6E6031

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# 6E6031/6E3032

## B. Tech. VI-Sem. (Main/Back) Exam., April/May-2016

## Civil Engineering

## 6CE1A Theory of Structures-II

**Time: 3 Hours** **Maximum Marks: 80**

**Min. Passing Marks (Main & Back): 26**

***Instructions to Candidates:-***

*Attempt any **five questions,** selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly.*

*Units of quantities used/ calculated must be stated clearly.*

*Use of following supporting material is permitted during examination. (Mentioned in form No. 205)*

1. NIL 2. NIL

## UNIT-I

Q.1 A beam ABC is simply supported at A, B and C and has hinge at D located at centre of BC. AB = 6 m, BC = 8 m. Draw influence line diagrams for reactions at A, B and C and for shear force at B. Calculate the maximum values of these quantities if an uniformly distributed load of 10kN/m and length 4m crosses the beam from left to right. [16]

**OR**

Q.1 Draw the influence line diagram for reaction at A for the continuous beam A B C. AB = BC = 5m. Flexural rigidity constant. Calculate ordinates at every / m interval. Beam is simply supported at A, B and C. [16]

## UNIT-II

Q.2 A three hinged parabolic arch of 18m span and 4m central rise carries a uniformly distributed load of 4kN/m intensity on the left 6m length. Calculate the normal thrust and radial shear at a distance of 5m from left end. Also calculate the maximum positive and negative bending moments. Both the ends of the arch are hinged at same level. Third hinge is at crown. [16]

**OR**

Q.2 A two hinged parabolic arch has a span of 26m and rise 5m. It is subjected to a concentrated load of 10kN at 8m from lift end hinge. The second moment of area varies as the secant of the slope of rib axis. Calculate the reactions at the hinges and the inclination of resultant reactions with the horizontal. Also calculate the maximum positive and negative bending moments anywhere on the arch. [16]

## UNIT-III

Q.3 A cable 20m long, is supported at two ends at the same level. The supports are 16m apart. The cable supports three loads of 14kN, 9kN and 12kN dividing the 16m distance in four equal ports. Determine shape of cable and reaction at the ends of the cable. [16]

**OR**

Q.3 The three hinged stiffening girder of a suspension bridge of 200m span is subjected to a point load of 25kN placed at 50m from left end hinge. Determine the bending moment and shear force at a section 80m from left end. Also calculate the maximum tension in the cable. Cable has a central dip of 20m. [16]

## UNIT-IV

Q.4 A beam of rectangular section, 120 mm wide and 160 mm deep is subjected to a bending moment of 24kN m. The trace of the plane of loading is inclined at 45° to the y – y axis of the section. Locate the neutral axis of the section and determine the maximum bending stress induced in the section. [16]

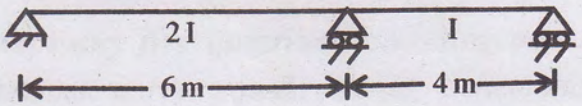
**OR**

Q.4 If the principal stresses at a point in an elastic material are 3f tensile , 2f compressive and f compressive, calculate the value of f at failure, according to five different theories of failure. The yield stress in simple tension is 250 N /mm$^2$ and passion's ratio = 0.3. [16]

## UNIT-V

Q.5 (a) Differentiate between stiffness method and flexibility method. [8]

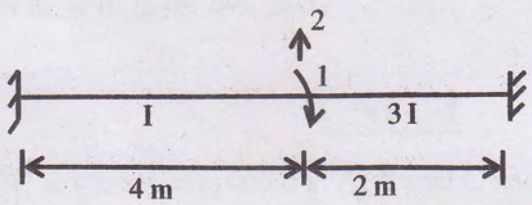
(b) Determine the stiffness matrix for the given beam. Neglect axial deformation. [8]




**OR**

Q.5 (a) Derive the relation between flexibility and stiffness matrices. [8]

(b) Determine the stiffness matrix for the coordinates mentioned for the given beam. [8]

