

320637(20)

B. E. (Sixth Semester) Examination, 2020

(Old Scheme)

(Civil Engg.)

GIS & its APPLICATIONS

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

***Note : Part (a) from each question is compulsory.
Attempt any two parts from parts (b), (c)
and (d) of each question.***

Unit-I

- | | |
|---|---|
| 1. (a) Define GIS. | 2 |
| (b) What are the key components of GIS? | 7 |

[2]

- (c) What are the different types of data products? 7
- (d) Explain the different levels of measurements used in GIS. 7

Unit-II

2. (a) Define satellite data. 2
- (b) Explain various functions of DBMS, in GIS. 7
- (c) Describe different modes of input data in GIS. 7
- (d) Describe the advantages and disadvantages of Vector and Raster data. 7

Unit-III

3. (a) Define DBMS. 2
- (b) Explain how spatial and non-spatial data are linked in GIS. 7
- (c) Give a brief account of smart features of DBMS. 7
- (d) What are the advantages and limitations of data overlay and modelling? 7

Unit-IV

[3]

4. (a) Name any four GIS software. 2
- (b) Discuss in detail the GIS application in water resources management. 7
- (c) Discuss in detail the GIS applications in land suitability analysis. 7
- (d) Discuss in detail the GIS applications in agriculture and forestry. 7

Unit-V

5. (a) Define data layer. 2
- (b) Describe, any one type of GIS analysis used for case study. 7
- (c) Citing any example. Explain how GIS is useful for handling land information system. 7
- (d) Draw a schematic draft for a GIS analysis. 7

320712(20)**B. E. (Seventh Semester) Examination,
April-May/Nov.-Dec. 2020****(Old Scheme)****(Civil Engg. Branch)****WATER RESOURCES ENGINEERING-I*****Time Allowed : Three hours******Maximum Marks : 80******Minimum Pass Marks : 28***

Note : Attempt all questions. Part (a) from each question is compulsory. Attempt any two from (b), (c) and (d).

Unit-I

1. (a) Define irrigation. 2
- (b) Describe the advantages of irrigation. 7

[2]

- (c) Describe the different methods of irrigation. 7
- (d) The base period, duty and area of various crops under a canal system are given in the table below. Find the reservoir capacity if the canal losses are 20% and reservoir losses is 10%. 7

Crop	Base Period (days)	Duty at the field (hec./cumec)	Area under the crop (hec.)
Wheat	120	1800	4800
Sugarcane	360	800	5600
Cotton	200	1400	2400
Rice	120	900	3200
Vegetable	120	700	1400

Unit-II

2. (a) Define water-course. 2
- (b) Describe different type of canal according to alignment. 7
- (c) Design an irrigation channel to carry a discharge of $15 \text{ m}^3/\text{s}$. Lacey's silt factor is 1.0 and channel side slope is $1/2 : 1$. 7

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- (d) Design an irrigation canal to carry a discharge of 14 cumecs. Assume $n = 0.0225$, $m = 1$, $B/D = 5.7$. 7

Unit-III

3. (a) Define water logging. 2
- (b) Describe the causes of water logging. 7
- (c) Describe the different types of lining. 7
- (d) Design a trapezoidal shaped concrete lined channel to carry a discharge of $105 \text{ m}^3/\text{s}$ at a slope of $1/4000$. The side slopes of the channel are $1.5 : 1$. The value of $n = 0.016$ and $b/d = 8$. 7

Unit-IV

4. (a) Define river training works. 2
- (b) Describe the classification of river training works. 7
- (c) Explain the following : 7
Meandering, Guide Bank, Groynes, Leaves
- (d) Describe the different types of Groynes. 7

Unit-V

5. (a) Define reservoir. 2

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- (b) Describe the different types of reservoirs. 7
- (c) What are the different investigations required for reservoir planning? 7
- (d) Describe the graphical method of flood routing. 7

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Roll No.

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APR-MAY

B. E. (Seventh Semester) Examination, 2020

(Old Scheme)

(Civil Engg. Branch)

QUANTITY SURVEYING and COST EVALUATION

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Attempt all questions. Part (a) from each question is compulsory. Attempt any two parts from parts (b), (c) and (d) of each question.

