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10CV62

Sixth Semester B.E. Degree Examination, Dec.2016/Jan.2017
Design and Drawing of R.C. Structures

Time: 4 hrs. Max. Marks:100

Note: *1. Answer any TWO full questions from Part-A and ONE question from Part-B.*
2. Use of IS-456-2000 and SP-16 is permitted.
3. Assume missing data suitably.

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

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PART – A

1 Draw longitudinal section and cross-section near the support of a simply supported doubly reinforced beam for the following data:
Size of beam : 300 mm × 450 mm
Clear span : 4.5 m
Bearing on wall = 200 mm
Thickness of wall = 300 mm
Main reinforcement (HYSD) = Tensile 3 – 20 mmϕ (One bar bentup at *l* /7)
Compressive: 2 – 16 mmϕ
Stirrups = 8 mmϕ 2-legged @ 200 mm c/c.
Also prepare barbending schedule. **(20 Marks)**

2 A continuous oneway RCC slab 150 mm thick is provided for a college drawing hall 6.5m×13m size. The width of the wall is 300 mm. Main reinforcement 12 mmϕ @150 mm c/c. Distribution reinforcement – 8 mmϕ @ 200 mm c/c. Centre to centre distance between beams = 3.20 m, Size of beam is 300 mm × 600 mm. Slab is monolithic with beam reinforcement. Main reinforcement – 4 - 20 mmϕ, 2-legged stirrups – 8 mm ϕ @ 150 mm c/c throughout. Draw the longitudinal section. **(20 Marks)**

3 Draw to a suitable scale sectional plan and elevation of a 500 mm square column with a footing with following details:
Reinforcement in column :
Main – 8 – 20 mm dia HYSD bars
Lateral ties – 8 mmϕ @ 300 mm c/c.
Footing Details:
Size = 2.20 m × 2.20 m
Thickness of footing = 300 mm
Reinforcement – 12 mmϕ @ 150 mm c/c, Both walls
Depth below G.L. = 1.0 m
Plinth level = 300 mm above G.L.
Height of ceiling above plinth level = 3.0 m
Also prepare Bar bending schedule. **(20 Marks)**

PART – B

4 Design a cantilever retaining wall to retain an earth embankment with a horizontal top 3.5 m above ground level density of earth = 18 kN/m^3. Angle of internal friction $\phi = 30°$. SBC of soil is 200 kN/m^2. Take coefficient of friction between soil and concrete = 0.50. Adopt M20 grade concrete and Fe415 steel. **(40 Marks)**

Draw

a. C/s of retaining wall **(10 Marks)**
b. L/s of stem **(06 Marks)**
c. Sectional plan of heel slab. **(04 Marks)**

5 Design a slab and beam type rectangular combined footing for two columns of size 300mm × 300mm and 400 mm × 400mm and subjected to an axial load of 800 kN and 1200 kN respectively. The columns are spaced at 4.0m c/c. The width of the footing is restricted to 1.8 m. Use M25 grade concrete and Fe415 steel. Assume SBC of soil = 180 kN/m^2. **(40 Marks)**

Draw to a suitable scale.

(i) Longitudinal section of footing **(15 Marks)**
(ii) Cross-section of footing near big column. **(05 Marks)**

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10CV63

Sixth Semester B.E. Degree Examination, Dec.2016/Jan.2017
Transportation Engineering - II

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

PART – A

1 a. Define the term "Permanent way". With neat sketch, mention the requirements of permanent way. **(10 Marks)**

b. Define the term "Creep in rails". With neat sketch, explain how creep is measured. **(10 Marks)**

2 a. Explain the various types of spikes, with neat sketches. Mention its requirements. **(10 Marks)**

b. With the help of neat sketches, explain
i) Reinforced cement concrete sleeper ii) C.S.T. 9 sleeper. **(10 Marks)**

3 a. Write short notes on :
i) Momentum gradient ii) Cant deficiency iii) Negative cant. **(10 Marks)**

b. On a 8^0 M-G track the average speed of different trains is 50 kmph and allowable cant deficiency is half that of maximum cant deficiency, determine permissible speed on curve. **(10 Marks)**

4 a. With the help of neat sketch, explain the working principle of "Marshalling Yard". **(10 Marks)**

b. Calculate all the necessary elements required to set out 1 in 8.5 turnout taking off from a straight B-G track with its curve starting from the toe of switch i.e tangential to the gauge face of the outer main rail and passes through the TNC. Given heel divergence 11.40cm. **(10 Marks)**

