

Total No. of Printed Pages:1

SUBJECT CODE NO:- H-488
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (Civil) (Sem-I)
Advance Surveying
[OLD]

[Time: TWO Hours]

[Max. Marks:40]

Please check whether you have got the right question paper.

- N.B.: 1) Q.No.1 and Q.No.5 are compulsory.
 2) Answer any two questions from Section A and Section B.
 3) Assume suitable data if necessary.

Section – A

- | | | |
|-----|--|----|
| Q.1 | Attempt any three
1) Explain mean sea level
2) What is hydrographic surveying.
3) What are soundings.
4) Define Drift.
5) Define scale of a vertical photograph | 06 |
| Q.2 | Explain the various methods of locating soundings. | 07 |
| Q.3 | Describe a fathometer and explain its use in hydrographic surveying. | 07 |
| Q.4 | The distance from the principal point to an image on a photograph is 6.5 cm and the elevation of the object above the datum is 200m. What is the relief displacement of the point if the datum scale is 1/10,000 and focal length of the camera is 15cm. | 07 |

Section – B

- | | | |
|-----|---|----|
| Q.5 | Attempt any three
1) What do you understand by Remote sensing.
2) Differentiate between active and passive remote sensing.
3) What are the sensors used in Remote sensing.
4) Name two softwares used in GIS.
5) Name the types of Remote sensing platforms. | 06 |
| Q.6 | Explain the applications of Remote Sensing. | 07 |
| Q.7 | What do you understand by electromagnetic spectrum? | 07 |
| Q.8 | What are the essentials of GIS? | 07 |

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-103
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (Civil) (Sem-II)
Environmental Engineering -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 each section.
 3. Assume suitable data if necessary.
- Section -A
- | | | |
|-----|---|----|
| Q.1 | Attempt the following | 10 |
| | a) Describe with neat sketch, principal, working and construction of a cyclone separator. | |
| | b) Write down working principal of pipe type electrostatic precipitator with neat sketch? | |
| Q.2 | a) A Coal fired thermal power plant burns 6.25 tonnes of coal per hour, and discharges the Combustion products through a stack having an effective height of 80m. The coal has a Sulphur Content of 4.7% and the wind velocity at the top of the stack is 8.0 m/sec. atmospheric conditions are moderately to slightly unstable. Determine the maximum ground level concentration of SO_2 and the distance from the stack at which this maximum occurs. | 07 |
| | b) Define lapse rate list out the manner which emitted plume behaves under sever conditions? | 04 |
| | c) What is photochemical smog and how it is formed? | 04 |
| Q.3 | a) State layers of atmosphere and explain their importance with respect to air pollution? | 07 |
| | b) Write in detail working of ESP with neat clean diagram and Explain advantages and disadvantages of ESP. | 08 |
| Q.4 | a) What is Air (Prevention and Pollution control) Act- 1981. | 05 |
| | b) With neat sketch explain | |
| | 1. Wind speed recorder | 05 |
| | 2. Wind direction recorder | 05 |
| Q.5 | a) Enlist metrological factor affecting air pollution and explain? | 05 |
| | b) Write short note on | 10 |
| | 1. Pollengrain | |
| | 2. Smoke | |
| | 3. Acid rain | |
| | 4. Bag house filter | |

Section – B

- Q.6 a) Define design period? What are the factors should kept in view while fixing design period? 05
- b) Explain rectangular sedimentation tank with neat sketch with respect to its working? 05
- Q.7 a) How will you estimate the quantity of water required by a town while arranging a water supply scheme for the same? 07
- b) What is a river intake? What are the factors which govern the location of an intake structure? 08
- Q.8 a) Design completely a rapid sand filter for a town having a total filtered coated requirements of 8 million liters of water per day, assume suitable data? 07
- b) What do you understand by temporary and permanent hardness and explain its remedial measure. 08
- Q.9 a) What is disinfection? Explain with neat sketch break point chlorination. 07
- b) Explain in detail what do you mean by water softening? Explain lime soda process in detail? 08
- Q.10 Write short notes on following (Any three) 15
- Clariflocculator
 - Reverse osmosis
 - Electrodialysis
 - Pressure filter

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-123
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (Civil) (Sem-II)
Design of Structures - II (RCC)
[OLD]

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

- N.B.
1. Questions No.1 from section A and Q.no.6 from section B are compulsory. Attempt any two questions of each section from the remaining.
 2. Assume suitable data if required & mention it clearly.
 3. Use of nonprogrammable calculators, IS 456-2000 is permitted.

Section -A

- Q.1 Attempt any five: 10
1. Enlist the different methods for design of RCC structures.
 2. What is singly reinforced section?
 3. Enlist types of load acting on RCC structures.
 4. What do understand by redistribution of moment?
 5. What do you understand by T beam?
 6. What is limit state for shear?
 7. Enlist different types of deflection
 8. What are disadvantages of cracking?
- Q.2 A reinforced concrete beam 250 mm X 400 mm overall depth is reinforced with 4 bars of 12mm diameter at the bottom. The clear cover of 25mm, calculate ultimate moment of resistance of section also find superimposed UDL over a simply supported span of 4m. Use M-15 and Fe 250. 15
- Q.3 Find moment of resistance for rectangular beam 300 mm X 500 mm effective, provide 4 bars of 22 mm diameter on tension side and 4 bars of 16mm diameter on compression side. The effective cover is 50mm. Use M-15 and Fe 415. 15
- Q.4 A reinforced concrete beam 400 mm X 700 mm is simply supported over a clear span of 8m. It carries a udl of 48 kN/m, including self weight of the beam. The section is reinforced with 6 bars of 20 mm diameter. Take effective cover as 40mm, Use M-20 and Fe-250. 15
 Calculate the shear reinforcement required if
- a) Only vertical stirrups are used
 - b) Two bars are bent up at 45° near each support
- Q.5 Find the moment of resistance of T beam with the following particulars: 15
- a) Width of flange = 1500 mm

- b) Width of web = 300 mm
 - c) Effective depth = 600 mm
 - d) Depth of flange = 100 mm
 - e) Area of tensile steel = 4500 mm²
- Use M-20 and Fe 415.

Section – B

- Q.6 Attempt any five : 10
- 1) What are different function of torsional reinforcement at the corner of slab?
 - 2) What is effective length of column?
 - 3) What is modification factor?
 - 4) Enlist components of staircase
 - 5) What are the function of lateral and helical ties?
 - 6) What are critical sections for shear in footing?
 - 7) What is Minimum and Maximum percentage of steel in column?
 - 8) What is two way slab?
- Q.7 Design a reinforced concrete one way simply supported slab for the following data. 15
- a) Effective span = 4.5m
 - b) Live load = 4 kN/m²
 - c) Floor Finish = 1 kN/m². Use M-20 and Fe 250.
- Q.8 The space available in residential building for staircase is 4.5m X 2.5 m in which Doglegged stair 15
to be accumulated. The floor to floor height is 3.2m. Plan and design Dog legged staircase.
Use M-20 and Fe 415.
- Q.9 Design short rectangular column to carry ultimate load of 1500kN. Unsupported length of 15
column is 3.2m. Use M15 & Fe415. Draw neat showing reinforcement details.
- Q.10 A square column 500 mm X 500 mm carries an axial load of 1650 kN. Design the square 15
footing. The S.B.C of soil is 150 kN/m². Use M20 & Fe415.

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-157
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (Civil) (Sem-II)
Geotechnical Engineering
[OLD]

[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 Q.No.6 from section B are compulsory. Attempt any two questions of each Section from the remaining.
 2. Figures to the right indicate full marks.
 3. Assume any additional data, if necessary and state it clearly.