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6E6032

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# 6E6032

## B. Tech. VI-Sem. (Main & Back) Exam., April/May-2016
## Civil Engineering
## 6CE2A Geotechnical Engineering - II

**Time: 3 Hours** **Maximum Marks: 80**

**Min. Passing Marks (Main & Back): 26**

***Instructions to Candidates:-***

*Attempt any **five questions,** selecting **one question** from **each unit.** All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly.*

*Units of quantities used/ calculated must be stated clearly.*

*Use of following supporting material is permitted during examination. (Mentioned in form No. 205)*

1. NIL 2. NIL

## UNIT-I

Q.1 (a) Discuss various approximate methods for the determination of the vertical stress at a point. What are their limitations? [8]

(b) What do you understand by contact pressure? What are the factors that affect the contact pressure distributions? Draw the contact pressure distribution diagram for flexible and rigid footings on sand and clayey soil. [8]

**OR**

Q.1 (a) Discuss the basis of westerguaard's theory. What is an influence line diagram? What is its use in practice? [8]

(b) A concentrated load of 50KN acts on the surface of a homogeneous soil mass of large extent. Determine the stress intensity at a depth of 5m [8]

(i) Directly under the load and

(ii) At a horizontal distance of 2.5m.

## UNIT-II

Q.2 (a) Differentiate between normally consolidated and over consolidated soils. How would you determine the over consolidation pressure. [8]

(b) Define the following terms – [8]

(i) Coefficient of volume change.

(ii) Compression index

(iii) Coefficient of compressibility

(iv) Expansion index

**OR**

Q.2 (a) What is coefficient of consolidation? What is it's use in the settlement analysis? How it is determined? [8]

(b) The laboratory consolidation data for an undisturbed clay sample are as follows – $e_1 = 1.00$, $\bar{\sigma}_1 = 85KN/m^2$ and $e_2 = 0.80$, $\bar{\sigma}_2 = 465KN/m^2$ Determine the void ratio for a pressure of $\bar{\sigma}_3 = 600KN/m^2$ [8]

## UNIT-III

Q.3 (a) Describe bishop's simplified method. What are its advantages over Swedish circle method? [8]

(b) What are different factor of safety used in the stability of slopes? Discuss the method of checking the stability of an infinite slope in cohesive soil. What is critical height? [8]

**OR**

Q.3 (a) How a slope is analyzed using Swedish circle method? Derive an expression for the factor of safety. [8]

(b) A long natural slope is an over consolidated clay ($c' = 10KN/m^2$, $\phi' = 25°$, $\gamma_{sat} = 20KN/m^3$) is inclined at 15° to the horizontal. The water table is at the surface and the seepage is parallel to the slope. If a plane slip had developed at a depth of 4m below the surface, determine the factor of safety. [8]

## UNIT-IV

Q.4 (a) What are the assumptions of Rankine's theory? Derive the expression for active pressure. [8]

(b) Describe Rebhann's construction. What is its use? [8]

**OR**

Q.4 (a) What are assumption's in coulomb's theory? Compare Rankine and coulomb theory. [8]

(b) A retaining wall 7m high, with its back face smooth and vertical. It retains sand with its surface horizontal. Using Rankine theory, determine active earth pressure at the base of backfill when

(i) It is dry

(ii) Saturated and

(iii) Submerged with water table at surface.

Take $\gamma = 18KN/m^3$, $\phi = 30°$ and $\gamma_{sat} = 21KN/m^3$. [8]

## UNIT-V

Q.5 (a) Define the following terms – [8]

(i) Net safe bearing capacity

(ii) Gross safe bearing capacity

(iii) Allowable soil pressure

(iv) Local and general shear failure

(b) Describe plate load test in detail. What are its limitations and applications. [8]

**OR**

Q.5 (a) Discuss various types of soil sampler. What is it's use? What are the factors that affect the disturbance of sample? How it is evaluated? [8]

(b) A strip footing of 2m width is founded at a depth of 4m below the ground surface. Determine the net ultimate bearing capacity using [8]

(i) Terzaghi's equation

(ii) Skempton's equation.

The soil is clay ($\phi = 0$, $C = 10KN/m^2$). The unit weight of soil is 20KN/m3.

