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**Question Paper Code : 71591**

22/05/17 RN

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Sixth Semester

Civil Engineering

CE 6605 — ENVIRONMENTAL ENGINEERING — II

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State the sources of wastewater.
2. What is meant by time of concentration?
3. What are the advantages of using a circular section for sewers?
4. Mention the various pumps used to pump sewage?
5. Define the biological concept taking place in a septic tank.
6. Why a constant velocity have to be maintained in a Grit channel?
7. Differentiate between activated sludge process and trickling filter process of sewage treatment.
8. What is the significance of solids retention time in ASP design?
9. What is meant by sludge conditioning? What are the methods of sludge conditioning?
10. What is meant by dewatering?

PART B — ( $5 \times 16 = 80$  marks)

11. (a) Explain the estimation of storm runoff and the factors influencing it.

Or

- (b) (i) Define the terms BOD and COD. Explain first stage BOD and second stage BOD with a graph. (8)
- (ii) The BOD of a sewage incubated for one day at  $30^\circ\text{C}$  has been found to 120 mg/L. What will be the 5-day BOD at  $20^\circ\text{C}$ ? Assume  $K = 0.21 \text{ d}^{-1}$  (base 1) at  $20^\circ\text{C}$  and  $\theta = 1.056$ . (8)

12. (a) Design a sewer running 0.7 times full at maximum discharge for a town provided with the separate system serving a population of 1 lakh. Water is supplied from the water works at a rate of 200 litres per capita per day. Take a constant value of  $n = 0.013$  at all depths of flow. The permissible slope is 1 in 600. Take peak factor of 2.25. Assume 80% of water turns as sewage.

Or

- (b) Explain the step by step procedure for laying and testing of a sewer line.

13. (a) (i) Why the septic tank method of treating sewage is considered ineffective? Under what circumstances a septic tank method of treating sewage is preferred? (4)
- (ii) Design a septic tank for a hostel of 150 persons. Let the desludging period be taken as one year and Length to breadth ratio as 2.5 : 1. Adopt peak discharge of  $205 L_{pm}$  surface area @  $0.92 \text{ m}^2$  for every  $10 L_{pm}$  of peak flow rate. Also design a soil absorption system dispersion trench for the disposal of the septic tank effluent, assuming the percolation rate as  $100 \text{ L/m}^2/\text{d}$ . Assume data wherever necessary. (12)

Or

- (b) (i) Explain the velocity control devices in Grit channel. (8)
- (ii) Discuss in brief various types of settling in sedimentation tanks. (8)

14. (a) Explain the basic operation of an activated sludge process with a flow diagram. Also mention its operating troubles with remedial suggestions. (12 + 4 = 16)

Or

- (b) Determine the size of a high rate trickling filter for the following data.

- (i) Sewage flow = 5 MLD
- (ii) Recirculation ratio = 1.5
- (iii) BOD of raw sewage = 250 mg/L
- (iv) BOD removal in primary tank = 30%
- (v) Final efficient BOD desired = 30 mg/L.

15. (a) Explain the self purification of streams with the help of an Oxygen sag curve. Explain the factors affecting the same. (10 + 6 = 16)

Or

- (b) With the help of a diagram, explain the working of a standard rate sludge digester?



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**Question Paper Code : 40818**

09/05/18

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**B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018**

**Sixth Semester**

**Civil Engineering**

**CE 6605 – ENVIRONMENTAL ENGINEERING – II**

**(Regulations 2013)**

**Time : Three Hours**

**Maximum : 100 Marks**

Assume suitable data if found necessary.

Answer ALL questions.

**PART – A**

**(10×2=20 Marks)**

1. How do you classify the sewage ?
2. What is effluent standard ?
3. State the objective of providing sewerage works.
4. What do you understand by self cleaning velocity ?
5. Write the significances of grey water harvesting.
6. Why grit chamber is provided in sewage treatment process ?
7. Define the term activated sludge.
8. Write short note on UASB.
9. Enlist methods of treated sewage effluent disposal.
10. Give out the advantages of sludge thickening.