SECTION – A

- Q.1 Answer the following,
- a) What are the major soil deposits of India? Explain their characteristics. 07
 - b) Sketch the phase diagram for a soil and indicate the volumes and weights of the phases on it. Define 'Void ratio', 'Degree of saturation', and 'Water content'. What is a unit phase diagram? 07
- Q.2 Answer the following,
- a) A sample of clay was coated with paraffin wax and its mass, including the mass of wax, was found to be 697.5 gm. The sample was immersed in water and the volume of the water displaced was found to be 355 ml. The mass of sample without wax was 690.0 gm, and the water content of the representative specimen was 18%. Determine the bulk density, dry density, void ratio and degree of saturation. The specific gravity of the solids was 2.70 and that of the wax was 0.89. 08
 - b) Write a brief note on plasticity chart. 05
- Q.3 Answer the following,
- a) What are the various factors that affect the permeability of a soil stratum? If k_1, k_2, k_3 are the permeabilities of layers h_1, h_2, h_3 thick, what is its equivalent permeability in the horizontal and vertical directions? Derive the formulae used. 07
 - b) State the different types of soil classification system? Explain each in details? 06
- Q.4 Answer the following,
- a) Derive the expression for the coefficient of permeability as obtained from the variable head permeameter. 07
 - b) Explain Terzaghi's theory of one Dimensional consolidation. 06
- Q.5 Answer the following,
- a) Discuss the effect of compaction on soil properties. 06
 - b) Write note on logarithm of time fitting method. 07

Section B

- Q.6 Answer the following,
- A circular area on the surface of an elastic mass of great extent carries a uniformly distributed load of 120 kN/m^2 . The radius of the circle is 3 m. Compute the intensity of vertical pressure at a point 5 meters beneath the center of the circle using Boussinesq's method. 07
 - What is Mohr's circle? Discuss its important characteristics. 07
- Q.7 Answer the following,
- Explain with neat sketch the procedure of determination of shear strength parameters of soil by vane shear Test. What are its merits and demerits? 07
 - Describe the trial wedge method. 06
- Q.8 Answer the following,
- What are the assumptions of Rankine's theory? Derive the expression for active earth pressure. 07
 - Write brief critical notes on 'Taylor's Stability Number'. 06
- Q.9 Answer the following,
- Explain different drainage conditions for shear test. 07
 - Explain stress isobars with the help of neat sketch. 06
- Q.10 Answer the following,
- Explain the method of slices for stability analysis of slopes. How can steady seepage be accounted for in this method? 07
 - Explain Rebhann's graphical construction method to evaluate the earth pressure on a retaining wall. 06

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-193
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (Civil) (Sem-II)
Water Resource Engineering - I
[OLD]

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

N.B

Please check whether you have got the right question paper.

- i) Question 1 & 6 is compulsory.
- ii) Answer any 2 questions of remaining of each section.
- iii) Assume suitable data if necessary and state it clearly.

SECTION A

- Q.1 a) What are the various methods available to calculate average precipitation over a basin? 04
 b) What do you understand by the term infiltration? How can we measure it in the field? 04
 c) Enlist various practical applications by hydrology. 02
- Q.2 a) What is a rainfall hyetograph? How is it derived from a rainfall mass curve. 05
 b) How is evaporation measured by using ISI standard pan? 05
 c) The total observed runoff volume during 8h storm with a uniform intensity of 1.6cm/h is $25 \times 10^6 \text{ m}^3$. If the area of the basin is 280 km^2 , find the average infiltration rate for the basin. 05
- Q.3 a) Explain various base flow separation techniques. 05
 b) A 4-h hydrograph for a project site in Mahanadi basin is given below. Calculate
 (i) a 12 h-unit hydrograph and (ii) 2 h-unit hydrograph by S hydrograph approach.
- | | | | | | | | | | | | | | | |
|---------------------------------------|---|----|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|
| Time (h) | 0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 |
| UH ordinates(m^3/s) | 0 | 30 | 110 | 170 | 210 | 180 | 120 | 80 | 40 | 35 | 20 | 15 | 5 | 0 |
- Q.4 a) What do you understand by a crest gauge? Explain the principle of working of any one type of crest gauge. 07
 b) Give the various empirical formulae used for the estimation of peak flood discharges 05
 c) Define W-index. 03
- Q.5 **Write short note on (any three)** 15
 a) Log Pearson type III distribution
 b) Determination of average precipitation over the catchment
 c) Gumbel's distribution
 d) Synthetic unit hydrograph
 e) Horton's infiltration equation.

SECTION B

- Q.6 a) Explain the terms “storage coefficient”, and “coefficient of transmissibility”. 04
 b) Define the terms i) Aquifer ii) Aquiclude iii) Aquifuge iv) Aquitard 04
 c) What do you understand by a partially penetrating well? 02
- Q.7 a) Explain Darcy’s law. What are its assumptions? Discuss its validity. 07
 b) The discharge at outlet is $0.2\text{m}^3/\text{s}$. Average losses from outlet to field are 10% of water 08
 flowing through the outlet. If kor and kor depth for wheat and rice are 3 weeks, 120mm and 2 weeks, 250mm, calculate how much area can be irrigated for each crop.
- Q.8 a) Explain with neat sketch different water shed structure in drainage line treatment. 07
 b) Explain steps involved in watershed management and small structures. 08
- Q.9 a) Obtain an expression for discharge through open well by recuperation test. 07
 b) Discuss remedial measures of water logging. 08
- Q.10 Write short note on : (any three) 15
 a) Recharge of groundwater
 b) Consumptive use of water
 c) Constant level of pumping test
 d) Important crops in India and their seasons

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-293
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (Civil) (Sem-I)
Design of Structure - I (Steel)
[Old]

[Time: Three Hours]

[Max. Marks: 80]

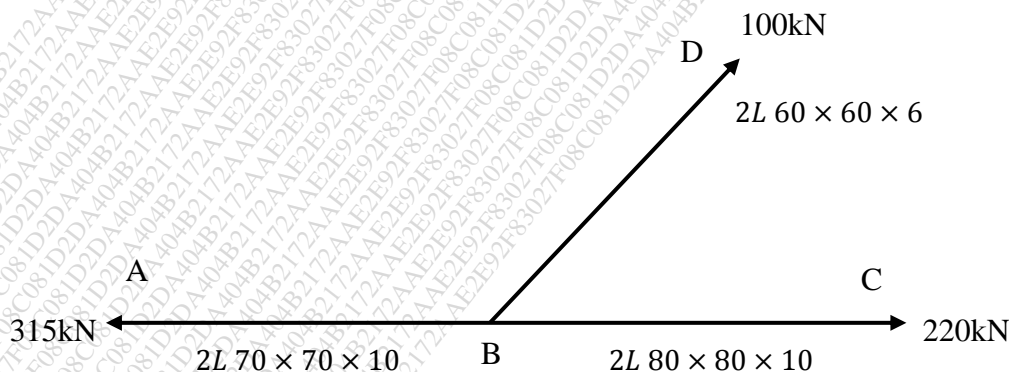
Please check whether you have got the right question paper.

- N.B
- i. Question No. 1 from section A and Q. No. 6 from section B are compulsory. Attempt any two questions of each Section from the remaining.
 - ii. Assume suitable data if required & mention it clearly.
 - iii. Use of nonprogrammable calculators, IS 800-2007 is permitted

Section A

- Q.1 Attempt any five. 10
- a) Enlist types of steel structure.
 - b) What is classification of structural members
 - c) What is net tensile stress area
 - d) What is gauge and end distance
 - e) What is shear lag
 - f) What is slenderness ratio
 - g) What is failure by flexural buckling, local buckling, flexural torsional buckling.

- Q.2 Design a joint B of a roof truss as shown in figure. The members are connected with 16 mm diameter bolts of grade 4.6 and steel having $F_u = 410 \text{ N/mm}^2$ to the gusset plate 10 mm thick. 15



- Q.3 An equal angle of a truss is connected to the gusset plate, it carries ultimate tensile of 128 kN. Design the section using bolt connection, Dia of bolt is 10 mm and $f_y = 250 \text{ N/mm}^2$ and $F_u = 410$ for plate. 15

- Q.4 Design a continuous strut to carry a service load of 175 kN. The effective length of strut is 5.8 m. 15

- Q.5 A column section ISHB 300@576.8 N/m support a total load of 900 kN. Design a suitable gusset plate base. 15

Section B

- Q.6 Attempt any five. 10
- Explain failure modes of beams.
 - What is effective span for beam
 - What is roof truss
 - How is the spacing of purlin fixed
 - What is bearing stiffeners
 - Enlist different design load acting on gantry girder
- Q.7 A simply supported steel joist of 5 m effective span laterally supported through out. It carries a 15 total udl of 55 kN/m (Inclusive of self-weight). Determine an appropriate section using steel grade of Fe 410.
- Q.8 Design a gantry girder to the following particulars: 15
- Capacity of the crane = 200 kN
 - Weight of the crane girder excluding crab = 180 kN
 - Weight of crab with motor, hook, etc = 35 kN
 - Minimum clearance between center of gantry girder to crane hook = 1.20 m
 - Distance between gantry girder rails = 15 m
 - Spacing of columns (effective span of gantry girder) = 7.50 m
 - Wheel base = 3 m
- Use steel yield stress 250 N/mm^2
- Q.9 Design the plate girder for an effective span of 50 m and carrying a udl of 55 KN/m and two concentrated load of 180 KN each acting at 10 m from both ends. The girder is simply supported at ends against lateral buckling throughout span. 15
- Take $F_y = 250 \text{ N/mm}^2$.
- Q.10 Write short notes on
- Explain beams connection 05
 - What are various section of plate girder 05
 - Explain procedure of gantry girder 05

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-314
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (Civil) (Sem-I)
Engineering Geology
[OLD]

[Time: Three Hours]

[Max. Marks:80]

Please check whether you have got the right question paper.