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# 6E6033

## B. Tech. VI-Sem. (Main/Back) Exam., April/May-2016

## Civil Engineering

## 6CE3A Environmental Engineering-II

**Time: 3 Hours** **Maximum Marks: 80**

**Min. Passing Marks (Main & Back): 26**

***Instructions to Candidates:-***

*Attempt any **five questions,** selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly.*

*Units of quantities used/ calculated must be stated clearly.*

*Use of following supporting material is permitted during examination. (Mentioned in form No. 205)*

1. NIL 2. NIL

## UNIT-I

Q.1 (a) Explain the following terms:- [4×2=8]

(i) Sewerage

(ii) Sullage

(iii) Sewage

(iv) Garbage

(b) A Sample of sewage has 4-day BOD value of 80% of the final at 20°C. Find out the base to rate constant K. [8]

**OR**

Q.1 (a) Define the following terms:- [4×2=8]

(i) BOD

(ii) COD

(iii) Th OD

(iv) TOC

(b) Find out the population equivalent of a city having average sewage flow as $10^8$ l/day and the average 5-day BOD as 300 mg/l. Assume 5-day BOD of sewage as 0.075 kg per capita per day. [8]

## UNIT-II

Q.2 (a) Compare the conservancy and water carriage systems of sewerage stating their advantages and disadvantages. [8]

(b) Find out the flow velocity and discharge in a circular sewer of diameter 1 m, laid at a slope of 1 in 400, when it is running half full. [8]

**OR**

Q.2 (a) Determine the diameter of a circular sewer running half full at a discharge of 800 l/s. Assume S = 0.0001 and n = 0.015. [8]

(b) Describe the various tests of pipe sewers before they are put into use. [8]

## UNIT-III

Q.3 (a) What do you mean by sedimentation? Describe various types of settling. [8]

(b) Design a grit chamber to remove particles upto a size of 0.2 mm and specific gravity 2.65. The average working temperature is 20°C. For a maximum flow of 15 MLD, a flow through velocity of 0.25 m/s will be maintained by a proportional flow weir. [8]

**OR**

Q.3 (a) What do you mean by biological treatment of sewage? Discuss various treatment techniques used for this purpose. [8]

(b) The sewage from a primary settling tank is applied to a standard rate filter at a rate of 5 million liters per day having a 5-day BOD of 175 mg/l. Find out the depth and volume of the filter, assuming a surface loading of 2000 $l/m^2$/day and an organic loading of 165 $g/m^3$/day. [8]

## UNIT-IV

Q.4 (a) What do you understand by sewage sickness and sludge bulking? Explain the remedial measures adopted for these two. [8]

(b) Write a detailed note on self- purification of streams. [8]

**OR**

Q.4 (a) What do you mean by oxygen-sag curve? Explain with a neat sketch and description. [8]

(b) What are the methods, problems and limitations of sewage disposal on land? [8]

## UNIT-V

Q.5 (a) Explain different sources of air pollution. [8]

(b) Describe various measures of controlling noise pollution. [8]

**OR**

Q.5 (a) Elaborate the adverse effects of air pollution. [8]

(b) Write short notes on green house effect and acid rain. [8]

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**Roll No. _____**

# B.Tech. VI sem(Main/Back) Exam May 2016
# Civil Engg.
# 6CE4A Design of Concrete Structure I
# 6E6034

**Time: 3Hours** **Maximum Marks: 80**

**Min Passing Marks: 26**

Attempt any **five questions,** selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.
Use limit state method unless specified specifically.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

IS456 (2000)

**UNIT -I**

Q. 1 (A) Compare the salient features of "limit state design philosophy" and "Working stress design philosophy. 6

(B) Using working stress method, design a singly reinforced beam section to resist a maximum service bending moment of 55.35 KN.m. Take width of beam section as two third of effective width. Use M-20 and Fe-415.
Give the neat sketch of beam section showing all details. 8+2