**PART – B**

**(5×13=65 Marks)**

11. a) i) Briefly explain the sources of waste water generation. (8)
- ii) Give an account of factors affecting the quantity of storm water. (5)

(OR)

- b) Determine designed discharge for a combined system serving population of 50000 with rate of water supply of 135 LPCD. The catchment area is 100 hectares and the average coefficient of runoff is 0.60. The time of concentration for the design rainfall is 30 min and the relation between intensity of rainfall and duration is  $I = 1000/(t + 20)$ . (13)



40818



12. a) i) Discuss the comparative merits and demerits of combined system and separate system. (7)
- ii) Explain the different types of storm water inlets used in collection system. (6)
- (OR)
- b) A combined sewer was designed to serve an area of 60 sq.km with an average population density of 185 persons/hectare. The average rate of sewage flow is 350 L/Capita/day. The maximum flow is 50% in excess of the average sewage flow. The rainfall equivalent of 12 mm in 24 h can be considered for design, all of which is contributing to surface runoff. What will be the discharge in the sewer ? Find the diameter of the sewer if running full at maximum discharge. (13)
13. a) Write a note in detail about theory, construction, design aspects and disposal of effluent of septic tank with neat sketch. (13)
- (OR)
- b) Discuss in detail about classification of screens and state application of each class. (13)
14. a) Elaborate the principle, construction and design aspects of trickling filter with neat sketch. (13)
- (OR)
- b) Elucidate the waste stabilisation pond system of sewage treatment. (13)
15. a) i) Explain the factors affecting self purification of natural streams. (5)
- ii) Draw a typical oxygen sag curve and explain its meaning and state its importance. (8)
- (OR)
- b) With the help of neat sketches explain the process, types and gas collection of anaerobic sludge digester. (13)

PART – C

(1×15=15 Marks)

16. a) Illustrate the laying, jointing and testing of sewers to convey community sewage. (15)
- (OR)
- b) Give a detailed account on activated sludge process of sewage treatment with help of neat sketch. (15)

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Question Paper Code : 52780

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Sixth Semester

Civil Engineering

CE 6605 — ENVIRONMENTAL ENGINEERING — II

(Regulation 2013)

• (Common to PTCE.6605 — Environmental Engineering — II for B.E. Part-Time — Fifth Semester — Civil Engineering — Regulation 2014)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is meant by BOD?
2. State the discharge standards for any two parameters for treated sewage.
3. Under what circumstances manholes are provided in sewerage system?
4. What is meant by small bore system?
5. State the objectives of grey water harvesting.
6. What are the objectives of primary treatment of sewage?
7. What is meant by sludge volume index?
8. How do you determine organic loading rate of a trickling filter?
9. How do you remediate sewage sickness?
10. What is meant by sludge conditioning?

PART B — (5 × 13 = 65 marks)

11. (a) Enumerate and explain the various physico-chemical characteristics of sewage and state their environmental significance.

Or

- (b) Explain the various sources of wastewater and their effects on environment.

12. (a) Explain various systems of sanitary plumbing and write down their main characteristics of each system.

Or

- (b) Briefly explain the various factors to be considered in the design of sewerage system.

13. (a) Assuming suitable criteria design a screen chamber with 20 mm spacing of bar for a proposed STP expected to treat 30 ML/d maximum flow. Draw a neat sketch of the unit.

Or

- (b) Explain the function of septic tank with a neat sketch. Also discuss the design criteria.

14. (a) Design a high rate trickling filter from the following data:

Design flow	:	40 ML/d
Recirculation ratio	:	1.5
BOD of raw sewage	:	250 mg/L
Desirable effluent BOD	:	20 mg/L

Or

- (b) Draw the typical process flow diagram for a UASB reactor and explain the working principle.

15. (a) What do you mean by "Self-purification" of stream? Draw a neat sketch of an oxygen sag curve and explain the salient features.

Or

- (b) Draw a neat sketch of a high rate two-stage anaerobic sludge digester and explain its working principle.

PART C — (1 × 15 = 15 marks)

16. (a) A waste treatment plant is required to digest a sludge in such a way that the moisture content is reduced to 95% from the initial value of 96%. The inflow of sludge initially contains 70% volatile matter in the solid portion and during digestion only 60% of the volatile matter is destroyed. The specific gravity of volatile matter is 1.2 and that of fixed solid is 2.5. Calculate the volume of sludge before and after digestion if the inflow contains 2500 kg dry solids per day. Assuming 100 kg/m<sup>2</sup>/year solids loading rate, design the sludge drying bed required for dewatering operation.

Or

- (b) It is proposed to treat 18 ML/d of primary treated sewage with the help of a ASP system. The BOD of raw sewage is 280 mg/L. Design the various components of ASP system by assuming the following parameters.

MLVSS in the reactor	=	2500 mg/L
Return sludge Concentration (VSS)	=	8000 mg/L
MCRT	=	8 d
Yield coefficient	=	0.45
Decay coefficient	=	0.05 d <sup>-1</sup> .