- N.B.: 1) Q.1 is compulsory and solve any two from the remaining questions from Section 'A'.
 2) Q.6 is compulsory and solve any two from the remaining questions from Section 'B'.
 3) Neat diagrams must be drawn whenever necessary.

Section -A

- | | | |
|-----|--|----------|
| Q.1 | Write short notes on <u>any five</u> .
a) Mantle of the earth
b) Weathering by organisms
c) Stream transportation
d) Pressure surface
e) Streak
f) Diagenesis and consolidation
g) Columnar joints | 10 |
| Q.2 | a) Give a brief account of the internal structure of the earth. What are the major characteristics of each region?
b) What is mineral? List the physical properties of minerals. Describe Fluorescence and phosphorescence. | 08
07 |
| Q.3 | a) Explain how to control earthquakes. What precautions should generally be taken while doing construction in earthquake effected areas.
b) Explain mountain building movements. Describe the types of mountains. | 08
07 |
| Q.4 | a) Describe the various structures present in the sedimentary rocks.
b) Explain with sketches Dip, Apparent and true dip and strike. | 08
08 |
| Q.5 | a) Define faults. Describe the various parts of faults.
b) How are the metamorphic rocks formed? Describe the agents of metamorphism. | 08
07 |

Section- B

- | | | |
|-----|---|----|
| Q.6 | Write short notes on any five.
a) Specific yield and specific retention
b) Limestones and marbles for buildings
c) Dams on shales
d) Overbreak in tunnels
e) Scouring action of rivers | 10 |
|-----|---|----|

- f) Soil creep earthflow
- g) Core recovery
- Q.7 a) Define a aquifer. Classify the aquifers on the basis of confinement and transmissibility. 08
b) Describe some common building stones, roofing stones and stones used for road metal. 07
- Q.8 a) Explain the problems that are met in constructing dams on the dipping strata. 08
b) What exploratory drilling? What are the advantages and limitations of drilling? 07
- Q.9 a) Explain how to construct the tunnel through folded, faulted and jointed rocks. 08
b) What are landslides? Describe the various methods of preventing landslides. 07
- Q.10 a) Describe the geological investigations required to be carried out for a reservoir basin. 08
b) Describe the various geological factors which affect the foundation of bridges. 07

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-348
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (Civil) (Sem-I)
Building Planning and Design
[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.

2) Solve any two questions from no 2 to 5 and any one from question no. 7 and 8.

3) Figure to indicate the maximum marks.

Section -A

- | | | |
|-----|---|----------|
| Q.1 | Answer the following (any five) | 10 |
| | <ul style="list-style-type: none"> a) What is set back line? b) What is Semi-detached building? c) Enlist different types of building. d) Define Circulation. How it is achieved? e) List out different level in construction stage. f) Explain building bye law in short. g) What are the guidelines for orientation of different units of a residential? | |
| Q.2 | <ul style="list-style-type: none"> a) Explain the term grouping, prospect, privacy. b) Explain the C.B.R.I. Suggestion for obtaining optimum orientation. | 08
07 |
| Q.3 | <ul style="list-style-type: none"> a) Explain the building bye-laws with reference to <ul style="list-style-type: none"> i) Open space requirement ii) Height limitations iii) Plinth are regulations b) Explain the importance of lighting and ventilation as per building bye-laws. | 08
07 |
| Q.4 | <ul style="list-style-type: none"> a) Explain the factors affecting the selection of site. b) Explain in detail testing of drains and maintenance of drains. | 08
07 |
| Q.5 | <ul style="list-style-type: none"> a) Explain the term Contrast, Proportion and Scale. b) Explain the importance of principle of planning in planning of Residential Bungalow Plan. | 08
07 |

Section- B

- | | | |
|-----|--|----|
| Q.6 | Plan and design a residential building for a family in a town using the following data. | 25 |
| | <ul style="list-style-type: none"> 1) Plot size 14m × 16m 2) Scale 1:50 3) Plinth Height - 1m 4) Required Components – Entrance Veranda, Living Room, Bed Room, Master Bed Room, Separate W.C. and Bath , Kitchen and Staircase. | |

Draw the following components.

- 1) Working Plan
- 2) Location and position of Column in Plan
- 3) Elevation
- 4) Section through staircase and W.C. + Bath
- 5) Schedule of opening
- 6) Area statement and Block plan calculation.

- Q.7 By assuming suitable data and norms list out the requirements and draw a line plan of Health care building. 15
- Q.8 a) How are the perspective projections classified? Mention the practical application of each type of perspective projection. 08
- b) What is meant by Landscaping? Explain the necessity of it and enlist the type of Landscaping. 07

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-383
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (Civil) (Sem-I)
Transportation Engineering-I
[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.
 2) Solve any two questions from remaining questions from each section.
 3) Figure to right indicates full marks.

- | | | |
|-----|--|----------|
| Q.1 | Solve any Five | 10 |
| | a) States the types of bridge foundation
b) Define Afflux
c) Explain the term “coffer dam”
d) Define Interlocking
e) State types of crossing
f) What is scour depth? How it is measured? | |
| Q.2 | a) Describe briefly Method of estimating flood discharge and method of determine linear water way for a bridge.
b) What is economic span? Derive the relation for the same. | 08
07 |
| Q.3 | a) How do you classify the bridges? Give its complete structure.
b) Describe with neat sketches the various types of wing walls with their advantages and disadvantages. | 07
08 |
| Q.4 | a) Write a note on Runway orientation
b) Describe in brief difference between aircraft and airport. | 07
08 |
| Q.5 | Write a short note (any three)
a) Geometric design of airfields
b) IRC loading on bridges
c) Wind rose diagram
d) Pile foundation for bridge
e) River training works | 15 |
| Q.6 | Answer the following any five
a) Define docks and harbour
b) State types of crossing
c) What is mean of wear of rails?
d) What is function of ballast?
e) Define guages
f) What is importance of grade compensation? | 10 |

- Q.7 a) Mention different types of rails and explain their properties 07
b) Write a short note on signaling during track maintenance 08
- Q.8 a) What are acute and obtuse crossing. Describe both with neat sketch. 08
b) What are the different gradients in station yard? Explain grade compensation. 07
- Q.9 a) Differentiate between Natural and Artificial harbors. Draw the sketch of typical artificial harbors. 07
b) Explain briefly the different types of station yards with the aid of neat sketches. 08
- Q.10 Write a short note on (**any three**) 15
- Marshaling yard
 - Site selection for docks and harbour
 - Characteristics of good ballast
 - Fish plates and fish bolts
 - Diamond crossing.

Total No. of Printed Pages:3

SUBJECT CODE NO:- H-418
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (Civil) (Sem-I)
Theory of Structure – II
[OLD]

[Time: Three Hours]

[Max.Marks:80]

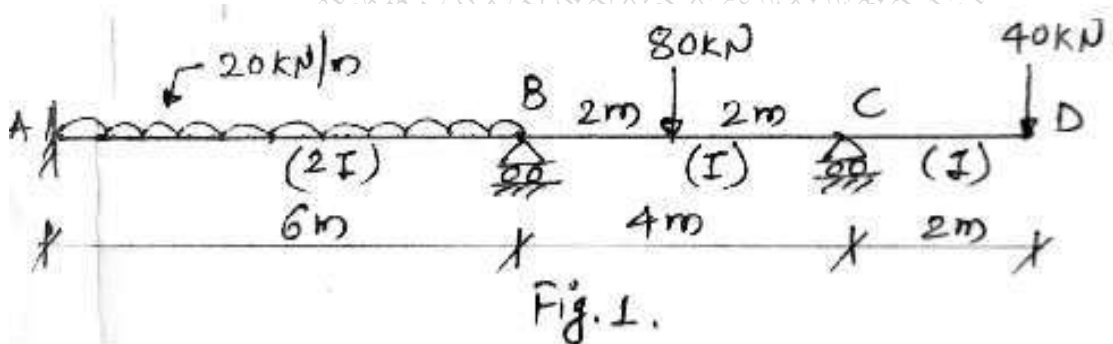
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N.B

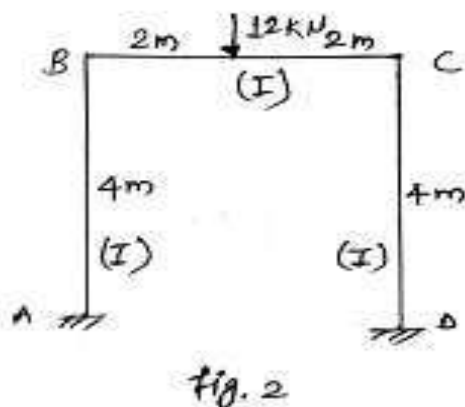
1. Questions No 1 & 6 are compulsory
2. Attempt any two questions from remaining each section
3. Assume suitable data if necessary & state it clearly.