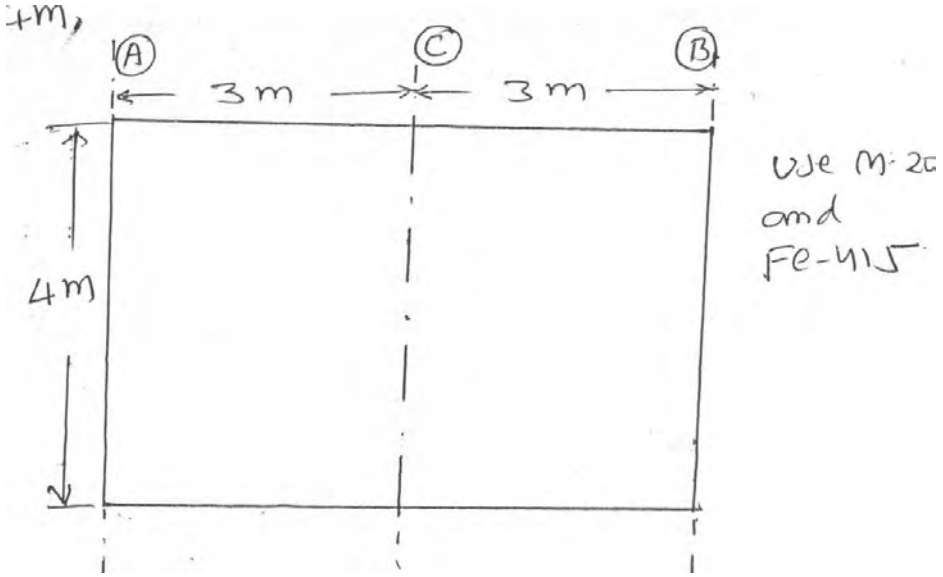
OR

Q.1 (A) Describe the characteristics of failure at limit state of collapse in flexure for under reinforced and over-reinforced sections. 4

(B) Using limit state design, determine and provide the tension reinforcement at mid span section of a simply supported R C beam for the following data:
(i) Beam section has 400 mm width and 600 mm overall depth with effective cover to tension reinforcement as 50 mm.
(ii) Beam is simply supported on two supports of 400 mm width each and at clear span of 5 m.
(iii) Super imposed working load on the beam is 45 kN/m.
Take load factor 1.5 for both dead load and superimposed load. Use M-20 and Fe 415. Give the neat sketch of the designed section. 10+2

**UNIT -II**

Q. 2 A hall of size 4 mx 6m is covered with a 110 mm thick RC slab casted monolithically with the end beams A and B and intermediate beam C. All the three beams A,B, C having section width of 250 mm and are simply supported at an effective span of 4 m.




Determine the following:

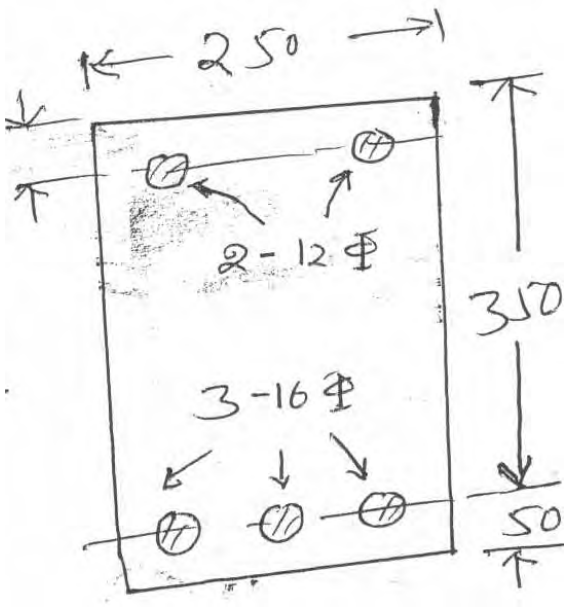
(i) Effective width of inverted L beam "A" and intermediate T beam "C"
(ii) Ultimate moment of resistance of T beam "C" if the N.A. depth coincides with the junction of flange and web.
(iii) Area of tension steel required to be provided for the case (ii) above.
(iv) Draw the stress block parameter and sectional details of T beam for the case (ii) above.