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**Question Paper Code : 80220**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Sixth Semester

Civil Engineering

CE 6605 – ENVIRONMENTAL ENGINEERING II

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

- Explain the meaning and significance of time of concentration?
- What are the typical characteristics of sewage from South Indian cities?
- Define Bore hole system.
- Write the objective of screen chamber.
- Define Hydraulic subsidence value?
- What is on site sanitation?
- List out the different methods of aeration in ASP?
- What is Sewage sickness?
- What is meant by ripened sludge?
- Define the 'treatment 'sludge conditioning'.

PART B — (5 × 16 = 80 marks)

- (a) (i) Define the terms BOD and COD? Differentiate between first stage BOD and second stage. (8)
- (ii) The BOD of a sewage incubated for one day at 30°C has been found to be 100 mg/L what will be the 5 day 20°C BOD. Assume BOD rate constant  $K' = 0.21 \text{ d}^{-1}$  at 20°C (base e). (8)

Or

- (b) (i) Explain briefly about Effluent standards. (8)



12. (a) (i) Explain the method of laying sewer line for the designed/desired alignment and gradient. (9)
- (ii) Determine the diameter of a sewer ( $n = 0.013$ ) carrying  $0.0125 \text{ m}^3/\text{s}$  of peak sewage flow at half full depth. Take slope as 1 in 400. (7)

Or

- (b) (i) List the sewer appurtenances commonly used? Explain any two with neat sketches? (10)
- (ii) List out the problems taken place during the Pumping of sewage. (6)
13. (a) (i) Explain briefly the operation and maintenance of Sewage Treatment Plants. (8)
- (ii) Design a primary clarifier of full scale STP with ASP for an average sewage flow of 12 Mld. Assume suitable data if necessary. (8)

Or

- (b) Explain with neat sketch component parts, functioning advantages and disadvantages of septic tank. Also discuss various methods of disposal of septic tank effluent. (16)
14. (a) With neat flow Diagram explain ASP in treating wastewater. Discuss the various Design Parameter involved in it. (16)

Or

- (b) Determine the size of a high rate TF for the following data. (16)
- Sewage flow = 6 mld
- Recirculation ratio = 1.5
- BOD of Raw Sewage = 230 mg/L
- BOD removal in PST = 30 %
- Final BOD effluent = 20 mg/L
15. (a) (i) Describe the anaerobic sludge digestion process and explain the effects of pH and Temperature on it. (10)
- (ii) Explain about Bio gas Recovery? (6)

Or

- (b) A town discharges 14 million litres per day sewage at a temperature of  $23^\circ\text{C}$  into a river having flow of  $1.7 \text{ m}^3/\text{s}$  and water temperature of  $20^\circ\text{C}$ .  $\text{BOD}_5$  at  $20^\circ\text{C}$  for the wastewater is 160 mg/L and  $K$  (base 10) is 0.1 per day, If  $R$  is 0.2 per day what is the critical oxygen deficit and the distance at which it occurs. Assume the stream as 92% saturated with oxygen before the sewage addition the solubility of oxygen at  $20^\circ\text{C}$  as 9.0 mg/L and river flow velocity as 0.12 m/sec. (16)



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**Question Paper Code : 80601**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Sixth Semester

Computer Science and Engineering

IT 6702 — DATA WAREHOUSING AND DATA MINING

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — ( $10 \times 2 = 20$  marks)

What are the nine decisions in the design of data warehouse?

Define Star Schema.

List OLAP guidelines.

Comment on OLAP tools on Internet.

Give an example of outlier analysis for the library management system.

What are the different steps in Data Transformation?

Elucidate two phase involved in decision tree induction?

List the methods to improve Apriori's efficiency.

State the role of cluster analysis.

10. Give the reason on why clustering is needed in data mining?

PART B — ( $5 \times 16 = 80$  marks)

1. (a) Explain seven components of Data warehouse architecture with neat diagram.