Section -A

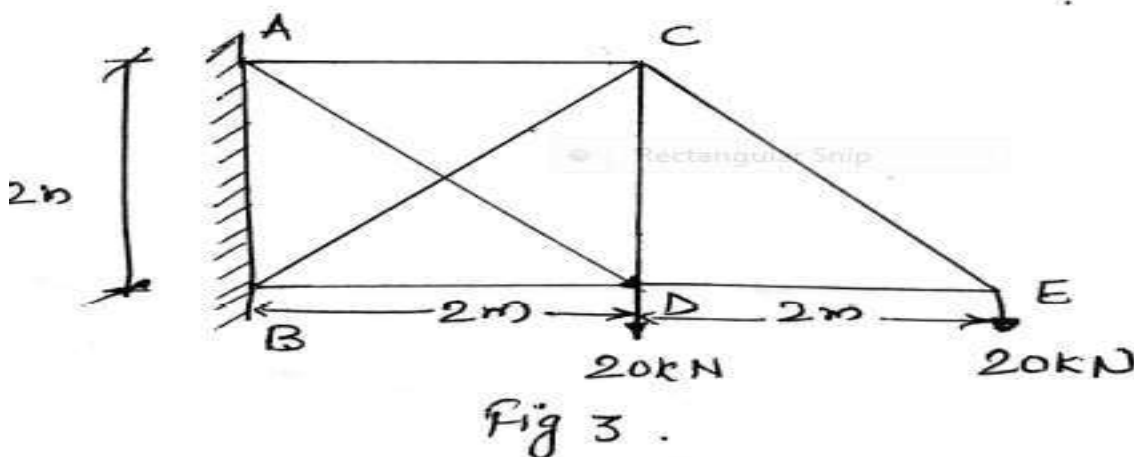
- Q.1 Answer the following (any two) 10
- a) Define shape factor & find shape factor of triangle of base b & height h
 - b) What is difference between plastic hinge & mechanical hinge.
 - c) What are assumptions made in plastic theory?
- Q.2 Analyse the continuous beam shown in fig.1 by slope deflection equation method & draw BMD 15



- Q.3 Analyze the portal frame shown in fig.2 by column analogy method & draw BMD 15



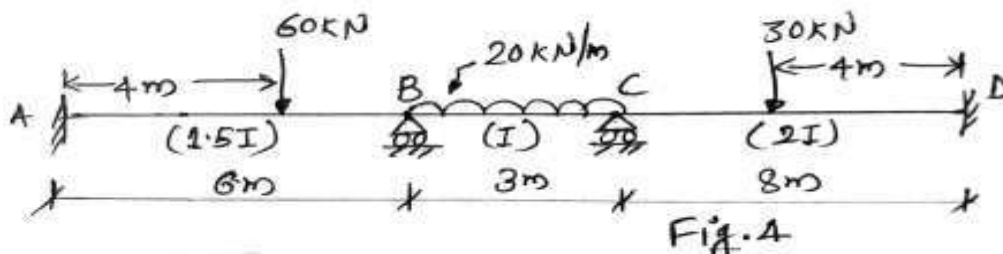
- Q.4 Find the forces in the members of redundant frame shown in fig.3 cross sectional area of each members is 1000mm^2 & $E = 2 \times 10^5 \text{ N/mm}^2$ 15



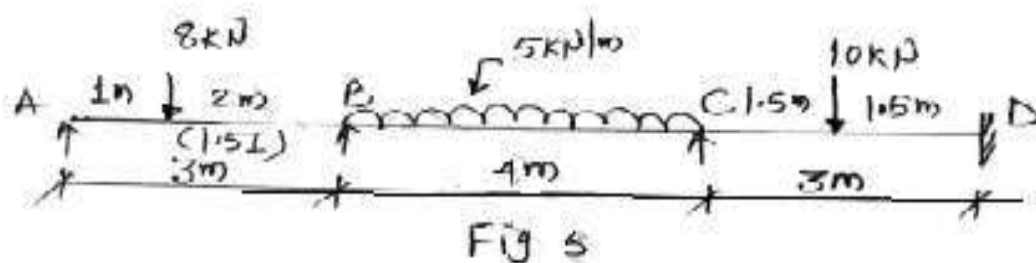
- Q.5 a) Derive slope deflection equation 08
b) Determine the end moment in a fixed beam of span "l" subjected to concentrated load "w" at a distance "a" from end A by using column analogy method. 07

Section – B

- Q.6 a) Answer the following (any two) 06
1) Explain Rotation factor and distribution factor
2) State distribution theorem
3) Explain effect of shortening of rib on two hinged Arch
b) Write a short note on normal thrust & radial shear of two hinged arch. 04
- Q.7 Analyze the continuous beam shown in fig.4 by using moment distribution method & draw BMD 15

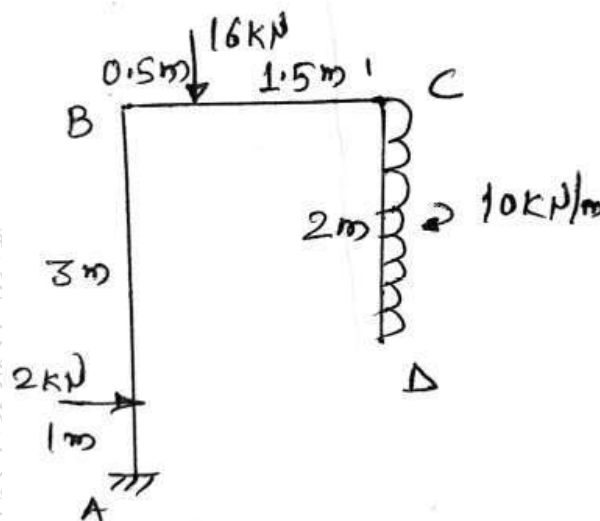


- Q.8 Determine the support moments at A, B, C, D for a continuous beam shown in fig.5 by using Kani's method & draw BMD.



- Q.9 Analyze the frame shown in fig.6 by using moment distribution method & draw BMD.

15



- Q.10 A two hinged parabolic arch of span 50m & span 5m is subjected to a central concentrated load of 60kN. It has a elastic support which yields by 0.0001 mm/kN.

Take $E = 200 \text{ kN/mm}^2$, $I = 5 \times 10^9 \text{ mm}^4$

Average area $A_m = 10000 \text{ mm}^2$ $\alpha = 10 \times 10^{-6} / ^\circ \text{C}$

Calculate the horizontal thrust developed when temperature rises by 20°C

- Neglecting rib shortening
- Considering rib shortening

Total No. of Printed Pages:3

SUBJECT CODE NO:- H-520
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (CIVIL) (CGPA) (Sem-I)
Theory of Structures - II
[Revised]

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B

1. Question no. 1 & 6 are compulsory.
2. Attempt any two questions from remaining from each section.
3. Assume suitable data if necessary and state it clearly.

Section – A

- Q.1 Answer the following (any Two): 10
- a. What are the assumptions made in plastic theory?
 - b. Explain kinematic indeterminacy.
 - c. State & explain castigliano's theorem & its applications.
- Q.2 Analyze the continuous beam as shown in fig .1 using slope deflection equation if support B sink 15 by 10mm. Take $EI = 4000KN.m^2$. Draw BMD.

