st half.12-AM(x)

n. 3715-12. (REVISED COURSE) GN-6134

May 2012.

(3 Hours) [Total Marks : 100

N.B. : (1) Question No. 1 is compulsory.
(2) Attempt any four out of the remaining six questions.
(3) Assume suitable data if necessary.

1. Write short notes on any four :–
   (a) Advantage and disadvantage of irrigation 5
   (b) Canal losses 5
   (c) Bandhara Irrigation 5
   (d) Types of geologic formations on the basis of water retention capacity 5
   (e) Factors affecting a flood hydrograph 5
   (f) Waterlogging. 5

2. (a) (i) What is meant by 'Duty' and 'Delta' of canal water ? Derive a relationship between duty and delta for a given base period. 6
   (ii) Find the delta for sugarcane when its duty is 730 hectares / cumec on the field and the base period of the crop being 110 days. 4

   (b) Given below are the ordinates of a 6-hr unit hydrograph for a catchment. Calculate the ordinates of the direct runoff hydrograph due to a rainfall excess of 3.5 cm occuring in 6 hr. 10

Time (hr)	0	3	6	9	12	15	18	24	30	36	42	48	54	60	69
Unit hydrograph Ordinate (m^3/s)	0	25	50	85	125	160	185	160	110	60	36	25	16	8	0

3. (a) Discuss various techniques used for water distribution in the Farms 10
   (b) A 30 cm diameter well penetrates 25 m below the static watertable. After 24 hours of pumping @ 5400 litres / minute, the water level in a test well at 90 m is lowered by 0.53 m and in a well 30 m away the drawdown is 1.11 m. 10
      (i) What is the transmissibility of the aquifer ?
      (ii) Also determine the drawdown in the main well.

4. (a) What are the different ways in which the irrigation canals can be aligned, explain with neat sketches. 10
   (b) Following are the ordinates of a storm hydrograph of a river draining a catchment area of 423 km^2 due to a 6-hr isolated storm. Derive the ordinates of a 6-hr unit hydrograph for the catchment — 10

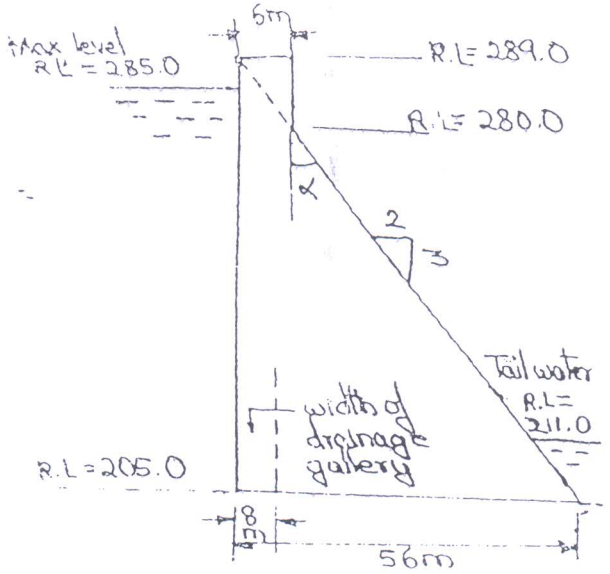
Time from start of storm (hr)	-6	0	6	12	18	24	30	36	42	48
Discharge (m^3/s)	10	10	30	87.5	115.5	102.5	85.0	71.0	59.0	47.5

Time from start of storm (hr)	54	60	66	72	78	84	90	96	102
Discharge (m^3/s)	39.0	31.5	26.0	21.5	17.5	15.0	12.5	12.0	12.0

[TURN OVER

5. (a) Discuss different types of raingauges with neat sketch. 8

(b) Figure below shows the section of a gravity dam built of concrete. 12



Calculate (neglecting earthquake effects)

(i) The maximum vertical stresses at the heel and toe of the dam.

(ii) The major principal stress at the toe of the dam.

(iii) The intensity of shear stress on a horizontal plane near the toe.

6. (a) Discuss the factors governing the selection of a particular type of Dam 8

(b) The yearly rainfall data for the catchment of a proposed reservoir site for 35 years is given in table below. Compute the dependable rainfalls for 60% and 75% dependability percentage. 12

Year	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965
Rainfall in cm	98	100	101	99	85	112	116	78	160	66

Year	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Rainfall in cm	184	90	76	118	86	92	96	93	88	94	107

Year	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Rainfall in cm	110	208	114	104	120	108	102	80	109	122	115	140	138	60

7. (a) What is meant by an 'energy dissipator' ? Discuss the various methods used for energy dissipation below spillways. 1

(b) What are the different types of cross drainage works that are necessary on a canal alignment ? State briefly the conditions under which each one is used.

Con. 3837-12. (REVISED COURSE) GN-6155

May 2012 (R) (3 Hours) [Total Marks : 100

N.S. : (1) Question No 1 is compulsory.
(2) Attempt any four questions out of remaining six questions.
(3) Figures to the right indicate full marks.
(4) Neat illustrations and legible handwriting will be appreciated.
(5) Answer should be brief and to the point.
(6) Assume suitable data if required and specify the same clearly.