Or

(b) Discuss DBMS schemas for decision support. Describe performance

12. (a) Discuss different tool categories in data warehouse business analysis. (16)

Or

- (b) (i) Summarize the major differences between OLTP and OLAP system design. (8)  
(ii) Describe about Cognous Impromptu. (8)

13. (a) Explain different strategies of Data Reduction. (16)

Or

- (b) Describe Data Discretization and Concept Hierarchy Generation. State why concept hierarchies are useful in data mining. (8+8)

14. (a) Find all frequent item sets for the given training set using Apriori and FP-growth, respectively. Compare the efficiency of the two mining processes. (10+6)

TID	items_bought
T100	{M, O, N, K, E, Y}
T200	{D, O, N, K, E, Y}
T300	{M, A, K, E}
T400	{M, U, C, K, Y}
T500	{C, O, O, K, I, E}

Or

- (b) Explain Naïve Bayesian classification with algorithm and sample example. (16)
15. (a) Describe the applications and trends in data mining in detail. (16)

Or

- (b) Describe different partition methods in cluster analysis. (16)

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**Question Paper Code : 80348**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Sixth Semester

Electronics and Instrumentation Engineering

EC 6651 — COMMUNICATION ENGINEERING

(Common to Electrical and Electronics Engineering and Instrumentation and Control Engineering)

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

Define modulation index.

Differentiate NBFM and WBFM.

Why flat top PAM is preferred over natural PAM?

What is slope overload error?

State the channel capacity theorem.

What is BCC and BSC?

What are the benefits of multiple access techniques in Communication Engineering?

Mention the significance of CDMA technique.

What is optical link?

List the merits and demerits of geosynchronous satellites.



PART B — (5 × 16 = 80 marks)

11. (a) Explain the generation of DSB-SC wave using Balanced Modulator. Derive the power of DSB-SC signal. (16)

Or

- (b) Explain in detail about indirect method of FM generation. (16)

12. (a) Explain the generation and detection of PWM signals. (16)

Or

- (b) (i) Explain the concept of BPSK and QPSK techniques in data communication. (12)

- (ii) Compare PCM and DM. (4)

13. (a) Explain the procedure of Shannon fano algorithm and calculate the entropy for the following probabilities using the algorithm. (16)

m1	m2	m3	m4	m5	m6	m7	m8
4/32	2/32	16/32	2/32	2/32	1/32	1/32	4/32

Or

- (b) (i) Briefly discuss on various error control codes and explain in detail with one example for convolutional code. (12)

- (ii) Draw the polar, unipolar, bipolar and Manchester NRZ line code format for an information {1 0 11 0 0}. (4)

14. (a) Explain the operation of FH-SS. Compare slow and fast FH-SS. (16)

Or

- (b) Discuss the FDMA and TDMA techniques used in wireless communication with their merits and demerits. (16)

15. (a) (i) Write a brief note on INSAT. (8)

- (ii) Write a brief note on Intelsat. (8)

Or

- (b) (i) Draw the block diagram of satellite link and explain. (8)

- (ii) Explain in detail about SCADA. (8)

Reg. No. :

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**Question Paper Code : 60510**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Sixth Semester

Electrical and Electronics Engineering

EE 2352/EE 62/10133 EE 602 — SOLID STATE DRIVES

(Regulations 2008/2010)

Common to PTEE 2352/10133 EE 602 – Solid State Drives for B.E. (Part-Time)  
Sixth Semester – Electrical and Electronics Engineering – Regulations 2009/2010

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — ( $10 \times 2 = 20$  marks)

What is dynamic torque?

Draw the load torque characteristics of constant power loads.

What are the drawbacks of rectifier fed DC drives?

Can a semi converter fed DC drive operated in quadrant IV? Justify your answer.

Write any two advantages of closed loop control system.

What do you mean by field weakening mode control?

What is slip power recovery scheme?

What is meant by super synchronous operation?

What are the modes of adjustable frequency control in synchronous motor drives?

When can a synchronous motor be load commutated?

PART B — (5 × 16 = 80 marks)

drives two loads. One has rotational motion. It is coupled a reduction gear with a = 0.1 and efficiency of 90%. The a moment of inertia of 10 kg-m<sup>2</sup> and a torque of 10 N-m. ad has a translational motion and consists of 1000 kg o be lifted up at an uniform speed of 1.5 m/s. Coupling this load and the motor has an efficiency of 85%. Motor has a of 0.2 kg-m<sup>2</sup> and runs at a constant speed of 1420 rpm. he equivalent inertia referred to the motor shaft and power d by the motor. (10)

the multi-quadrant operations of low speed hoist in speed lane. (6)

Or

the mathematical condition for steady state stability and um point. (8)

the operation of electrical drives in three different modes. (8)

steady state analysis of the single phase fully controlled separately excited DC motor drive for continuous current explain its operation in motoring and regenerating braking (16)

Or

the operation of four quadrant dc chopper drive. (10)