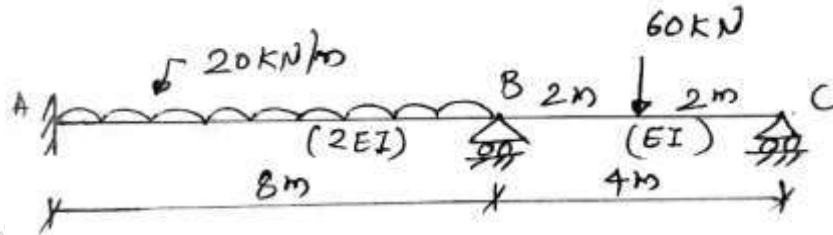


Fig.1

- Q.3 Analyze the frame shown in fig.2 by column analogy method & draw BMD. 15

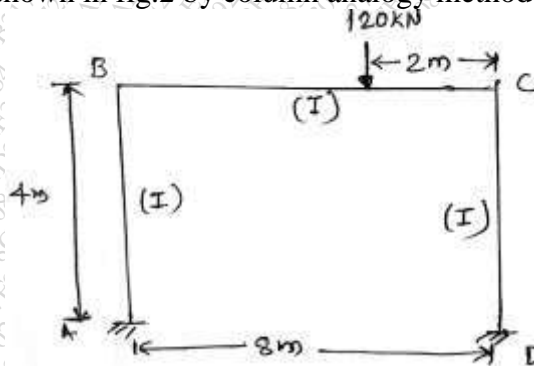


Fig.2

- Q.4 Find the forces in member BE & CF of truss shown in fig.3 the ratio of length to cross – sectional area for all members is the same. The frame is pinned at A & rest on rollers at D. 15

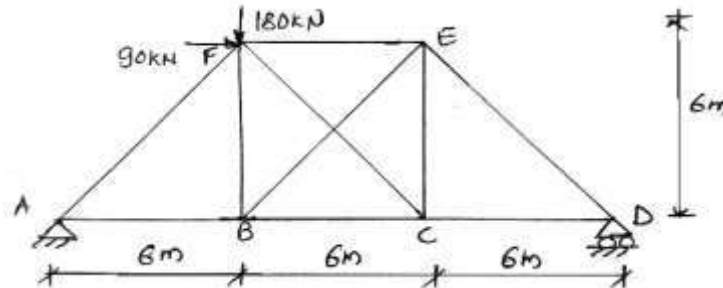


Fig. 3

- Q.5 a) A fixed beam of span " l " carries a uniformly distributed load " ω " throughout the span. Determine the end moments developed by using column Analogy Method. 08
- b) Derive slope deflection equation. 07

Section – B

- Q.6 a) Answer the following (any Two): 06
1. Explain distribution factor & Rotation factor.
 2. Explain effect of temperature charges in two hinged arches.
 3. Explain effect of shorting of rib in two hinged arches.
- b) Write a short note on sway analysis of frame using moment distribution method. 04
- Q.7 Analyze the frame shown in fig.4 Kani's method All members have section. 15

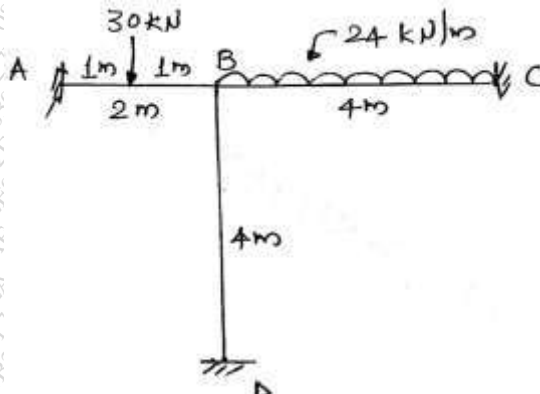
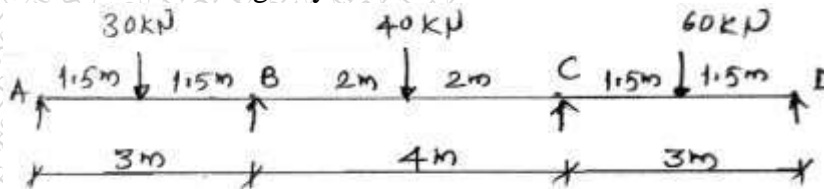


Fig.4

- Q.8 Analyze the continuous beam shown in fig.5 by moment distribution method and draw BWD. Assume uniform flexural rigidity. 15



- Q.9 Analyze the portal frame shown in fig.6 using moment distribution method & draw BMD. Assume uniform flexural rigidity.

15

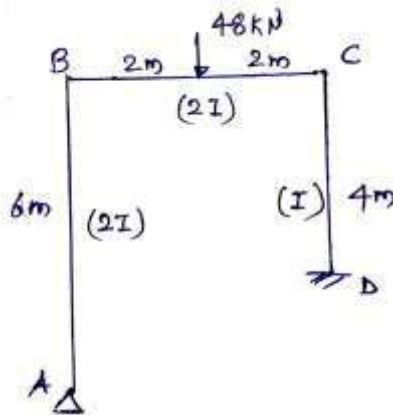


Fig.6

- Q.10 A two hinged parabolic arch of span 18m & rise 5m carries two concentrated loads of 50kN & 100kN at 5m & 9m from left hinge respectively. Find normal thrust & radial shear at 7m from left support & draw BMD.

15

Total No. of Printed Pages:3

SUBJECT CODE NO:- H-527
FACULTY OF SCIENCE AND TECHNOLOGY
T.E.(CIVIL) (CGPA) (Sem-I)
Design of Structure-I (Steel)
[Revised]

[Time: Three Hours]

[Max. Marks:80]

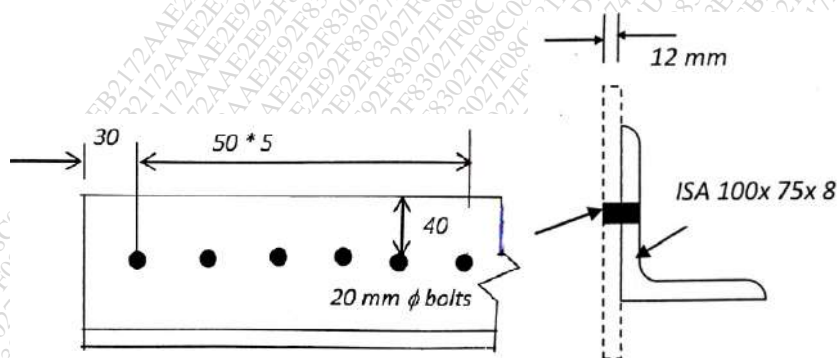
Please check whether you have got the right question paper.

- N.B.:i) Question No.1 from Section A and Q.No.6 from section B are compulsory. Attempt any two questions of each Section from the remaining.
 ii) Assume suitable data if required & mention it clearly.
 iii) Use of nonprogrammable calculators, IS 800-2007 is permitted.

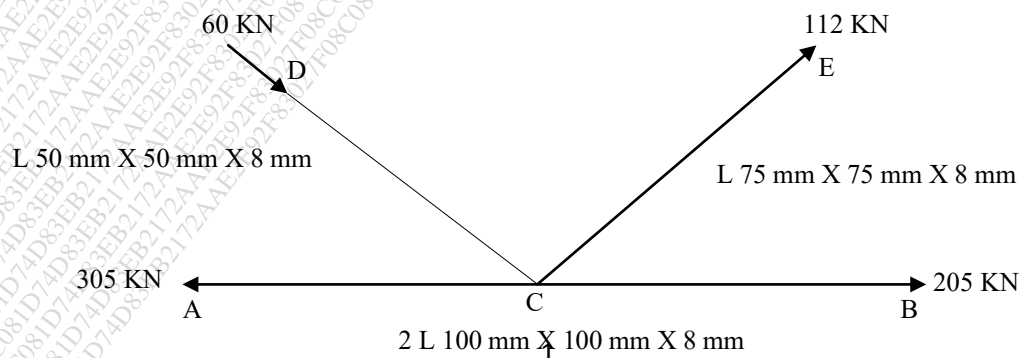
Section- A

- Q.1 Attempt any five. 10
- What are the advantages of steel structure
 - What is the difference between semicompact and compact section.
 - What is limit state of serviceability
 - Enlist types of joints
 - What design strength of tension member
 - What is lug angle.
 - What is single lacing and double lacing.

- Q.2 A single unequal angle $100 \times 75 \times 8$ mm is connected to a 12 mm thick gusset plate at the ends with 6 nos. 20 mm diameter bolts to transfer tension. Determine the design tensile strength of the angle. If the gusset is connected to the 100 mm leg. Use Steel Fe 410 and bolts are of grade 4.6 and $F_y=250\text{N/mm}^2$. 15



- Q.3 a) Fig. shows the joint in the bottom chord continuous member of the truss. Design the connection using M16 black bolt of property class 4.6 and grade Fe410 steel. Assume edge distance of 35 mm and minimum pitch. 08

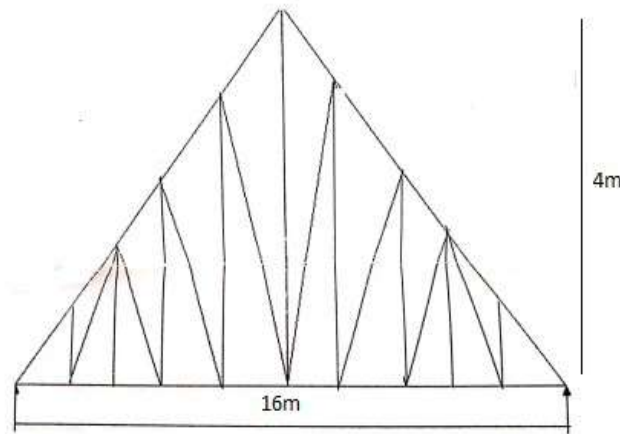


- b) ISA $100 \times 100 \times 10$ mm angle is to be welded in shop to 12 mm gusset plate. The angle carries an ultimate pull of 300 kN applied along its centroidal axis which is 28.4 mm from the back of the angle. Determine the length of side fillet weld required at the heel and toe of the angle. 07