PART – B

5 a. Define the term "Runway Orientation". Explain any one method of determination of best orientation of runway, with neat sketch. **(10 Marks)**

b. Explain the various factors to be considered in selection of suitable site for airport. **(10 Marks)**

6 a. With neat sketches, explain the following : i) Normal landing case ii) Normal take – off case iii) Engine failure case. **(10 Marks)**

b. Design an exit taxiway joining the runway and a parallel main taxiway. The total angle of turn is 30 degrees and turnoff speed is 80 kmph. Assume radius of entrance curve as 731m. Draw a neat sketch and show all elements. **(10 Marks)**

7 a. With neat sketch, explain the method of transferring the centre line into the tunnel. **(10 Marks)**

b. Write short notes on : i) Pilot tunneling ii) Drilling pattern in hard rock. **(10 Marks)**

8 a. Define the term "Harbour". Explain the various factors considered in location of site for harbor. **(10 Marks)**

b. Differentiate between :
i) Dry docks and wet docks ii) Ware house and Transit shed. **(10 Marks)**

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10CV64

Sixth Semester B.E. Degree Examination, Dec.2016/Jan.2017
Geotechnical Engineering – II

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

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PART – A

1 a. What is dewatering? What are the objectives of dewatering and list the methods of dewatering employed in field practice. **(08 Marks)**

b. A soil sampler was pushed into the soil for a depth of 600mm and the length of the sample obtained was 590mm. What is the recovery ratio? What happened to the sample? How can this be avoided? **(04 Marks)**

c. A seismic refraction study of an area has given the following data:

Distance from impact point to geophone (m)	15	30	60	90	120
Time to receive wave (Sec.)	0.025	0.05	0.10	0.11	0.12

Determine the seismic velocity for the surface layer and underlying layer. Also determine the thickness of upper layer. **(08 Marks)**

2 a. Distinguish between Boussinesq's and Westergaard's theory of stress distribution. **(06 Marks)**

b. Explain construction and uses of Newmarks chart for determining stress distribution. **(06 Marks)**

c. Two columns M and N 6m apart, load on column M is 400kN and on column N is 300kN. The load can be considered as point loads. Calculate the vertical stresses in the soil 3m below the foundation vertically below M and N. **(08 Marks)**

3 a. What is flownet? What are the uses of flownet? **(04 Marks)**

b. Explain the graphical method of determining phreatic line in homogeneous earthen dam with horizontal drainage filter. **(08 Marks)**

c. A soil stratum with permeability $K = 5 \times 10^{-7}$ cm/sec overlies an impermeable stratum. The impermeable stratum lies at a depth of 18m below the ground surface. A sheet pile wall penetrates 8m into the permeable soil stratum. Water stands to a height of 9m on upstream side and 1.5m on downstream side, above the surface of soil stratum. Sketch the flow net and determine quantity of seepage. **(08 Marks)**

4 a. Derive equations for the earth pressure coefficients K_a and K_p by considering backfill with horizontal surface. Use Rankines theory. **(08 Marks)**

b. A retaining wall 8m height supports sandy back fill with e = 0.6, G = 2.65 and $\phi = 30°$. Water table is at a depth of 2m from ground surface. Draw active earth pressure diagram and find magnitude and point of application of total active earth pressure. Assume soil above water table has degree of saturation of 50%. **(12 Marks)**

PART – B

5 a. Explain the causes for a slope failure and list the modes of finite slope failure. **(06 Marks)**

b. With the help of sketch explain Swedish circle method of stability analysis for cohesive soil. **(06 Marks)**

c. A 5m deep cut is made in a soil having C = 15 kN/m^2, ϕ = 10°. If the slope is 1:1, what is the factor of safety? If the slope is changed to $1V:1\frac{1}{2}H$ what will be the change in factor of safety? The density of soil is 18 kN/m^3 and the stability number for ϕ = 10° are as follows:

Slope angle (i)	45°	30°	15°
Stability No. (s_n)	0.108	0.075	0.023

(08 Marks)