V, 20 A, 1000 rpm separately excited dc motor has an e resistance of 2.5 Ω. The motor is controlled by a step opper with a frequency of 1 kHz. The input dc voltage to the is 250 V. What will be the duty cycle of the chopper for the operate at a speed of 600 rpm delivering the rated torque? (6)

ansfer function of dc motor-load system with converter fed age control. (16)

Or

e design procedure for speed controller of an electrical drive (8)

the factors involved in converter selection and equations d in controller characteristics. (8)

14. (a) A 2.8 kW, 400 V, 50Hz, 4 pole, 1370 rpm, delta connected squirrel cage induction motor has following parameters referred to the stator  $R_s = 2 \Omega$ ,  $R_r = 5 \Omega$ ,  $X_s = X_r = 5 \Omega$ ,  $X_m = 80 \Omega$ . Motor speed is controlled by stator voltage control. When driving a fan load it rated speed at rated voltage. Calculate motor terminal voltage and torque at 1200 rpm. (16)

Or

- (b) (i) Explain the concept of V/f control in detail. (8)  
(ii) Make a comparison between voltage/current fed inverters. (8)
15. (a) (i) Explain the open loop V/f speed control of multiple permanent magnet synchronous motors. (8)  
(ii) Explain with the block diagram, the torque angle control of self controlled synchronous motor drive. (8)

Or

- (b) With a neat block diagram explain the closed loop control of load commutated inverter fed synchronous motor drive. (16)



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**Question Paper Code : 60862**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Sixth Semester

Mechanical Engineering

ME 2354/ME 62/10122 ME 604 — AUTOMOBILE ENGINEERING

(Regulations 2008/2010)

(Common to PTME 2354/10122 ME 604 Automobile Engineering for  
B.E. (Part-Time) Fifth/Sixth Semester – Mechanical Engineering –  
Regulations 2009/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — ( $10 \times 2 = 20$  marks)

What are the various cylinder arrangements for the multi-cylinder engines?

What are the advantages of Al alloy pistons?

List out the emissions that are common to both SI and CI engines.

What are the devices available for after-treatment of exhaust gases from SI engines?

Why do we provide slip joint in the propeller shaft?

What is the function of differential?

What do you mean by telescopic steering wheel?

Explain the basic difference between independent suspension system and conventional suspension system.

What are the advantages of Hybrid vehicle?

0. Mention the advantages of LPG usage in automobiles.

PART B — (5 × 16 = 80 marks)

11. (a) With a neat sketch explain constructional details of IC engine.

Or

- (b) Discuss the different types of chassis frame with neat sketches.

12. (a) Explain electronically controlled CRDI system for Diesel injection.

Or

- (b) (i) Write short notes on Turbocharger. (6)

- (ii) Discuss engine emission control measures for SI engines. (10)

13. (a) Explain the operation of single plate clutch with relevant diagrams.

Or

- (b) With the help of a neat sketch, explain the construction and operation of a sliding mesh gear box.

14. (a) Mention different types of braking systems in automobile and explain any one type in detail.

Or

- (b) (i) Write short notes on power steering. (6)

- (ii) Write briefly about independent type of front suspension system. (10)

15. (a) What are the characteristics of Alcohols? Write detailed notes on the use of Alcohols in Automobile.

Or

- (b) Explain in detail about the principle of operation of fuel cell.

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**Question Paper Code : 60262**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Sixth Semester

Civil Engineering

CE 2354/CE 64/10111 CE 605 — ENVIRONMENTAL ENGINEERING — II

(Regulations 2008/2010)

Common to 10111 CE 605 — Environmental Engineering — II for B.E. (Part-Time)  
Sixth Semester — Civil Engineering — Regulations 2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

Differentiate between sewage and drainage.

Name two most important parameters used to characterize sewage.

State the components parts of a large pumping plant.

Enlist the various sewer appurtenances commonly used.

State the purpose of aeration process.

Draw the flow diagram of unit operation for domestic sewage treatment.

Differentiate between conservancy system and water carriage system.

Write notes on soak pits and vacuum filtering.

What do you mean by two stage digestion of sewage?

Compare sewage farming and effluent irrigation.



