END TERM EXAMINATION

SIXTH SEMESTER [B.TECH] MAY-JUNE 2017

Paper Code: ETCE-304   Subject: Application of Remote Sensing and GIS

Time: 3 Hours   Maximum Marks: 75

Note: Attempt any five questions including Q no.1 which is compulsory. Select one question from each unit.

Q1 (a) Differentiate the Geostationary and sun Synchronous satellites. (5)
(b) Explain the Lambertian and Specular reflection with diagram. (5)
(c) What are the advantages and disadvantages of GPS? (5)
(d) How the basic entities are represented in raster and vector data model. Give two examples. (5)
(e) Discuss the application of GIS in civil engineering. (5)

Unit-I

Q2 Explain wave model of electromagnetic radiation. Draw and explain the diagram of electromagnetic spectrum showing its various region of particular interest in remote sensing. Draw and explain spectral reflectance curve for water. (12.5)

OR

Q3 Explain the principle of remote sensing. Draw and explain the graph of spectral energy distribution of blackbody at various temperature. Draw and explain spectral reflectance curve of soil. (12.5)

Unit-II

Q4 Differentiate between restoration and enhancement of remote sensing images. List any four image enhancing operations and explain any two of them. (12.5)

OR

Q5 What is the working principle of GPS? What you understand by GPS? Identify its 3 segments and explain the purpose of each. Write brief note on DGPS and its, relative advantages over GPS. . (12.5)

Unit-III

Q6 Discuss the importance of topology in GIS. Explain and draw flow chart of GIS subsystem and components of GIS. (12.5)

OR

Q7 What are the advantages and disadvantages of raster data format and vector data format? What is data model? Illuminate different type of GIS data. (12.5)

Unit-IV

Q8 Explain various method of weather analysis, forecasting and modelling. Comment on the use of geo-spatial technology in the field of weather analysis, forecasting and modelling. (12.5)

OR

Q9 Explain the application of geo spatial technology in:- (12.5)
(a) Coniferous and Deciduous trees.
(b) Healthy and stressed vegetation

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END TERM EXAMINATION

SIXTH SEMESTER [B.TECH.] MAY- JUNE 2017

Paper Code: ETCE-306	**Subject: Quantity Surveying and Cost Estimation**

Time: 3 Hours

Maximum Marks: 75

Note: Attempt all questions as directed. Internal choice is indicated. Assume missing data suitably, if not given.

Q1 Attempt **any five** parts:- **(5x5=25)**

(a) List and explain the factors that affect rate analysis.

(b) Calculate the quantity of materials for the following:-
  i. R.C.C(1:2:4) for 20m³ of work
  ii. R.C.C(1:3:6) for 20m³ of work

(c) What IS: 1200(1974) used for? List out its parts along with nature of work involved.

(d) What is depreciation? What are different types of depreciation? How is depreciation calculated in sinking fund method?

(e) Analyse the rates for road works for laying and consolidation of stone metal.

(f) Explain the annual cost method and rate of return method. Point out the difference between the same.

(g) Enumerate the various objectives behind valuation of properties.

Q2 An old shop in the main market area has been purchased by a person at a cost of Rs. 20000/-. Work out the amount of annual sinking fund at 3% interest assuming future life of the building as 15 yrs. Take scrap value of the Building as 10% of the cost of purchase. Discuss, Income and outgoings of a building. **(12.5)**

OR

A RCC framed two-storied building is standing on a plot of land measuring 900 m². The plinth area of each storey is 400 m². The future life of the structure is 60 years. It fetches a gross rent of Rs 10,000 per month. Work out the capitalized value of property on the basis of 6% net yield. For sinking fund, 3% compound interest may be assumed. Cost of land may be taken as Rs 700 per m².
The outgoings are as under.
(i) Repair and maintenance-5% of gross income.
(ii) Taxes-12% of gross income

Q3 Give the detailed specification for **(12.5)**
(a) Laterite wall 23 cm thick in cement mortar 1:3 for load bearing wall
(b) RCC roof slab for residence

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OR

Write detailed specification for:-
(a) 3-coat O.B.D. (oil bound distemper) work on to new plastered surface
(b) Foundation trench excavation work.