Unit-I

1. (a) What do you understand by unit of measurement? 2
- (b) Write units of measurement of various items of work : 7
 - (i) Earth work in excavation

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- (ii) Cement concrete
- (iii) D.P.C.
- (iv) Half brick work
- (v) Rolled steel channels
- (vi) Marble flooring
- (vii) White washing

(c) Write short notes on the following : 7

- (i) Revised estimate
- (ii) Supplementary estimate

(d) Write short notes on : 7

- (i) Master Roll
- (ii) Competent authority
- (iii) Deposit work

Unit-II

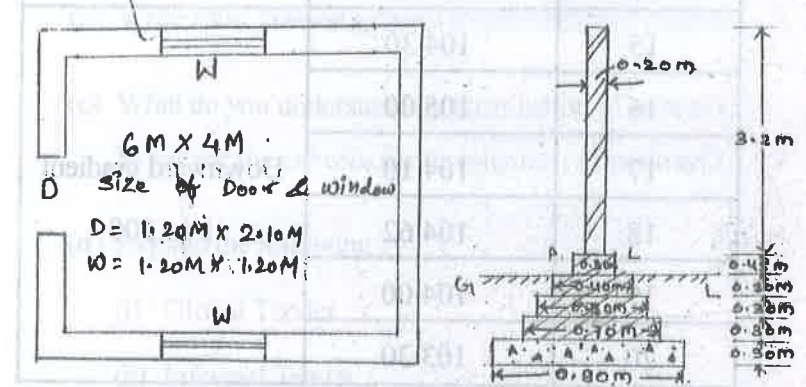
2. (a) What do you understand by detailed estimate? 2

(b) Explain following terms : 7

- (i) Long wall-short wall method
- (ii) Centre line method

(c) Estimate the following items of work for a single room 6 m x 4 m building as per given cross-section of wall and foundations as shown in fig. by long wall short wall method : 7

- (i) Earthwork in excavation in foundation
- (ii) Concrete in foundation
- (iii) Brickwork in plinth and foundation
- (iv) Brickwork in super-structure



(d) Reduced level (RL) of ground along the centre line of a proposed road from chainage 10 to 20 are given below. The formation level at the 10th chainage is 107 and the road is in down ward gradient of 1 in 150 up to the chainage 14 and then the gradient

change to 1 in 100 downward formation width of road is 10 metre and side slopes of banking are 2 : 1 length of the chain is 30 metre. 7

Chainage	R.L. of Ground	R.L. of formation
10	105.05	107.0
11	105.60	Downward gradient 1 in 150
12	105.44	
13	105.90	
14	105.42	
15	104.30	Downward gradient 1 in 100
16	105.00	
17	104.10	
18	104.62	
19	104.00	
20	103.30	

Unit-III

3. (a) What is the purpose of Rate Analysis? 2
- (b) Analysis the rate of cement concrete 1 : 2 : 4 per unit. Use 10 cubic metre for calculation purpose. 7

- (c) Prepare analysis of rate for the following items of work. Assume suitable rates of materials and labour for 1st class brickwork and 1 : 6 in super st. 7
- (d) Write detailed specifications of cement concrete flooring. 7

Unit-IV

4. (a) What is a Contract? 2
- (b) Write short note on general requirements of contract. 7
- (c) What do you understand by termination of contract? What are the criteria for termination of contract? 7
- (d) Explain the following : 7
- (i) Global Tender
 - (ii) Informal Tender
 - (iii) Unbalance Tender
 - (iv) Notice inviting Tender

Unit-V

5. (a) What do you understand by the term Valuation? 2

(b) Define the following terms : (any four) 7

(i) Book value

(ii) Annual value

(iii) Market value

(iv) Scrap value

(v) Sinking fund

(c) Write short notes on : 7

(i) Mortgage

(ii) Easement

(iii) Year purchase

(d) Define object of valuation of property. 7

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B. E. (Seventh Semester) Examination,

April-May 2020 / NOV-DEC 2020

(New Scheme)

(Civil Engg. Branch)

WATER RESOURCES ENGINEERING-I

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Attempt any three parts of each question.

Part (a) is compulsory. Assume suitable data wherever necessary.

1. (a) Explain the differences in the duty at watercourse and canal head, give the reason also. 2
- (b) (i) Describe point wise the precise method of the determining required channel capacity for any

[2]

command area. Illustrate it with the help of a table.