- Q.4 Design laced column 8 m long to carry a factored load of 1800 kN. The column is effectively held in position at both ends and restrained against rotation at one end. Providing double lacing system and used two channels back to back. Used $F_y 250 \text{ N/mm}^2$. 15
- Q.5 Design a gusset base for a column ISHB 350 @ 710 N/m with two plates $450 \text{ mm} \times 20 \text{ mm}$ carrying a factored load of 2500 kN. The column to be supported on concrete pedestal with M20 grade of concrete. 15

Section – B

- Q.6 Attempt any five. 10
- Define Purlin and Girt
 - What is spacing of roof truss.
 - What is stiffener.
 - What is plastic section modulus.
 - Explain shear lag effect
 - State the components of a plate girder
 - What is partial safety factor
- Q.7 A simply supported beam of 5 m effective span. It carries a total udl of 40 kN/m (Inclusive of self weight) in addition the beam carries a central point load of 50 kN (Inclusive of self weight). The beam is laterally supported throughout using steel grade of Fe 410. 15
- Q.8 Design the plate girder for an effective span of 25 m and carrying a udl of 45 kN/m and two concentrated loads of 105 kN each acting at 5 m from both ends. The girder is simply supported at ends against lateral buckling throughout span. 15
- Take $F_y = 250 \text{ N/mm}^2$
- Q.9 Calculate dead load, live load, wind load for following truss for Aurangabad city for following diagram 15
- Span = 16 m
 - Centre to centre spacing = 4 m
 - Eaves Height = 6.2 m
 - Wind pressure acting normally on the windward side = 1200 N/m^2



Q.10 Write short notes on

- Explain web buckling
- Explain vertical stiffeners
- Explain different types of trusses

05
05
05

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-534
FACULTY OF SCIENCE AND TECHNOLOGY
T.E.(CIVIL) (CGPA) (Sem-I)
Building Planning And Design
[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 are compulsory.
2. Attempt any two questions remaining from section –A.
3. Attempt any one questions remaining from section – B.
4. Assume suitable data if necessary.
5. Use drawing sheet for Q.no.6 of section – B.
6. Figures to the right indicate full marks.

Section -A

- | | | |
|-----|--|----|
| Q.1 | a) Attempt any five questions from the following | 10 |
| | i) What is Building line? | |
| | ii) Define waist slab and angle of pitch for stair | |
| | iii) What is the Detached Building? | |
| | iv) What is the chimney and Tunneling Effect? | |
| | v) Define F.S.I & F.A.R | |
| | vi) What is the Drainage & sanitation? | |
| | vii) What do you mean by coping with neat sketch? | |
| Q.2 | a) Enlist Principles of Architectural Composition and explain any three in detail. | 08 |
| | b) Define climate. What factors of nature do influence climate? | 07 |
| Q.3 | a) Discuss the municipal corporation procedure for Building Permission in detail. | 08 |
| | b) Explain in details types of parking spaces with neat sketch. | 07 |
| Q.4 | a) Describe merits and drawback of separate system, partially separate system and combined system. | 08 |
| | b) Explain working of septic tank with neat sketch. | 07 |
| Q.5 | a) What are the different types of flooring? Briefly explain any three of them. | 08 |
| | b) Write down the thumb rule for deciding width and tread of a stair. Design a suitable stair case having the size available 3m X 3m .with floor to floor Height is 3m and draw a layout with details. | 07 |

Section – B

- Q.6 Plan and design a residential bungalow for a family in new Aurangabad using the following data
(Draw with suitable scale)
- Plot size 13m X 20m
 - Requirement: Ent. Varandha , Living room, Kitchen cum dinning, store room, Bed room , Master Bed Room Separate W.C. Bath and stair case.
 - Front Back & side margin as per NBC-2005
 - Working Drawing plan. 08
 - Elevation. 03
 - Locate position of column in plan. 03
 - Section through stair. 06
 - Area statement (Block plan calculation). 05
- Q.7
- List out the requirement with minimum standards specified by building Bye- law of factory building and Draw Line plan layout. 10
 - What are the requirements of different areas of a residential building? Explain any two in detail. 05
- Q.8
- What is the principle of perspective drawing? Explain two point perspectives with neat sketch. 08
 - What is the necessity of landscaping? Discuss any two types of landscaping. 07

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-541
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (CIVIL) (CGPA) (Sem-I)
Engineering Geology
[Revised]

[Time: Three Hours]

[Max. Marks:80]

Please check whether you have got the right question paper.

- N.B.: 1) Q. No. 1 is compulsory and solve any two from remaining questions from Section A.
 2) Q. No. 6 is compulsory and solve any two from remaining questions from Section B.
 3) Neat and labelled diagrams must be drawn wherever necessary.

Section A

- | | | |
|-----|--|----|
| Q.1 | Write short notes on (Any five) | 10 |
| | 1) Peasolitic texture
2) Mantle
3) Residual Mountains
4) Rock and Mineral
5) Lustre and its types
6) Isoseismal lines | |
| Q.2 | a) What is Igneous rock? Explain Hatch's classification. | 08 |
| | b) What is Rejuvenation of River? Describe in detail structures formed by River. | 07 |
| Q.3 | a) Define fold and explain types of fold. | 08 |
| | b) What is Earthquake? Distinguish between Magnitude and Intensity by Earthquake. | 07 |
| Q.4 | a) What is Mountain? Explain various types of mountains. | 08 |
| | b) What are Joints? Explain primary and secondary joints. | 07 |
| Q.5 | a) Explain the importance of stratigraphy in Civil Engineering. | 08 |
| | b) Discuss origin, distribution, classification and economic importance of Archean Rocks in India. | 07 |

Section B

- | | | |
|-----|--|----|
| Q.6 | Write short note on (Any five) | 10 |
| | 1) Dyke and sill
2) Vadose Water
3) Mural Joints
4) Permeability
5) Tunnel lining
6) Unconfined Aquifer | |

- Q.7 a) Write a note on Artificial Recharge of Ground Water. 08
b) Discuss in detail about common Building stories of India. 07
- Q.8 a) Explain unsuitable and favorable conditions of Dam site. 08
b) What is the significance of Exploratory drilling in Civil Engineering? 07
- Q.9 a) What difficulties will have to face if:
i) Tunnel in driven through syncline
ii) Tunnel along the strike 08
b) What is rain water harvesting? Explain artificial and natural recharge of tube well. 07
- Q.10 a) Explain Engineering characteristics of Amygdaloidal Basalt and vesicular Basalt. 08
b) Describe significance of Geology in civil Engineering. 07

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-548
FACULTY OF SCIENCE AND TECHNOLOGY
T.E.(CIVIL) (CGPA) (Sem-I)
Highway Engineering
(Revised)

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

Please check whether you have got the right question paper.

N.B

1. Solve any three from each section.
2. Q.No.05 & 07 are compulsory.
3. Non-Programmable calculator is allowed.
4. Figure to right indicates full marks.

Section A

- | | | |
|-----|---|----|
| Q.1 | a) Explain classification of roads and explain salient features of Bombay Road Plan. | 07 |
| | b) Explain total reaction time of driver and the factors on which it depends. Explain PIEV theory. | 08 |
| Q.2 | Explain CBR and test procedure for laboratory and field tests. How are the results of the test obtained and interrupted? | 15 |
| Q.3 | a) Explain ductility test of bitumen | 08 |
| | b) Explain impact value test of aggregate. | 07 |
| Q.4 | a) There is a horizontal highway curve of radius 400m and length 200m on this highway. Compute the setback distance required from the Centre line on the inner side of the curve so as to provide for
a. Stopping sight distance of 90m
b. Safe overtaking sight distance of 300 m
The distance between the Centre line of road and the inner lane is 1.9m | 08 |
| | b) A valley curve is formed by a descending grade of 1 in 25 meeting an ascending grade of 1 in 30. Design the length of valley curve to fulfill both comfort condition and headlight sight distance requirements for a design speed of 80kmph. Assume allowable rate of change of centrifugal acceleration $C = 0.6 \text{ m/sec}^3$ | 07 |
| Q.5 | A national highway passing through rolling terrain in heavy rainfall area has a horizontal curve of radius 500m. Design the length of transition curve assume design speed as 70 kmph. | 10 |

Section B

- Q.6 Discuss the object of the following types of joints (any three) draw neat sketches 15
- Expansion joint
 - Contraction joint
 - Warping joint
 - Longitudinal joint
- Q.7 What are the various types of failures in flexible pavement? Explain the causes? 10
- Q.8
- What are the various types of special repair in flexible pavement 08
 - State the functional classes of traffic signs with example. 07
- Q.9
- Explain different road user characteristics and vehicular characteristics which affect the road design. 08
 - What are the various types of traffic islands used? Explain the use of each. 07
- Q.10 Discuss various factors to be considered for the design of pavements in detail. 15

Total No. of Printed Pages:02

SUBJECT CODE NO:- H-563
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (Civil) (CGPA) (Sem-II)
Design Of Structures-II (Rcc)
[Rev]

[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.
- Answer any two from each section.
- ii) Use I.S. 456-2000 is permitted.
- iii) Assume suitable data, if required.