Q4 Work out the quantities of the following item from the given drawings (fig.1) **(12.5)**
(a) Excavation for foundation
(b) P.C.C (1:4:8) in foundation
(c) U.C.R masonry in foundation with C.M(1:6)

Fig 1(a)plan of two rooms block

fig (b)foundation Details

OR
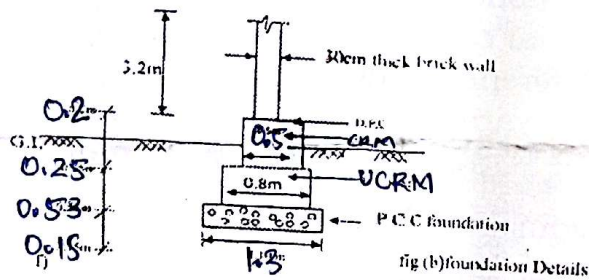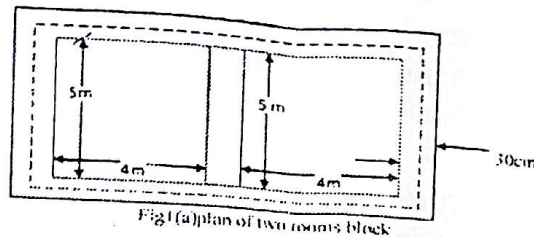
Write detailed specification for:-
(a) U:c:R masonry in C.M.(1:6)
(b) (1:4:8) P:C:C work for foundation

Q5 (a) Explain procedure for preparation and submission of tender for construction work. **(6.5)**
(b) What is valuation? Explain its purposes. **(6)**

OR **(12.5)**

Explain the following in detail:-
(a) Contract documents
(b) Building bye-laws & norms
(c) Scrutiny and award of tender
(d) Salvage value and scrap value

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END TERM EXAMINATION

SIXTH SEMESTER [B.TECH] MAY- JUNE 2017

Paper Code: ETCE-308	Subject: Open Channel, Flow and Numerical Hydraulics

Time: 3 Hours	Maximum Marks: 75

Note: Attempt any five questions including Q.No1 which is compulsory. Assume missing data suitably, if not given.

Q1   Attempt **any five** parts:-   (5x5=25)

(a) Give a brief note on Sub-critical, Critical, Super critical flow.

(b) What are regimes of flow? Give the BAZIN, GANGUILLET-KUTTER, MANNINGS formulas for chezy's constant.

(c) What are the three zones of channel bed? Explain briefly.

(d) What is gradually varied flow? What are the assumptions made while deriving an equation for gradually varied flow?

(e) What is top width, wetted area, wetted perimeter, Hydraulic mean radius hydraulic depth?

(f) Explain the steps for design the stable channels carrying clear water using Critical Tractive Force Approach.

Q2   The discharge of water through a rectangular channel of width 8m, is 15 m³/s when depth of flow of water is 1.2 m. Calculate: (12.5)
- Specific energy of flowing water
- Critical depth and critical velocity
- Value of minimum specific energy

Q3   Find the discharge through a trapezoidal channel of width 8m and side slope of 1 horizontal to 3 vertical. The depth of flow of water is 2.4 m and value of Chezy's constant, C=50. The slope of the bed of the channel is given as 1 in 4000.   (12.5)

Q4   A Sluice gate discharge water into a horizontal rectangular channel with a velocity of 6m/s and depth of flow is 0.4m. The width of the channel is 8m. Determine whether a hydraulic jump will occur, and if so, find its height and loss of energy per kg of water. Also determine the power lost in the hydraulic jump.   (12.5)

Q5   Design a lined canal having the following data: (12.5)
Full supply discharge=200 cumec
Side slope=1.25:1
Bed slope=1 in 5000
Rugosity coefficient=0.018
Permissible velocity=1.75 cumec

Q6   Design a lined canal to carry a discharge of 40 cumec. Assume bed slope as 1 in 5000, N=0.0225 and side slope-1:1.   (12.5)

Q7   Write short about:-   (4+4+4.5=12.5)
(a) Laminar and turbulent diffusion
(b) Dispersion and advection
(c) mixing in rivers, lakes and coastal waters

Q8   Explain the finite volume method for One-dimensional steady state diffusion and write the equations for diffusion problems.   (12.5)

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END TERM EXAMINATION

SIXTH SEMESTER [B.TECH] MAY-JUNE 2017

Paper Code: ETCE 312	Subject: Transportation Engineering-I
Time: 3 Hours	Maximum Marks: 75

**Note: Attempt any five questions including Q.No. 1 which is compulsory.
Internal choice is indicated. Assume suitable data wherever necessary.**

Q1. Answer the following: (5x5=25)
   a) What are the salient features of Roman Roads?
   b) Enumerate the factors governing the width of carriage way?
   c) What are the various uses of Origin and destination study?
   d) What are the desirable properties of bituminous mixes?
   e) Write down the construction steps for water bound macadam road?

