughness of channel constant. Find new dimensions and increase in channel. 08
- b) Calculate the lowest possible specific energy for flow rate of  $12 \text{ m}^3/\text{s}$  through a horizontal rectangular channel of width 3.0m. 07
- Q.4 a) Find the maximum power transmitted by a jet of water discharging freely out of nozzle fitted to a pipe, 250 M long and 150 MM diameter with  $f = 0.01$ . The available head at the nozzle is 75M. 08
- b) Derive the expression for power transmission through pipes. 07
- Q.5 Write a short note on 15
- i) Specific energy curve
  - ii) Hydraulic jump

iii) Rapidly varied flow

### Section – B

- Q.6 Answer the following questions. 10
- Define mechanical efficiency and overall efficiency of turbine.
  - Define Impact of Jet
  - What is draft tube?
  - Draw the diagram of centrifugal pumps Enlist the component parts.
  - What is surge tank?
- Q.7 a) Derive the relation for the force exerted by a jet of fluid on a moving flat plate when the plate is inclined to the jet? 08
- b) A pelton wheel is having a mean bucket diameter of 0.8M and is running at 1000r.p.m the net head on the pelton wheel is 400M of the side clearance angle is 150° and discharge through nozzle is 150 liters/sec, find 07
- Power available at the nozzle &
  - Hydraulic efficiency of the turbine.
- Q.8 a) Differentiate between centrifugal and reciprocating pump. 08
- b) Explain with neat sketch working of a centrifugal pump. 07
- Q.9 a) Derive an expression for friction head in suction and delivery pipe of reciprocating pump. 08
- b) Design the working of a propeller pump. Draw inlet and outlet triangles of pump. 07
- Q.10 Write a short note on 15
- Surge tank
  - Hydraulic crane
  - Priming of a pump

Total No. of Printed Pages:2

**SUBJECT CODE NO:- H-1050**  
**FACULTY OF SCIENCE AND TECHNOLOGY**  
**S.Y. B.Tech. (Civil) CBC & G (Sem-IV)**  
**Surveying-II**  
**[Revised]**

[Time: Three Hours]

[Max.Marks: 80]

- N.B Please check whether you have got the right question paper.
1. Question No.1 from Section A and Question No.6 From Section B is compulsory.
  2. Solve any two questions from remaining questions from Section A and Section B each.

**Section A**

- Q.1 Answer the following questions (Any Five) 10
- a) What is transition curve? Where is such a curve provided?
  - b) What is the shift of curve?
  - c) How is gradient expresses?
  - d) What is centrifugal ratio?
  - e) Draw a neat sketch of the geodimeter?
  - f) What is total station?
- Q.2 a) Explain Rankin's Method with neat diagram. 07
- b) The probable error of direction measurement is 1.25 seconds. Compute the maximum value of R if the maximum probable error desired is 08
- 1) 1 in 25,000 and
  - 2) 1 in 10,000
- Q.3 a) Describe the method of setting a circular curve by perpendicular offsets from the tangent with the help of chain and tape? 07
- b) Two tangents intersect at a chainage of 1000m, the deflection angle being  $30^\circ$ . Calculate all the necessary data for setting out a circular curve of radius 200m by the method of offsets from the chord produced taking a peg interval of 20m 08
- Q.4 a) What is shift? Prove that a transition curve bisects a shift and that a shift bisects a transition curve? 07
- b) Find the difference of levels of the points P and Q and the R.L of P from the following data 08
- Horizontal distance between P and Q=7000m  
 Angle of depression to P and Q= $2^\circ 32' 12''$   
 Height of signal at P=2.87m  
 Height of instrument at Q=1.27m  
 Co-efficient of refraction=0.07  
 $R \sin 1'' = 30.88\text{m}$ ;  $m=0.07$   
 R.L of Q=417.860m

- Q.5 a) Obtain an expression for determination of height of an elevated object above the ground when its Base and top are visible but not accessible? 07
- b) Explain the different method of overcoming the difficulties in setting out circular curves? 08

### Section B

- Q.6 Answer the following questions (Any Five) 10
- What do you mean by principle point?
  - What do you mean by azimuth of the principle plane?
  - Define nadir point and ground nadir point?
  - What do you mean by SPOT?
  - What is space-based platforms?
  - Define Picture plane and focal plane?

- Q.7 a) Describe the formula for horizontal and vertical angles from terrestrial photograph? 07
- b) How to determine scale of an aerial photograph? What do you understand by the term 'Datum scale' and 'Average scale'? 08

- Q.8 a) What is tilt distortion? Prove that in a tilted photograph, tilt distortion is radial from isocenter? 07
- b) Two objects A and B whose elevation are 500m and 1500m respectively above mean sea level are photographed from certain height with the axis of the camera vertical. The co-ordinates expressed in mm of the corresponding photo images a and b are: 08

Point	x co-ordinate	Y co-ordinate
a	+200	+150
b	-320	-300

The focal length= 200mm and length AB=44227m. Find the height of the camera station.

- Q.9 a) What is GIS? Write down components of GIS and application of GIS? 07
- b) Write a detailed note on electromagnetic energy used for remote sensing? 08
- Q.10 a) Write a note on wild distomats? 07
- b) Explain the advantages of raster and vector data? 08