5+4+4+3

OR

Q.2 (A) A doubly reinforced beam, simply supported over a span of 4.50 m has sectional details as shown in figure given below:

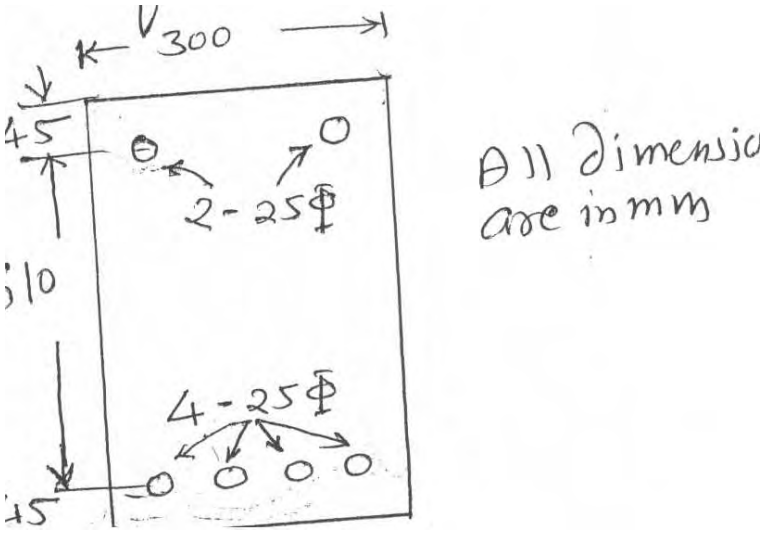
50




All dimensions are in "mm"
Use M-20 and Fe-415
Asc= 2-12dia mm
Ast= 3-16 dia mm.
Check the beam for limit state of collapse in deflection using modification factors as per IS 456. 6

(B) Determine the stress level in compression steel and ultimate moment of the doubly reinforced beam given below:

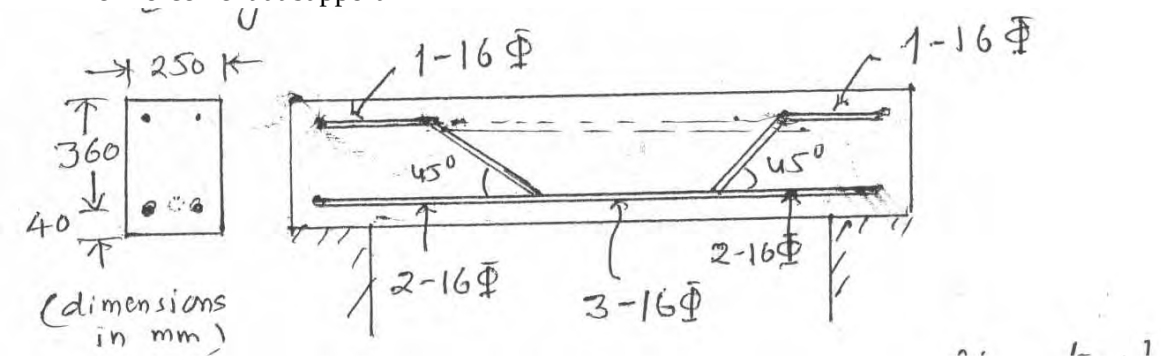
Use M-20 and Fe-415 . All dimensions are in mm. Dimensions are 300 x 700 mm with cover of 45 mm on either side.



**UNIT -III**

Q.3. (a) Draw the neat longitudinal section of a simply supported beam and show the pattern and location flexure cracks, shear cracks and bond cracks. 4

(b) For the simply supported beam shown in figure design the shear reinforcement at support




Consider M.20 and Fe-415 and ultimate shear at support = 200 KN 12

OR

Q. 3 (a) with the help of neat sketch , show

i. two legged vertical stirrups
ii. three legged vertical stirrups
iii. inclined shear stirrups 4

(b) Determine the various ways by which bond strength of a given R.C. beam section can be improved. 4

( c) A reinforced concrete beam section 300 mm wide is reinforced with four bars of 25 mm diameters at an effective depth of 600 mm. the beam has to resist a factored shear force of 400 KN at support Section. Assume fck = 25 $N/mm^2$ fy= 415 $N/mm^2$