Q2. a) Describe in detail about the classification of road bases on location and function as suggested by Nagpur road plan? (6.5)
   b) Derive an expression for finding the extra widening required on horizontal curves? (6)

OR

Q3. a) Explain in brief the various surveys to be carried out before planning a highway system for a given area? (6.5)
   b) Calculate the stopping sight distance on a highway at a descending gradient of 2 percent for a design speed of 80 kmph. Assume total reaction time as 2.5 seconds and design coefficient of friction as 0.35. Assume any other data as per IRC recommendations. (6)

Q4. a) Explain in detail about the objects and scope of traffic engineering? (6.5)
   b) In a breaking test, a vehicle travelling at a speed of 30 kmph was stopped by applying breaks fully and the skid marks were 5.8 m in length. Determine the average skid resistance of the pavement surface. (6)

OR

Q5. a) Estimate the basic capacity of traffic lane at a speed of 60 kmph. Assume that all the vehicles are of 6.0 average length. (6.5)
   b) Describe in detail about the factors to be considered while designing of highway lighting? (6)

Q6. a) Indicate the main features of Unified and Highway Research Board classification system? Discuss the advantages and limitations of it? (6.5)
   b) Draw the neat sketch of flexible pavement cross section and show the component parts? Enumerate the function and importance of each component of the pavement? (6)

OR

Q7. a) What are the various factors to be considered in pavement design? Discuss the significance of each of them? (6.5)
   b) Explain the desirable properties of aggregate to be used in different types of pavement construction? (6)

Q8. a) What are the problems in the construction of high embankments over weak foundation soils? How are the various problems dealt with? (6.5)
   b) Explain various cross drainage and drainage structure provided on the highway? (6)

OR

Q9. a) Explain in brief the construction of earth roads? Discuss the advantages and limitations of earth road? (6.5)
   b) Explain the procedure for patch repair works in following pavements: (6)
   i) WBM pavements   ii) Bituminous pavement during monsoon

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P

END TERM EXAMINATION

SIXTH SEMESTER [B.TECH   ] MAY-JUNE 2017

Paper Code: ETIT 302	Subject: Decision Science
Time: 3 Hours	Maximum Marks: 75

**Note: Attempt any five questions including Q.No. 1 which is compulsory.
Select one question from each unit.**

Q1. Attempt all parts. Each part contains equal marks.   **(5x5=25)**

a) Two dice are rolled; find the probability that the sum is 4.

b) Table below shows hypothetical probabilities of a disk crash using a Brand X drive within one year.

	Brand X	Brand X'
Crash C	0.6	0.1
No crash C'	0.2	0.1

i) Calculate the probability of crash, given that Brand X is used.

ii) Calculate the probability of crash given brand X is not used.

c) Calculate the mean, median and mode of following series:

Class interval	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79
NO. of students	9	13	27	57	64	46	31	9

d) Does the following linear programming problem exhibit infeasibility, or unboundness? Explain.

Min. $X + Y$

sub to $5X + 3Y < 30$

$3X + 4Y > 36$

$Y < 7$

$X, Y > 0$

e) Explain zero sum games with example.

Unit-I

Q2. a) Suppose you are in an operations manager for a plant that manufactures batteries. Give an example of how you could use inferential statistics to make better managerial decisions.   **(6)**

b) Consider the following linear program:

Max $4x_1 + 3x_2$

Subject to : $2x_1 + 3x_2 \leq 6$.

$-3x_1 + 2x_2 \leq 3$

$2x_2 \leq 5$.

$2x_1 + x_2 \leq 4$.

Find x_1 and x_2 that (i) satisfies all constraints and (ii) has the greatest objective function value.   **(6.5)**

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Q3. a) A supplier shipped a lot of six parts of a company. The lot contained three defective parts. Suppose the customer decided to randomly select two parts and test them for defects. How large a sample space is the customer potentially working with? List the sample space. Using the sample space list, determine the probability that the customer will select a sample with exactly one defect.   **(6)**

b) Write Bayes theorem with its application and example.   **(6.5)**

Unit-II

Q4. Use the decision table given here to complete parts i) through iv). **(12.5)**

		State of nature	
	S_1	S_2	S_3
d_1	250	175	-25
d_2	110	100	70
d_3	390	140	-80

Decision Alternative

i) Use the maximax criterion to determine which decision alternative to select.

ii) Use the maximin criterion to determine which decision alternative to select.

iii) Use the Hurwicz criterion to determine which decision alternative to select. let $\alpha=.3$ and then let $\alpha=.8$ and compare the results.

iv) Compute an opportunity loss table from the data. Use this table and a maximax regret criterion to determine which decision alternative to select.