6 a. Define the following:
i) Ultimate bearing capacity
ii) Safe bearing capacity
iii) Net ultimate bearing capacity
iv) Allowable bearing capacity. **(08 Marks)**

b. A strip footing 2m wide carries a load intensity of 400kN/m^2 at a depth of 1.2m in sand. The saturated unit weight of sand is 19.5 kN/m^3 and unit weight above water table is 16.8 kN/m^3. The shear strength parameters are c = 0 and ϕ = 35°. Determine the factor of safety with respect to shear failure for the following cases of location of water table:
i) Water table is 4m below ground level
ii) Water table is 1.2m below ground level
iii) Water table is 2.5m below ground level
For ϕ = 35° consider N_q = 41.4 and N_γ = 42.4. **(12 Marks)**

7 a. What are settlements? Explain the components of settlement and their determination. **(08 Marks)**

b. A square footing 2m side as shown in Fig.Q.7(b) carries a load of 4000kN. Calculate the settlement at the centre of clamp layer assuming a distribution of 2V:1H. **(12 Marks)**

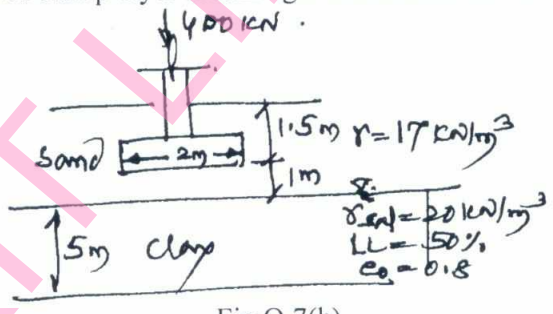

Fig.Q.7(b)

8 Write short notes on any four of the following:
i) Factors influencing the selection of depth of foundation.
ii) Factors influencing the choice foundation.
iii) Combined footing.
iv) Mat foundation.
v) Pile foundation.
vi) Pile load capacity. **(20 Marks)**

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10CV65

Sixth Semester B.E. Degree Examination, Dec.2016/Jan.2017
Hydraulic Structures and Irrigation Design Drawing

Time: 4 hrs. Max. Marks:100

Note: ***Answer any TWO full questions from Part-A and any ONE question from Part-B.***

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

PART – A

1 a. Explain the various factors to be considered while selecting a site for a reservoir. **(07 Marks)**

b. The monthly yield of water from a catchment is given below. Determine the minimum capacity of the reservoir if the flow is drawn at a uniform rate assuming that there is no loss of water over the spillway. Use mass curve method.

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Inflow vol. in Mm^3	1.4	2.1	2.8	8.4	11.9	11.9	7.7	2.8	2.52	2.24	1.96	1.68

(08 Marks)

2 a. Explain step by step the analytical procedure to be adopted for analyzing the stability of gravity dams (Not step by step method). **(07 Marks)**

b. Following data were obtained from the stability analysis of a concrete gravity dam:
Total overturning moment about toe = 1×10^6 kN-m
Total resisting moment about toe = 2×10^6 kN-m
The vertical force above base = 5×10^4 kN
Base width of the dam = 50 m
Slope of the d/s face = 0.8 (H) : 1 (V)
Calculate the maximum and minimum vertical stress to which the foundation will be subjected to. What is the maximum principle stress at toe? Assume there is no tail water.
(08 Marks)

3 a. What are the causes of failure of earth dams? Explain them along with relevant sketches. **(07 Marks)**

b. In a slip circle analysis of downstream slope of a dam during steady seepage. The section of the dam was drawn to a scale 1 cm = 5 m and the results obtained were :

Area of N - rectangle = 15.25 sq.cm
Area of U - rectangle = 5.20 sq.cm
Area of T - rectangle = 6.50 sq.cm
length of arc = 12.50 cm

The properties of the materials of the dam are :
Effective angle of friction = 26°
Unit cohesion = 0.20 kg/km^2
Unit weight of soil $\gamma = 2$ g/cm^2
Determine factor of safety for the slope. **(08 Marks)**

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PART – B

4 An irrigation tank is provided with a surplus weir which has the following data:

i) Combined catchment area = 25.89 km^2
ii) Intercepted catchment area = 20.71 km^2
iii) Top width of bund = 2 m
iv) Side slope of the tank bund = 2 H : 1 V
v) Top bund level = 14.50 M
vi) Max. water level = 12.75 M
vii) F.T. L = 12.00 M
viii) Average ground level at the site of work = 11.00 M
ix) Saturation gradient with 1 m clear cover = 4 : 1
x) Hard soil is available for foundation at = 9.5 m
xi) Coefficient in Ryve's formulae for combined catchment = 9
xii) Coefficient for intercepted catchment = 1.5