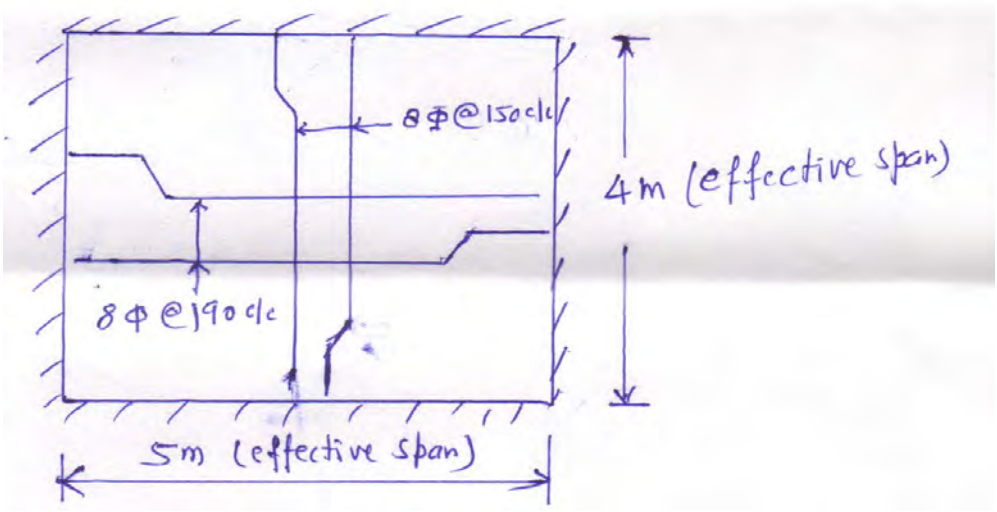
Design the shear reinforcement at support. 8

**UNIT -IV**

Q. 4 (a) With the Help of neat Sketch describe the following for a flat slab.

(i) Colum Strip
(ii) Middle strip
(iii) Panel
(iv) Drops (6)

Q. 4 (b) Determine torsion reinforcement for the following slab iIf the corner are prevented from lifting : Use M-20 and Fe-415




Give the neat sketch showing torsion reinforcement (8+2)

OR

Q. 4 An office floor having 4mX10 m clear dimension is having 230mm thick wells all around. The room is proposed to be covered by R.C. slab using M-20 and Fe-415, Take live load =4kN/$m^2$ , finish load 1.5 kN/$m^2$, adopt over all depth=185mm. load factor=1.5

For the above problem:

(i) Determine main and distribution reinforcement
(ii) check for shear and deflection
(iii) give the neat sketches showing reinforcement (8+4+4)

**UNIT V**

Q. 5 (a) Differentiate between short column and long column and describe their structural behavior. (5)

(b) Describe the salient features of PU-MU interaction curve and its uses. (5)

(c) Differentiate between isolated footing and combined footing. Also discuss the criteria for deciding the shape and size of footing in plan. (6)

**OR**

Q. 5 Design a helically reinforced circular column of 400 mm diameter subjected to an factored axial load of 1500 KN. The column is hinged at both the end with unsupported length as 3.4 m. Use M-25 and Fe-415. Give the neat sketch showing reinforcement detail. First verify that column is short and may be considered as axially loaded. (8+4+4).

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# 6E6035

## B. Tech. VI-Sem. (Main/Back) Exam., April/May-2016
## Civil Engineering
## 6CE5A Transportation Engineering-I

**Time: 3 Hours** **Maximum Marks: 80**

**Min. Passing Marks (Main & Back): 26**

***Instructions to Candidates:-***

*Attempt any **five questions,** selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly.*

*Units of quantities used/ calculated must be stated clearly.*

*Use of following supporting material is permitted during examination. (Mentioned in form No. 205)*

1. NIL 2. NIL

## UNIT-I

Q.1 (a) Discuss the role of transportation in national development. [6]

(b) What are the significant recommendations of Jayakar Committee Report? How this helped in road development in India. [10]

**OR**

Q.1 (a) Compare road transportation with other modes of transportation. [6]

(b) Determine the lengths of different categories of roads in a state in India by the year 2018 using the 3ed road development formula and with the following data.[10]

Area of state: 18000 sq.km.

Number of towns: 25

Road Density: 83 km/ 100 $km^2$.