(ii) In order to determine the quantity of water at head of canal knowing the quantity of water at root of soil, what the different efficiency which are to be taken into account explain in sequence. 7

(c) Explain how frequency of irrigation is determined on the basis of soil moisture? 7

(d) The base period, intensity of irrigation and duty of various crops under a canal system are given in the table below. Find the reservoir capacities if the canal losses are 20% and reservoir losses are 12%. 7

Crop	Base period	Duty at the field	Area under crop (ha)
Wheat	120	1800	4800
Sugar-cane	360	800	5600
Cotton	200	1400	2400
Rice	120	900	3200
Vegetables	120	700	1400

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[3]

2. (a) Explain how capacity factor affect the discharge capacity of a channel. 2

(b) Design a distributary canal making use of Garret's diagram for the data given below full supply discharge = 2.26 cumecs, bed slope = 1 in 5000, Kutter's $N = 0.0225$, $CVR = 1$: side slope = $\frac{1}{2}$: 1 (Horizontal : Vertical). 7

(c) Design an irrigation channel section for the following data :
 Discharge = 30
 Silt factor = 1.0
 Side slope = $1\frac{1}{2}$: 1
 Draw the complete channel section assuming it to be in part cutting and part filling. 7

(d) An alluvial irrigation canal has been excavated with 1 : 1 side slopes in cutting and 1.5 : 1 (H : V) in filling. At a given cross section of this canal, the cutting depth is found to be D , and water depth up to full supply level as $1.2 D$. The berm width left originally is $D/2$, find the berm width when canal attains regime. 7

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3. (a) Explain how lining of canal increases its commanded area? 2
- (b) Give point wise justification of lining in existing canal and lined canal in new project. Illustrates suitably. 7
- (c) How the discharge passes thorough any outlet can be calculated, explain it for non modular, flexible and rigid outlets. 7
- (d) Compare the brick, concrete and boulder lining with respect to their hydraulic efficiency, economy, durability and reparability. 7
4. (a) Write down the ill effects of embankment construction for flood control. 2
- (b) The following data pertain to a bridge site of river, Maximum discharge = 6200 cumecs, highest flood level = 104.00 m; river bed level = 99.00 m, average diameter of river bed material = 0.12 mm. Design and sketch Bell's Bunds including the launching apron to train the river. 7
- (c) Explain how do the following assist in river control (i) Spurs and (ii) Guide bunds. 7

[5]

- (d) How cut off are artificially induced? What are their advantages and disadvantages? 7
5. (a) Define maximum reservoir level and how it affects height of a dam. 2
- (b) The lowest portion of the capacity-elevation curve of a proposal irrigation reservoir draining 20 km² of catchment, is represented by the following data :

Elevation in m	Capacity in ha.m
600	24.2
602	26.2
604	30.3
606	36.8

The rate of silting for the catchment has been assessed to be 300 m³/km²/year. Assuming the life of reservoir to be 50 years, (a) compute the dead storage and the lowest sill level, if the main canal is 6 km long with a bed slope of 1 in 1500, and the canal bed level at the tail end is at RL 594.5 m. The FSD of the canal at the head is 80 cm. The crop water requirement is assessed as 320 ha m. 7

[6]

- (c) The hydrograph of inflow to a reservoir is given in the table below :

Time in days	0	2	4	6	8	10	12	14	16	18	20
Flow (m ³ /s)	60	120	420	545	420	310	250	190	150	110	60

The reservoir is full at the start of the flood inflow.

The storage S of the reservoir above the spillway crest is given in million cubic meter by $S = 8.64 h^{0.97}$,

where h is the head in meters above the crest. The

discharge over the spillway is given in cumecs by

$Q = 61 h^{0.96}$. Find the head over the spillway crest

at the end of 8th day of the flood.

7

- (d) Explain the procedure of determining the life of reservoir based on silting of reservoir.

7

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B. E. (Seventh Semester) Examination, April-May 2020/

(New Scheme)

NOV-DEC 2020

(Civil Engg. Branch)

ENVIRONMENTAL ENGINEERING-II

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : All questions are compulsory. Part (a) of each question is compulsory and answer any two parts out of (b), (c) and (d) of each question.

Provided neat sketches wherever necessary.