Provide protection revetment wherever necessary. Assuming suitable data, wherever necessary design the body wall, wing wall and apron. **(25 Marks)**

Draw the following views:

a. Cross sectional elevation of weir **(15 Marks)**
b. Half plan at top and half plan at foundation **(20 Marks)**
c. Longitudinal section of weir. **(10 Marks)**

5 Design a tank sluice with a tower head with the following data:

i) Full supply discharge = 0.20 cumecs
ii) Tank bund top level = 40 m
iii) Ground level at site = 34.50 m
iv) Level of hard soil = 33.50 m
v) Top width of bund = 2 m
vi) Side slope of bund = 2 : 1
vii) Sill level of sluice = 34.00 M
viii) Thickness of barrelslab = 15 cm
ix) M.W.L of tank = 38.00 m
x) F.T.L of tank = 37.00 m
xi) Average low water level = 35.00 m

The details of the channel below the sluice are as under:

i) Bed level = 34.00 m
ii) F.S.L = 34.50 m
iii) Bed width = 1.25 m
iv) Side slope = 1½ : 1
v) Top level of bank = 35.50 m **(25 Marks)**

Assume any other details suitably. Draw to a suitable scale the following views:

a. Longitudinal section of sluice **(20 Marks)**
b. Half plan at top and half plan at foundation level. **(15 Marks)**
c. Cross-section across tower head and across barrel. **(10 Marks)**

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10CV666

Sixth Semester B.E. Degree Examination, Dec.2016/Jan.2017
Rural Water Supply and Sanitation

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
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PART – A

1 a. Explain the investigation and selection of water sources and factors governing the selection of a particular source of water. **(10 Marks)**

b. Briefly explain the water borne diseases with their effects and prevention and solutions to control the water borne diseases. **(10 Marks)**

2 a. Discuss considerations given the choice of a particular type of pump. **(04 Marks)**

b. What is meant by disinfection? Explain the different methods of disinfection. **(08 Marks)**

c. Write a note on types of Hardness and its removal with necessary chemical reactions. **(08 Marks)**

3 a. Explain the main objectives of rural sanitation in villages. **(08 Marks)**

b. Write a explanatory notes in the following :
i) Two – pit Latrines ii) Aqua privy iii) Types of W.C. (water closets). **(12 Marks)**

4 a. Explain briefly the drainage systems. Why it is important to dispose of sullage? **(10 Marks)**

b. Explain the methods of rain water harvesting in detail, with neat diagrams. **(10 Marks)**

PART – B

5 a. Describe the Epidemiologic or Disease causation cycle, with the help of neat sketches. **(06 Marks)**

b. Classify the communicable diseases with their mode of transmission. **(10 Marks)**

c. Explain the principle of control of communicable diseases. **(04 Marks)**

6 a. Describe briefly the following : i) Garbage ii) Ashes iii) Rubbish iv) Organic waste v) Inorganic waste. **(05 Marks)**

b. Explain the major collection systems and disposal methods of Refuse. **(11 Marks)**

c. What are the advantages and disadvantages of Biogas plant? **(04 Marks)**

7 a. Describe how the milk as a vehicle of infection. **(06 Marks)**

b. Explain the essentials of milk sanitations. **(08 Marks)**

c. Discuss the methods of milk pasteurization. **(06 Marks)**

8 a. Describe the mosquito control measures. **(10 Marks)**

b. Explain the Housefly control measures to prevent spread of diseases. **(10 Marks)**

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10CV667

Sixth Semester B.E. Degree Examination, Dec.2016/Jan.2017
Traffic Engineering

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. Briefly discuss the scope of traffic engineering. **(05 Marks)**

b. A car weighing 1300 kg and travelling at a speed of 65 kmph on a level road of rolling resistance coefficient 0.025, is allowed to coast by suddenly switching off the engine and putting the gear in neutral. If coefficient of air resistance is 0.37 and frontal area is 1.65 m^2, find the deceleration caused. In how much distance will the car come to a half? **(08 Marks)**

c. Briefly explain the various road user characteristics and state how it affects driving conditions. **(07 Marks)**