Q5. Explain multistage decision making with a case study.   **(12.5)**

Unit-III

Q6. Define two person zero sum games. What is the role of concept of dominance in zero sum game with example?   **(12.5)**

Q7. Write a note on Queueing theory and its application.   **(12.5)**

Unit-IV

Q8. a) Explain different methods to address transportation problem.   **(6)**

b) Solve the following transportation problem for maximum profit.   **(6.5)**

X	A	B	C	D	Availability
X	12	18	6	25	200
Y	8	7	10	18	500
Z	14	3	11	20	300
Demand	180	320	100	400	

Q9. a) Explain different network models.   **(6)**

b) Write a note on CPM and PERT.   **(6.5)**

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ETIT-302

P2/2

END TERM EXAMINATION

SIXTH SEMESTER [B.TECH.] MAY-JUNE 2017

Paper Code: ETCE-310 | Subject: Advanced Structural Design

Time: 3 Hours | Maximum Marks: 75

Note: Attempt all questions as directed. Internal choice is indicated. Assume missing data suitably, if not given.

Q1 Attempt **any five parts** of the following:- (5x5=25)
(a) Describe seismic waves in detail with neat sketches.
(b) Differentiate between Static method (Seismic co-efficient method) Dynamic method (Response-spectrum method).
(c) Explain various types of joints used in steel water tank.
(d) How will you calculate the friction loss in a prestressed concrete.
(e) Differentiate between prestressed concrete and reinforced concrete material.
(f) Which are various systems of prestressing? Explain any one in detail.
(g) Explain the design principles of various parts of a retaining wall.

Q2 Determine the design seismic force by the response spectrum method of IS 1893-2002 for a residential building idealized and modeled as shown in fig 1. It is located in Zone V. Show mode shapes and corresponding natural frequency, time period amplitude of each mode. (12.5)
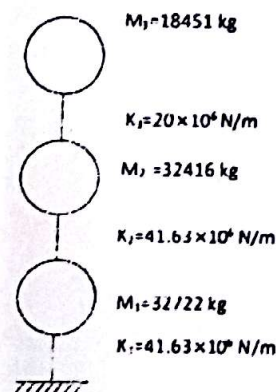
$M_1 = 18451$ kg

$K_1 = 20 \times 10^6$ N/m

$M_2 = 32416$ kg

$K_2 = 41.63 \times 10^6$ N/m

$M_1 = 32122$ kg

$K_1 = 41.63 \times 10^6$ N/m

Figure 1

OR

Derive expression for mode shapes and frequencies of a uniform cantilever beam and determine the first three frequencies and mode shapes. (12.5)

Q3 Design a circular water tank of capacity 2,00,000 litres. The depth of the tank is limited to 3m from inside. Keep the joint between the wall and the base slab as flexible. The base slab rests on ground use M30 concrete. (12.5)

OR

Design a rectangular water tank resting on a ground having size 12m*5m*4m. Use M30 concrete and Fe415 steel. (12.5)

Q4 A prestressed concrete I-beam has its upper flange 750 x 200mm deep, lower flange 400mm wide and 300mm deep and web of depth 500mm and width 150mm. It is supported over a span of 30m and carries a udl of 4 KN/m exclusive of self wt. It is prestressed with 120 wires of 5mm

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dia with their centroid located at 100mm above the bottom edge and initially tensioned to 1KN/mm². Assuming 15% losses in the prestress, determine the extreme fiber stresses at mid span at various stages. **(12.5)**

OR

A prestressed concrete pile is 300mm in section and is provided with 40 wires of 3mm dia distributed over the section. Initially the wires are tensioned in the prestressing beds with a total pull of 450KN. Determine the final stress in concrete and the percentage loss stress in the wires.

Take Es = 2.08x10⁴ MPa, Ec – 3.2xx10⁵ MPa

Creep shortening = 32x 10⁻⁶ mm/mm per MPa

Total shrinkage strain = 200x10⁻⁶

Relaxation loss of stress in steel = 4.5% of the initial stress   **(12.5)**

Q5   Design heel slab of a counter fort retaining wall for the following conditions:-   **(12.5)**
(a) Height of embankment above ground level = 6.5m
(b) Density of earth = 17 kN/m³
(c) Angle of internal friction
(d) Safe bearing capacity of soil = 180 kN/m²
(e) Back fill is horizontal with a surchange of 20 KN/m
(f) Spacing of counter for ts = 4.0m

OR

A section of a plate girder consists of flange plates 600x40mm and web plate 1800x12mm. Determine the moment capacity of the section and the shear resistance of web buckling. Intermediate stiffeners are not provided.   **(12.5)**

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