Unit-I

1. (a) Define sewage and sewerage. 2
- (b) Explain different sewerage systems giving their advantage and disadvantages. 7

[2]

- (c) Why are the manholes required and where are these provided? Explain the construction of one with sketch. 7
- (d) A 400 mm dia circular sewer is to flow at depth of 0.3 times diameter on a grade ensuring a degree of self-cleansing equivalent to that obtained at full depth at a velocity of 0.9m/sec. Find the required grade and associated velocity and rate of discharge at this depth. Assume Manning's rugosity coefficient n as 0.013. The variation of n with depth may be neglected. 7

Unit-II

2. (a) What is the significance of nitrites in wastewater characteristics? 2
- (b) Explain the procedure of determination of total solids, suspended, solids, dissolved solids and settleable solids for a wastewater sample. How one can determine the volatile and fixed part of these solids? 7
- (c) Explain the construction, working and design criteria of Septic Tank giving neat sketch. 7
- (d) A 4% solution of a sewage sample is incubated for 5 days at 20°C. The depletion of oxygen was found to be 4 mg/L. Determine the BOD of the sewage. What will be 3-day BOD of this sewage in summer

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[3]

when the temperature is 37°C? Take the BOD rate constant (base 10) as 0.1 per day at 20°C. 7

Unit-III

3. (a) What do you mean by secondary treatment of waste water? 2
- (a) What do you understand by suspended growth process and attached growth process? Explain the working of a Trickling Filter giving neat sketch. 7
- (b) A single stage trickling filter is designed for an organic loading of 10000 kg of BOD in raw sewage per hectare meter per day with a re-circulation ratio of 1.5. This filter treats a flow of 4 MLD of raw sewage with a BOD of 2000 mg/L. Using NRC formula determine the strength of the effluent. 7
- (d) Write notes on the following : 7
- (i) Oxidation ditch
- (ii) Activated Sludge Process

Unit-IV

4. (a) What is Oxygen sag curve? 2
- (b) Explain the different stages in anaerobic digestion of sludge. 7
- (c) The rate of flow in river is 3 cum/sec and has a

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BOD₅ of 2 mg/L. The river is saturated with D.O. of 9.2 mg/l at 20°C. Wastewater having BOD₅ of 120 mg/L and D.O. content zero with a flow rate of 0.30 cum/sec is discharged into river. Assuming temperature of 20°C throughout and deoxygenation coefficient as 0.1/days and reoxygenation coefficient of 0.3/day. Find out the degree of treatment required if the minimum DO to be maintained in the river is 4 mg/L. 7

(d) Describe the characteristics of wastewater generated from a sugar industry and also mention the treatment methodology to be adopted for such waste. 7

Unit-V

5. (a) Compare the per capita solid waste generated in India and some developed countries. 2
- (b) Describe different method for collection and disposal of municipal solid waste. 7
- (c) Explain the various adverse effects on health, due to ill managed municipal solid waste of city. 7
- (d) Write notes on following : 7
- (i) Incineration
 - (ii) Composition of refuse
 - (iii) Composting

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B. E. (Seventh Semester) Examination,

April-May 2020 / NOV-DEC 2020

(New Scheme)

(Civil Engg. Branch)

QUANTITY SURVEYING and COST EVALUATION

Time Allowed: Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Attempt all questions. Part (a) from each question is compulsory. Attempt any two parts from part (b), (c) and (d) of each question. Assume the missing data suitably if missing.

Unit-I

1. (a) Explain the mode of measurement of:

2

(i) Half brickwork

[2]

- (ii) Shutter of door and Window
 - (iii) Flooring
 - (iv) Binding of steel reinforcement
- (b) Explain in brief of following : 1¾×4=7
- (i) Muster roll
 - (ii) Measurement Book
 - (iii) Standard Measurement Book
 - (iv) Material of file account
- (c) Prepare a preliminary estimate of a residential building project with a total plinth area of all the building 1800 m². The following information is given : 7
- (i) Plinth area rate - Rs. 500/- m²
 - (ii) Additional amount allowed for special architectural features : 1.5% of bulding cost
 - (iii) Extra for water supply and sanitary fitting : 5% of building cost
 - (iv) Extra for building services : 7.50% of building cost.
 - (v) Contigencies : 2% of overall cost
 - (vi) Supervision charges = 7.5%

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- (d) Write short notes on : 7
- (i) Differentiate between contingencies and workcharged establishment
 - (ii) Purpose of preparing approximate estimate and detail estimate