2 a. Describe the different static characteristics of vehicles that affect road design and traffic performance. **(08 Marks)**

b. A passenger car weighing 10 kN is required to accelerate at a rate of 2 m/s^2 in the first gear from a speed of 10 kmph to 20 kmph. The gradient is +2 percent and the road has a WBM surface in good condition. Frontal projection of the area of car is 2.15m^2. Car tyres have radius of 0.33m. The rear gear axle ratio is 3.82 : 1 and the first gear ratio is 2.78 : 1. Calculate the engine horse power needed and the speed of the engine. Make suitable assumptions. Coefficient of air resistance = 0.39, coefficient of rolling resistance 0.0.25. Tyre deformation factor = 0.945 ; transmission efficiency = 0.9. **(08 Marks)**

c. Explain PIEV theory and its significance. **(04 Marks)**

3 a. From the following data, determine, i) model speed ii) speed limit for regulation iii) median speed iv) speed limit for traffic geometric design : **(08 Marks)**

Speed–group	No. of vehicles observed	Speed group	No. of vehicles observed
20.0 – 29.99	0	70.0 – 79.91	38
30.0 – 39.99	12	80.0 – 89.99	27
40.0 – 49.99	32	90.0 – 99.99	15
50.0 – 59.99	48		
60.0 – 69.99	60		

b. With the help of neat sketches explain the different methods of presenting traffic volume data. **(07 Marks)**

c. Define study area. What are the different factors that are to be considered while delineating the study area into zones? **(05 Marks)**

4 a. Define PCU. What are the different factors affecting PCU? List the IRC recommended values for different vehicles. **(06 Marks)**

b. Two vehicles A and B approaching at right angles, A from West and B form South, collide with each other. After the collision, vehicle A skids in a directors 50 North of West and vehicle B, 60° East of North. The initial skid distances of the vehicles A and B are 38 m and 20m respectively before collision. The skid distances after collision are 15m and 36m respectively. If the weights of vehicles B and A are 6 and 4.4 tonnes, calculate the original speeds of the vehicles. The average skid resistance of the pavement is found to be 0.55. **(08 Marks)**

c. Write short notes on the following : i) Derive line diagram ii) On–street parking iii) practical capacity. **(06 Marks)**

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PART – B

5 a. Explain the principle of i) car following theory ii) queuing theory. **(06 Marks)**

b. From Greenshield's theory derive the relationship between speed, flow and density. **(07 Marks)**

c. The speed and concentration of vehicles in a traffic stream were observed and the following data are obtained. Find the linear regression equation for determining the speed and concentration.

K(vph)	5	10	15	20	25	30	35	40	45	50
V(kmph)	72	68	61	52	47	39	32	27	20	13

(07 Marks)

6 a. The sport speeds at a particular location are normally distributed with a mean of 51.7 kmph and standard deviation of 8.3 kmph. What is the probability that : i) the speeds exceed 65 kmph ii) speeds lie between 40 kmph and 70 kmph iii) 85^{th} percentile speed. The values from normal distribution tables are ϕ (1.6) = 0.952 ; ϕ(2.21) = 0.9864) ϕ(1.41) = 0.9207 and $\phi(z) = 0.85$ for which z = 1.04. **(08 Marks)**

b. Write a short note on traffic forecasting. **(06 Marks)**

c. The average arrival rate of vehicles at a stop controlled approach is 720 veh/hr. Assuming that arrival of vehicles is Poisson distributed, estimate the probabilities of having 0, 1, 2, 3, 4, 5 or more vehicles arriving over a 10 sec interval. **(06 Marks)**

7 a. A simple four leg intersection needs a fixed tune signal. The critical flow in N–S and E–W directions are 600 and 400 veh/hr, saturation flow is 1800 veh/hr, lost time/phase due to starting delays, is observed to be 2 seconds. Determine the cycle length and distributions of green. Give a neat sketch of timings. Use Webster's method. Take inter-green period = 4 sec and amber period = 2 sec. **(08 Marks)**

b. With the help of neat sketch explain elements of a traffic rotary. **(07 Marks)**

c. Explain the importance of ITS in traffic engineering. **(05 Marks)**

8 Write short notes on the following :

a. Moving car observer method

b. Vehicle actuated and synchronized signals

c. Chi-square test

d. Street lighting. **(20 Marks)**

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