1. a) Define "Air Pollution". Explain their effect on building material. 5
b) Explain Hydraulic Equivalent Sewers. 5
c) Differentiate between aerobic and anaerobic waste wate. treatment. What do you understand by "attached growth" and 'suspended growth" processes of biological treatment. Give examples and application of both processes of biological treatment. 10

2. a) Prove that 50 dB + 50 dB ≠ 100 dB in case of sound level reading 5
b) Why sewers run partially full? What do you understand by crown corrosion. 5
c) Prepare a list of plumbing materials required for G+ 4 residential building consists of 20 flats of 2 BHK. 10

3. a) A circular sewer is to have a slope of 1 in 200 and is to carry a flow of 500 lit/sec when flowing half full, n= 0.013. What will be the size of the sewer? What will be the velocity? 8
b) Describe physical chemical and biological characteristics of sewage and their significance in Waste Water Treatment. 12

4. a) Explain the principal of working of "Activated Sludge Process". Explain the modifications in the conventional activated sludge process with the help of flow charts. What are the draw backs of conventional activated sludge process? 12
b) Following data is available for domestic waste water B.O.D treatment 8
D.O in dilution water- 7.9 mg/lit
D.O in sample waste water- 1.8 mg/lit
Volume of sample waste water- 6ml
D.O of diluted sample after 5 days- 2.73 mg/lit
Percentage dilution of waste sample water- 2%
Compute 1) $B.O.D_5$ and
2) Ultimate B.O.D

[TURN OVER

5 a) Explain the mechanism of sludge digestion and explain hoe the products formed in sludge digestion are disposed. 8

b) Following is the data for single Stage Trickling Filter 12

Sewage flow:- 4750 m^3/day

B.O.D $_5$ of raw sewage:- 240 mg/lit

Recirculation ratio:- 2

Depth of media:- 2.2 mt

B.O.D of effluent:- 27 mg/lit

B.O.D removal in primary tank: 35%

Determine the size of single stage trickling filter and find out its efficiency.

Check for 1) Organic loading rate excluding recirculation.

2) Hydraulic loading rate.

6 a) Design a septic tank for housing colony of 200 people, water supply rate is 150 lepd and the tank is to be cleaned once in two years. 8

b) Why sewer appurtenances required? Explain any two sewer appurtenances with sketches. 12

7 Write short notes on any four:- 20

a) Testing of pipes

b) Oxygen Deficit curve

c) Imhoff Tank

d) Self Purification of stream

e) Tertiary treatment.

Civil – Sem-VII
LSMRCS

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Con. 4205-12. (REVISED COURSE) GN–6152

May 2012

(3 Hours) [Total Marks : 100

N.B. (1) Question No. 1 is compulsory.
(2) Attempt any four questions from the remaining six questions.
(3) Assume suitable additional data if necessary and state the same.

1. (a) What are the various types of limit states recommended in IS code ? 5
(b) Explain ultimate load method and compare it with limit state method. 6
(c) What are the functions served by longitudinal reinforcement and transverse reinforcement in case of column ? 6
(d) Why doubly reinforced section is required ? 3

2. (a) Design the singly reinforced beam for a factored bending moment 1×10^8 Nmm use M 20 / Fe415 by ultimate load theory. 8
(b) Design an isolated pad footing for a column having size 230 × 450 kN and axial load 1500 kN. Assume SBC of soil 300 kN/m². Use M20/Fe415. 12

3. (a) Determine the area of steel required for a singly reinforced conc. beam 200mm × 450mm deep (effective) to resist an ultimate moment of 70 kNm. Assume M20/Fe415. 8
(b) Calculate the MR of a doubly reinforced R.C. beam of rectangular section of size 300mm × 450mm deep reinforced with 6 No. 20 mm dia bars on tension side and case – 12
(i) 4 No. 20mm dia on comp. side
(ii) 5No. 20mm dia on comp. side.
Assume effective cover of 40 mm on both sides. Use M20/Fe415

4. (a) A Tee beam consists of a flange 1100 mm wide and 120 mm deep the depth of the beam is 600 mm upto the centre of steel and width of web 300 mm find the area of steel requried for an ultimate moment of 600 kNm. Use M20/Fe415. 10
(b) A simply supported reinforced conc. beam of size 230 mm × 600 mm deep (effective) carries a super imposed load of 40 kN/m over a span of 10 m. The beam is reinforced with 6Nos. 25 mm dia. on tension face. Design the shear reinforcement using vertical stirrups. 10

% age steel	:	1·0	1·25	1·5	1·75	2·00	2·25
Tc	:	0·62	0·67	0·72	0·75	0·79	0·81

5. (a) Design a R.C. slab for a room measuring 5m × 6m. The slab is to be cast monolithically over the beams with corners held down. The width of supporting beam is 230 mm. The slab carries super imposed load of 3 kN/m². Use M20/Fe415. Draw neat sketch showing reinforcement. 12
(b) Design a roof slab over a passage of size 10 m × 2·5 m provided at the entrance of a public building. The slab is supported by 230mm wide beam and carries super imposed load of 3 kN/m². Use M 20/Fe415. Draw neat sketch showing reinforcement details. 8

6. (a) Calculate the load carrying capacity of a short axially loaded circular column 350 mm dia reinforced with 6Nos. of 20 mm dia. bars. The helical reinforcement consists of 8mm bars spaced at 50 mm c/c. Assume clear cover to main steel equal to 50 mm. Use M20/Fe415. 10
(b) A R.C.C. column 300 mm × 500 mm is reinforced equally on two short sides by 3000 mm² on each side. The cover to the centre of steel is 50 mm. Calculate ultimate load and ultimate moment the column can resist if it is just on the verge of cracking. 10
take Ku = 1 use M20/Fe415
take fs_1 = 355 N/mm², fs_2 = 70 N/mm²
fc_1 = 9 N/mm² fc_2 = 3 N/mm²

7. Design a combined rectangular footing for two columns A and B carrying load of 800 kN and 1000 kN respectively. Column A is 400 mm square and column B is 500 mm square in size and they are placed 4m c/c. The properly line is 600 mm beyond the face of column. A. SBC of soil 200 kN/m². Use M20/Fe415. Draw neat sketch showing reinforcement details. 20