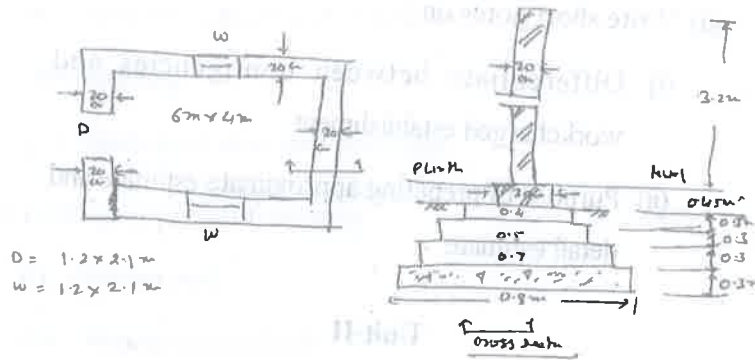
Unit-II

2. (a) List the factors to be considered for preparing of a detail estimate. 2
- (b) What are various methods of calculating detail estimate? Explain Centre line method compared to other methods. 2+5=7
- (c) Estimate the following items of work for a single room 6.0 m × 4.0 m building as per given section of wall and foundation as shown in fig. by centreline method. 1¾×4=7
- (i) Earth work in excavation in foundation
 - (ii) Concrete in foundation
 - (iii) Brickwork in plinth and foundation
 - (iv) Brickwork in superstructure

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[4]

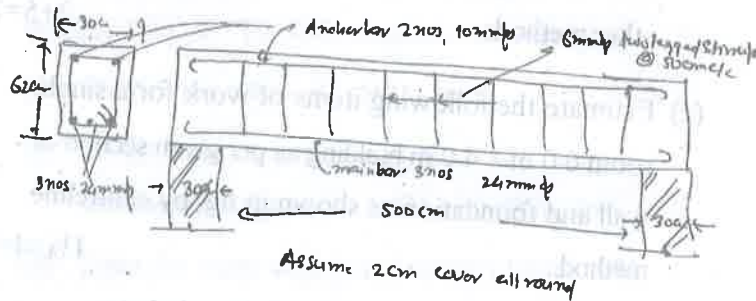


$D = 1.2 \times 2.1m$
 $W = 1.2 \times 2.1m$

Fig

(d) Fig. show the longitudinal section and cross section of simple beam of clear span 5.0 m. thickness of supporting all is 30 cm.

7



Fig

Unit-III

3. (a) How the provision of establishment charges included in rate analysis.

2

[5]

- (b) Analysis the rate of plaster of 100 m² cements and sand motor ratio 1:4 thickness of plaster = 15 mm. 7
- (c) Define rate analysis. List the factors and describe in brief affecting the rate analysis. 1+6=7
- (d) Describe in brief general specification of first class building. 7

Unit-IV

- 4. (a) What are the essentials of a contract? 2
- (b) Differentiate between labour contract and item rate contract? 7
- (c) Write the conditions of informal tender? 7
- (d) What is contract document? What are the documents that shall be attached with contract agreement? 7

Unit-V

- 5. (a) Write the methods of valuation of a property? 2
- (b) Describe the rental method of estimation of building? 7
- (c) Describe in brief methods of calculating depreciation? 7

(d) Explain the following : $1\frac{3}{4} \times 4 = 7$

(i) Sinking fund

(ii) Annuity

(iii) Obsolescence

(iv) Market value

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B. E. (Seventh Semester) Examination, April-May 2020/

(New Scheme)

NOV-DEC 2020

(Civil Engg. Branch)

CONSTRUCTION EQUIPMENTS and TECHNIQUES

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Attempt all questions. Part (a) from each question is compulsory answer any two parts out of (b), (c) and (d) of each question.

Unit-I

1. (a) What are the types of pump used in construction? 2
- (b) Describe the grouting equipment and their application. 7

[2]

- (c) Write a note on the blasting equipments. 7
- (d) What is Conveyor? Explain the types of conveyor.

Unit-II

2. (a) Define batching. 2
- (b) Write short notes on screening equipments? 7
- (c) Explain the following : 7
- (i) Surge piles
- (ii) Washer
- (d) Explain the types of transporting equipments used in concrete industries. 7

Unit-III

3. (a) What is Caission and their types? 2
- (b) Describe in brief pipe jacking system. 7
- (c) What is Cofferdam? Explain its any one method of construction with sketches. 7

[3]

- (d) Write note on : 7
- (a) Well point system
- (b) Grouting material

Unit-IV

4. (a) What is erection technique? 2
- (b) Explain vacuum dewatering system, and its advantages? 7
- (c) Explain about the techniques on aerial transportation system. 7
- (d) Write about the rigging of transmission line structure. 7

Unit-V

5. (a) Define mud jacking. 2
- (b) Describe sub-grade wall proofing and its procedure. 7
- (c) What is under pinning? Explain about the advanced techniques of under piping. 7
- (d) Write a note on pipe laying protecting sheet piles. 7

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B. E. (Seventh Semester) Examination,

April-May 2020/NOV-DEC 2020

(New Scheme)

(Civil Engg. Branch)

EXPANSIVE SOILS

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Attempt all questions. Part (a) of each unit is compulsory and carries 2 marks. Answer any two parts ($2 \times 7 = 14$ marks each) out of three from (b), (c) and (d).