SECTION - A

- | | | |
|-----|--|----|
| Q.1 | a) What are the different types of limit states? On which basis they are classified. | 05 |
| | b) Explain the modes of failure with detail diagram. | 05 |
| Q.2 | a) Write short note on zoning in shear design. | 03 |
| | b) A doubly reinforced beam is 230mm wide and 380mm deep to the centre of the tensile reinforcement. The area of compression reinforcement and tensile reinforcement are 1265mm^2 and 1700mm^2 respectively. The effective cover is 40mm at compression steel. Find the ultimate moment of resistance of the beam section. Use M20 & Fe 415 grades of concrete & steel respectively. | 12 |
| Q.3 | Design the shear reinforcement for simply supported beam carrying U.d.l. of 60 KN/m. The span of the beam is 6m, Take width of the beam is 230mm & depth 650mm. Use M25 & Fe 415 grades. Beam having tensile reinforcements as 6 – 25 mm diameter. | 15 |
| Q.4 | a) Explain the check for development length and necessity of the check. | 03 |
| | b) An R.C. slab of effective depth 100 mm carries a U.d.l. of 15 KN/m^2 on an effective span of 3.5m. The slab is supported on a wall having 230 mm thick. The reinforcement consists of 10mm & bars at 125mm clc. Find the development length required from the face of the support. Use M20 & Fe 415 grades. | 12 |
| Q.5 | a) Write a short note on types of deflections and I.S. code requirements. | 04 |
| | b) Write a short note on factors affecting shear strength of concrete. | 04 |
| | c) Derive the various design parameters (constants) for M20 & Fe 415 grades. | 04 |
| | d) Explain in detail stress block parameters. | 03 |

SECTION – B

- Q.6 a) Explain bar detailing rules. 03
 b) What are the factors affecting bond resistance of section. 03
 c) Write a short note on serviceability requirements of one-way slab design. 04
- Q.7 a) What is flanged section. Explain the various cases encountered in analysis of flanged section. 03
 b) Design a reinforced concrete slab for a hall of $4.5\text{m} \times 6.5\text{m}$ (inner dimensions) supported on beams of width 300mm. the slab is simply supported on one short edge & continuous over three adjacent supports. Take live load as 3 KN/m^2 & floor finish is 1 KN/m^2 . Assume mild exposure. Use M24 and Fe 500 grades. 12
- Q.8 Design a dog legged stair for a building in which the vertical distance between floor is 3.6m. The stair hall measures $2.5\text{m} \times 5\text{m}$. The live load may be taken as 3 KN/m^2 . Use M20 & Fe 415 grades. 15
- Q.9 a) Establish the relation for the load carrying capacity of an axially loaded short column. 03
 b) Design a short rectangular column to carry an ultimate axial load of 1600 KN. Assume the effective length of column as 3.2. Use M20 and Fe500 grades. 12
- Q.10 Design an isolated rectangular sloped footing for the column of size $230\text{mm} \times 520\text{mm}$ with reinforcing 6 bars of 16mm dia. and carrying an axial ultimate load of 1200 KN. The S.B.C. of soil is 190 KN/m^2 . Use M20 and Fe415 grades. 15

SUBJECT CODE NO:- H-570
FACULTY OF SCIENCE AND TECHNOLOGY
T.E.(CIVIL) (CGPA) (Sem-II)
Professional Practices
[Revised]

[Max. Marks:80]

N.B.:

- Question no.1 and 5 is compulsory
- Attempts any one question from sections A and any two questions from sections B.
- Figures to the right indicate full marks.
- Assume suitable data wherever necessary.

Q.1	Workout the quantities of the following items from the given drawing from figure 1	20
	a) RCC Raft slab (1:1:5:3)	
	b) P.C.C (1:2:4)	
	c) R.C.C wall (1:2:4)	
	d) Steel Reinforcement in Raft slab only	
Q.2	a) Write any two detailed specification for	10
	i) Excavation for foundation work	
	ii) P.C.C. work for foundation (1:4:8)	
	iii) Plastering in C.M.(1:4) on new brick work surface	
	b) Carry out any two rate analysis for following	10
	i) 12 cm thick R.C.C. slab (1:2:4)	
	ii) Plastering in cement mortar (1:3)	
	iii) Brickwork in cement work (1:6)	
Q.3	a) What is rate analysis? Explain factors affecting on the rate analysis.	05
	b) Explain the principles of writing specification in detail.	05
	c) What is specification? And explain the types of specification in brief.	05
	d) What is IS:1200? List out its parts along with nature of work involved.	05
Q.4	a) Explain English and PWD method of measurements in detail.	05
	b) What are the requirement of estimator and write uses of estimates?	05
	c) Explain following terms	10
	i) Provisional sum	
	ii) Provisional quantities	

Q.5	Explain the following terms in detail	16
	a) Building bye laws and norms	
	b) Termination of contract	
	c) Formation of housing society	
	d) Administrative approval	

- | | | |
|-----|---|----|
| Q.6 | a) Explain the essential of valid contract in detail. | 06 |
| | b) What is contract? Explain various types of contract in detail. | 06 |
| Q.7 | a) Explain procedure for selection of tender in government works. | 06 |
| | b) What are the objectives of valuation of property | 06 |
| Q.8 | a) What is property mortgaging? Explain in brief. | 06 |
| | b) Explain the process of housing loan and repayment conditions. | 06 |



3

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-577
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (CIVIL) (CGPA) (Sem-II)
Geotechnical Engineering
[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 made compulsory. Solve any two questions from remaining Questions of each section.
 - 2) Assume suitable data if necessary & mention it clearly
 - 3) Figures to right indicates full marks

Section – A

- Q.1 Attempt any five: 10
- a) Draw and explain soil as a three phase system
 - b) Define void ratio and porosity
 - c) Define effective pressure
 - d) State and explain Darcy's law
 - e) What is discharge velocity and seepage velocity?
 - f) Define moisture content.
- Q.2 a) A compound sample of soil with a bulk unit weight of 19.62 kN/m^3 has a water content of 15%, What are its dry density, degree of saturation & air content? Assume $G=2.65$ 08
- b) Prove that $e = \frac{wG}{s}$ 07
- Where e, w, G & S are void ratio, water content, specific gravity & degree of saturation of soil mass.
- Q.3 a) What is classification of soil? Explain Indian Standard classification 07
- b) Derive expression of coefficient of permeability of clayey soil by falling head method 08
- Q.4 a) Explain procedure of determination of maximum dry density & optimum moisture content by standard proctor test. 08
- b) An undisturbed sample of a clay stratum, 2m thick, was tested in the laboratory and the avg. value of coefficient of consolidation was found to be $2 \times 10^{-4} \text{ cm}^2/\text{sec}$. If structure is built on the clay stratum, how long it will take to attain half the ultimate settlement under the load of structure? Assume double drainage. 07
- Q.5 a) Discuss Terzaghi's theory of consolidation by stating the various assumption & its validity. 07
- b) A soil strata consist of 3 layers of soil thickness 1m, 1.5m, & 2.0m having coefficient of permeability of $3 \times 10^{-3} \text{ cm/sec}$, $4.5 \times 10^{-3} \text{ cm/sec}$, & $3 \times 10^{-3} \text{ cm/sec}$, respectively 08
- Estimate the average coefficient of permeability in the direction
- i) Parallel to the bedding plane.
 - ii) Normal to the bedding plane