## UNIT-II

Q.2 (a) List and explain the properties and requirements of road aggregates. Also mention the various tests conducted for judging the suitability of road aggregates. [8]

(b) Explain briefly the construction of earth roads. Discuss the advantages and limitations of earth roads. [8]

**OR**

Q.2 (a) List different types of cutbacks. When are these used? Discuss in brief the tests carried out on cutback bitumen? [10]

(b) Briefly list the methods of construction of gravel roads. [6]

## UNIT-III

Q.3 (a) What is Super elevation? Explain the steps for practical design of super elevation. [8]

(b) Calculate the length of transition curve for a plain and rolling terrain for the following data: Design speed = 80 kmph., Radius of curve = 250 m, Road width = 70 m, Maximum allowable rate of super elevation 1 in 150, Super elevation maximum restricted to 0.07. Assume pavement is rotated with respect to centerline. [8]

**OR**

Q.3 (a) Define SSD. Explain any one factor that restricts the SSD. [6]

(b) A valley curve is formed by a descending gradient of 1 in 25 meeting an ascending gradient of 1 in 30. Design the total length of valley curve, if the design speed is 100 kmph so as to fulfill comfort conditions and head light sight distance for night driving assuming suitable details. [10]

## UNIT-IV

Q.4 (a) Indicate how the traffic volume data are presented and the results used in traffic engineering. [8]

(b) What are the various objects and applications of spot – speed studies? [8]

**OR**

Q.4 (a) Write short note on :- [4×2=8]

(i) Thirteenth highest hourly traffic volume.

(ii) PCU

(iii) Road Markings.

(iv) Traffic Signal System

(b) Explain origin and destination study. What are the various uses of O & D studies. [8]

## UNIT-V

Q.5 (a) Explain "Flexible and Rigid" pavements and write the points of difference. [8]

(b) What are the special points to be considered in the alignment of hill road? Discuss. [8]

**OR**

Q.5 (a) Explain group index method of pavement design. What are the limitations of this method? [8]

(b) Write short notes on (any 4) :- [4×2=8]

(i) Hair pin bend.

(ii) Resisting length.

(iii) Cross – drainage in hill roads.

(iv) Maintenance problems in hill roads.

(v) Scupper.

(vi) Prevention of land slide.

(vii) Precipice work.

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6E6036

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# 6E6036

## B.Tech. VI-Sem. (Main &Back) Exam., April/May-2016

## Civil Engineering

## 6CE6.1A Remote Sensing and GIS

**Time: 3 Hours** **Maximum Marks: 80**

**Min. Passing Marks (Main & Back): 26**

***Instructions to Candidates:-***

*Attempt any **five questions,** selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly.*

*Units of quantities used/ calculated must be stated clearly.*

*Use of following supporting material is permitted during examination. (Mentioned in form No. 205)*

1. NIL 2. NIL

## UNIT-I

Q.1 (a) Define Photogrammetry and compare between Aerial and Terrestrial Photographs. [8]

(b) Discuss various terminology used in Aerial Photographs. [8]

**OR**

Q.1 (a) Describe various types of Aerial Photographs. [8]

(b) Write about various information recorded on Aerial Photographs. [8]

## UNIT-II

Q.2 Explain Remote Sensing and describe Remote Sensing System with diagram in detail. [16]

**OR**

Q.2 Write short note on

(a) Electromagnetic Radiation & Spectrum [8]

(b) Scattering and Atmospheric Window [8]

## UNIT-III

Q.3 Explain Multi concept of Remote Sensing with application in Civil Engineering in detail. [16]

**OR**

Q.3 Write short note on:

(a) Various type of platform [8]

(b) Characteristics of Sensors [8]

## UNIT-IV

Q.4 (a) Write about Principal of Digital Image Processing. [8]

(b) Differentiate between Digital and Visual Techniques. [8]

**OR**

Q.4 (a) Explain the concept of Image processing. [8]

(b) Describe various techniques used in Digital Image Processing. [8]

## UNIT-V

Q.5 (a) Define Geographical Information System. [8]

(b) Discuss about application of G.I.S. in Municipal. [8]

**OR**

Q.5 Write short note on application of G.I.S. on

(a) Forestry

(b) Urban Development [16]

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