Unit-I

1. (a) What is expansive soil?

[2]

- (b) Explain X-ray diffraction method for identification of expansive soil.
- (c) What do you mean by differential thermal analysis?
- (d) How expansive soil form in the field? Explain.

Unit-II

- 2. (a) What are the characteristics of expansive soil?
- (b) Explain clay mineralogy of expansive soil.
- (c) Write short notes on :
 - (i) Clay water relation
 - (ii) Electrolysis process
- (d) What is the difference between atomic bond and molecular bonds of expansive soil?

Unit-III

- 3. (a) What is the chemical composition of black cotton soil?
- (b) What are the techniques adopted for construction in black cotton soil?
- (c) Write short notes on :

[3]

- (i) Swelling potential
- (ii) Mechanism of volume change
- (d) Describe modern method of construction in under reamed coil.

Unit-IV

- 4. (a) What do you mean by stabilization?
- (b) Write short notes on :
 - (i) Stabilization of expansive soil with slag
 - (ii) Stabilization of expansive soil with lime
- (c) What is reinforced earth technique?
- (d) Explain grouting and soil nailing

Unit-V

- 5. (a) What are the factors affecting the expansive soil.
- (b) What is the method of assessment for liquefaction?
- (c) Explain expansive soil model of bingham fluid bounded by porous beds.
- (d) How consolidation of marine clay deposits takes place. Explain.

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Roll No. :

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B. E. (Seventh Semester) Examination, April-May 2020/

NOV-DEC 2020

(New Scheme)

(Civil Engg. Branch)

TRAFFIC ENGINEERING

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Part (a) from each question is compulsory.

Attempt any two from (b), (c) and (d).

Unit-I

1. (a) Explain the term PCU.

2

[2]

- (b) Discuss the measure for operation of traffic and discuss in brief the function of traffic engineering. 7
- (c) Discuss various problems which the people face due to mixed traffic in India. 7
- (d) Describe the concept of 3E's used in traffic engineering in details. 7

Unit-II

2. (a) Define "Traffic density." 2
- (b) What are 'Accident Studies'? Explain its objectives. 7
- (c) Explain briefly the various aspects investigated during parking studies. What are the uses of these studies. 7
- (d) Spot speed studies were carried out at a certain sketch of a highway and the consolidated data collected are given below :

Speed range, kmph	No. of vehicles observed
0 to 10	12
10 to 20	18
20 to 30	68
30 to 40	89
40 to 50	204

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50 to 60	255
60 to 70	119
70 to 80	43
80 to 90	33
90 to 100	09

Determine :

- (i) the upper and lower values or speed limits for regulation of mixed traffic flow, and
- (ii) the design speed for checking the geometric design elements of the highway.

Unit-III

3. (a) What is "High Mast Lighting"? 2
- (b) Explain the various types of traffic signals and their functions. How are the signal timing decided? 7
- (c) What are the various types of traffic markings commonly used? What are the uses of each? 7
- (d) Write the design steps of isolated traffic signals by IRC method. 7

Unit-IV

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4. (a) What do you mean by cost analysis of an accident? 2
- (b) Design a street lighting system for the following conditions :
- | | |
|-----------------|------------|
| Street width | 15 m |
| Mounting height | 7.5 m |
| Lamp size | 6000 lumen |
| Luminaire type | II |
- Calculate the spacing between lighting units to produce average $L_{ux} = 6.0$. 7
- Take coefficient of utilisation = 0.44.
- (c) With neat sketches show various types of traffic signs, classifying them in proper groups. 7
- (d) Explain the various design factors in highway lighting. 7

Unit-V

5. (a) Write few characteristics desirable for road side trees. 2
- (b) Discuss the mitigative methods suggested by IRC for healthy environment along roads and streets. 7
- (c) What are the major pollutants emitted by automobiles? Discuss its effects and its measures. 7
- (d) What is arboriculture? What is its objectives? 7