Section - B

- | | | |
|------|--|----|
| Q.6 | Attempt any five: | 10 |
| | a) What is shear strength of soil? | |
| | b) What are the advantages of tri- axial test? | |
| | c) Explain earth pressure on retaining wall. | |
| | d) Enlist slope failure | |
| | e) Enlist methods to determine shear strength | |
| | f) What is stability curve? | |
| Q.7 | a) Explain shear characteristics of sand. | 05 |
| | b) In an unconfined compression test, a sample of sandy clay 8 cm long & 4 cm in diameter fails under a load of 120N at 10% stain compute the shearing resistance taking into account effect of change in cross section of sample. | 10 |
| Q.8 | a) Discuss Swedish method & its application to dry cohesive soils | 07 |
| | b) Show graphical representation or graph between C & ϕ for | 08 |
| | i) Sandy soil ii) clayey soil iii) moist sand | |
| Q.9 | a) What are the assumptions made in Rankine's theory? Justify any two | 07 |
| | b) Explain the construction & use of Newmark influence chart | 08 |
| Q.10 | a) Derive Boussinesq's equation for point load. | 07 |
| | b) Explain the procedure of determination of shear strength parameters of soil by direct shear test. | 08 |

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-584
FACULTY OF SCIENCE & TECHNOLOGY
T.E.(CIVIL) (CGPA) (Sem-II)
Water Resources Engineering-I
[Revised]

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B

- 1) Q.no.1 & Q.No.6 are compulsory
- 2) Solve any two questions from remaining in each section
- 3) Assume suitable data if necessary

Section – A

Q.1 Solve any five from following 10

- a) Draw neat sketch of hydrological cycle.
- b) Define Hyetograph and Hydrograph
- c) Enlist various forms of precipitation
- d) Enlist the various factor affecting infiltration
- e) Define Evaporation and Evapotranspiration process
- f) What is W- index?
- g) Give three empirical formula that are commonly used to estimate the design flood
- h) Define unit hydrograph.

Q.2 a) What is precipitation? Explain with neat sketch hydrological cycle in detail. 07

- b) A catchment area has seven rain gauge stations. In a year the annual rainfall recorded by the gauge are: 08

Station	A	B	C	D	E	F	G
Rainfall (cm)	90.0	98.5	93.3	72.4	75.7	89.0	91.7

For a 5 % error in the estimation of the mean rainfall, calculate minimum number of Additional station required in the catchment.

Q.3 a) Describe the principle of working of a weighing bucket type recording rain gauge with a neat sketch. 15

- b) What is Infiltration? Explain factors affecting infiltration.

Q.4 a) How can evapotranspiration be reduced? 05

- b) The ordinates of a 6-h unit hydrograph are given. A storm had 3 successive 6-h intensity of rainfall magnitude of 5, 7, 6cm respectively. Assume a ϕ - index of 0.3cm/hr and a base flow of 30m³/s. Determine the resulting hydrograph of flow. 10

Time (hrs)	0	6	12	18	24	30	36	42	48	54	60	66
Ordinates of 6-h (m ³ /s)	0	252	605	808	698	597	448	318	196	98	48	0

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

- i) Log Person type –III distribution
- j) Gumbel's distribution
- k) S- curve Hydrograph
- l) Double mass curves

15

Section – B

Q.6 Solve any five from following

- i. What is aquifer and aquifuge?
- ii. What is permanent wilting point?
- iii. Define duty and delta.
- iv. List methods of applying water to crops.
- v. What is watershed management?
- vi. Enlist causes of water logging
- vii. Enlist various methods of recharge of ground water?
- viii. Find delta for a crop if duty for a base period 110 days is 1400 hectares/cumec.

10

Q.7 a) Derive an expression for the steady state discharge of a well fully penetrating into a unconfined aquifer.

07

b) Design a tube well for the following data.

08

- i) Yield required = 0.8 cumecs
 - ii) Thickness of confined aquifer = 30m
 - iii) Radius of circle of influence = 300m
 - iv) coefficient of permeability = 60m /day
 - v) Drawdown = 5m
- assume suitable if necessary

Q.8 a) What are the various types of irrigation system? Explain any five with neat sketch.

07

b) Water is released at the rate of 15 cumec at the head of a canal. If duty at the field is 1100 hectare/cumec and loss of water in transit is 30 % find the area of the land that can be irrigated.

08

Q.9 a) Explain in detail various steps involved in watershed management?

07

b) Discuss remedial measures of water logging

08

Q.10 Write short notes on following

15

- i. Important crops in India and their season
- ii. Irrigation water standards
- iii. Necessity of crop rotation.
- iv. Ridge line treatment in watershe

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-1003
FACULTY OF SCIENCE AND TECHNOLOGY
T.Y. B.Tech. (Civil) (Sem-VI)
Design of Structure-II
[Old]

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B

- i) Use of IS 456:2002 is allowed.
- ii) Question No.1 and 6 are compulsory.
- iii) Attempt any two questions from each section from remaining.

Section A

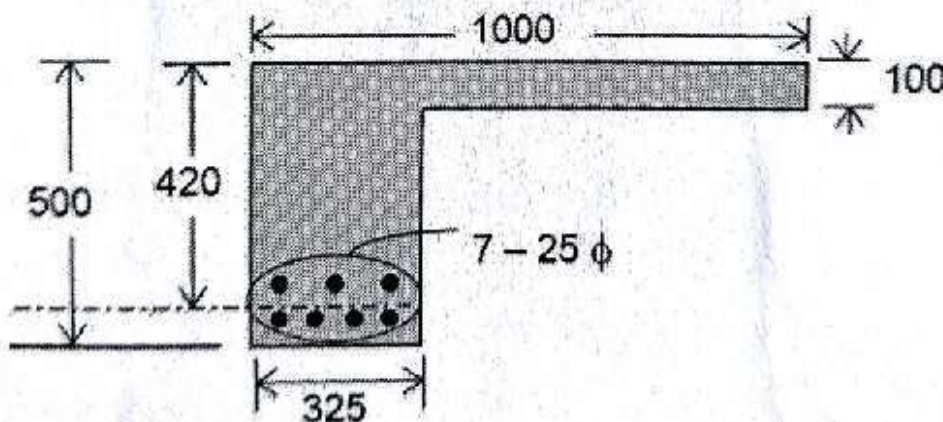
- | | | |
|-----|---|--------------|
| Q.1 | Explain the following terms,
a) Doubly Reinforced beam
b) Shear Reinforcement
c) Modes of failure
d) Durability of concrete
e) Load combinations in RCC design | 10 |
| Q.2 | a) Write a note on short term deflection.

b) An R.C.C beam is required to resist a bending moment of 120KNm. Design a beam for flexure. Use of M20 grade of concrete & Fe415 steel. | 05

10 |
| Q.3 | a) Write a note on crack width calculation.

b) Determine the ultimate moment of resistance of the doubly reinforced beam section, $b = 300\text{mm}$, $D = 600\text{mm}$, $A_{st} = 3054\text{sqmm}$, $c_c = 25\text{mm}$ $f_y = 415\text{MPa}$ and $f_{ck} = 20\text{MPa}$. | 05

10 |
| Q.4 | Assuming M25 concrete and Fe415 steel, compute the ultimate moment of resistance of the L-beam section shown in the following figure Fig.1(all dimensions are in mm) | 15 |



- Q.5 a) Write down the recommendations of code for shear reinforcement. 05
- b) Design shear reinforcement for a cantilever beam fixed at one end having a point load of 15kN at the unsupported end and a UDL of 20kN/m. The grade of concrete is M25 & grade of steel is Fe500 & the percentage of main steel is 1.2%. 10

Section B

- Q.6 Explain the following terms, 03
- a) Critical sections for shear in footing 04
- b) Torsional reinforcement in slabs 03
- c) Reinforcement in stair case (with diagram)
- Q.7 a) IS code specifications for compression members. 05
- b) Design a column of size 380×450mm and having 3.5m unsupported length. The column is subjected to a load of 2000KN and is effectively held in position but not restrained against rotation. 10
- Q.8 a) What are the types of staircase? Draw suitable diagram. 05
- b) Design the staircase slab. The stairs are simply supported on beams provided at the first riser and at the edge of the upper landing. Assume a finish load of 0.8kN/sqm and a live load of 5kN/sqm. Use M20 concrete and Fe415 steel. R=150mm, T=300mm, Effective span = 4.5m in which landing is 1.5m wide. Assume mild exposure conditions. 10
- Q.9 a) What are the different types of footing? 05
- b) Design an isolated footing for a square column, 450mm×450mm, reinforced with 8-25 ϕ bars, and carrying a service load of 2300 kN. Assume soil with a safe bearing capacity of 300 kN/sqm at a depth of 1.5 m below ground. Assume M 20 grade concrete and Fe 415 grade steel for the footing, and M 25 concrete and Fe 415 steel for the column. 10
- Q.10 a) What is the difference between one way slab and two way slab reinforcement. 05
- b) Design a simply supported slab to cover a room with internal dimension 4.0 m × 5.0m and 230 mm thick brick walls around. Assume a live load of 3kN/sqm and a finish load of 1 kN/sqm. Use M20 and Fe500. Assume mild exposure conditions. 10