PART B — (5 × 16 = 80 marks)

ation of 30,000 is residing in a town having an area of 120 ha. If the average co-efficient of runoff for this area is 0.60 and the time of concentration of the design rain is 30 minutes. Calculate the storm water discharge. (10)

the factors that affect the hydraulics of sewer lines. (6)

Or

Calculate the storm runoff for the following data :

Area = 120 ha  
 Population = 75000  
 Velocity = 3.5 m/s  
 Time of travel = 3 min  
 Pipe diameter = 22 mm (10)

BOD. Explain its significance in sewage. (6)

with neat sketch, the details of two pipe system. (10)

A 150 mm diameter sewer with an invert slope of 1 in 400 is flowing at full depth. Calculate the rate of flow in the sewer. (6)

Or

Design a circular sewer so as to cater to a residential colony based on the following data :

Area of the colony = 36 ha.  
 Per capita water consumption = 35 lpcd  
 Population = 8,000  
 Rainfall = 4 cm/h  
 Invert slope = 1 in 900. (10)

the steps involved in laying of sewer lines. (6)

Design a septic tank for the following data :

Number of people = 100  
 Water supply/capita/day = 120 lit  
 Retention period = 1 year  
 Length to width ratio = 4 : 1. (10)

Explain the physical, chemical and biological characteristics of sewage water. (6)

Or

(b) (i) Describe with the help of neat sketch, the component of a Imhoff tank. (10)

(ii) Write a note on skimming tank with neat sketch. (6)

14. (a) (i) Give the flow diagram for the activated sludge process and describe the working condition of the activated sludge process. (10)

(ii) Enumerate the various methods used to dispose the digested sludge. (6)

Or

(b) (i) Explain the function and operation of trickling filter with a neat sketch. (10)

(ii) Enumerate the operational principles of septic tank and oxidation ponds. (6)

15. (a) (i) Design the dimensions required for sludge drying bed for the sludge obtained from the digestion tank for 40,000 population. (10)

(ii) State the objectives of sludge treatment in detail. (6)

Or

(b) (i) Elaborately discuss the different methods of sludge disposal. (10)

(ii) Write a brief notes on advances in sludge treatment and disposal. (6)

Reg. No. :

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**Question Paper Code : 60463**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Sixth Semester

Electronics and Communication Engineering

EC 2353/EC 63/10144 EC 604 — ANTENNAS AND WAVE PROPAGATION

(Regulations 2008/2010)

Common to PTEC 2353 – Antennas and Wave Propagation for B.E. (Part-Time)  
Sixth Semester – Electronics and Communication Engineering – Regulations 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — ( $10 \times 2 = 20$  marks)

What is an elementary dipole and how does it differ from the infinitesimal dipole?

What is the effective area of a half wave dipole operating at 1 GHz?

What are the applications of loop antenna?

Define Pattern multiplication.

The impedance of an infinitesimally thin  $\lambda/2$  antenna ( $L = 0.5 \lambda$  and  $L/D = \infty$ ) is  $73 + j42.5 \Omega$ . Calculate the terminal impedance of an infinitesimally thin  $\lambda/2$  slot antenna.

Draw the geometry for E-plane type of metal-plate lens antenna.

Mention the types of feeding structures used for microstrip patch antennas.

Design a 3 element Yagi-Uda antenna to operate at a frequency of 200 MHz.

What is free space loss factor?

What is Gyro frequency?

PART B — (5 × 16 = 80 marks)

Effectiveness of the following parameters of an antenna :

(4 × 4 = 16)

Solid angle

Efficiency

lobes

Impedance.

Or

Describe the following parameters of an antenna : (4 × 4 = 16)

Field pattern

Directivity

Length

Aperture.

Binomial array?

(2)

Field pattern of 10 element binomial array with spacing of the elements of  $3\lambda/4$  and  $\lambda/2$ .

(14)

Or

Expressions for field pattern of broad side array of  $n$  point

of flat reflector and corner reflector antennas.

(2)

How a paraboloidal antenna gives a highly directional

(6)

in detail about the feeding structure of parabolic reflector

(8)

Or

Notes on :

Antenna

(8)

Antenna.

(8)

14. (a) What are the importance of Helical antenna? Explain the construction and operation of Helical antenna with neat sketch.

Or

- (b) Explain the principle of operation of Log periodic antenna with neat schematic diagram.

15. (a) (i) Discuss the factors that are involved in the propagation of radio waves. (6)

- (ii) Draw a 2 ray model of Sky wave propagation and explain it in detail. (10)

Or

- (b) (i) Derive the characteristic equations of Ionosphere. (8)

- (ii) Define and explain : (8)

(1) Skip zone

(2) MUF

(3) Multihop propagation

(4) Whistlers.



Question Paper Code : 50300

**B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017**

## Sixth Semester

# Civil Engineering

**CE 6605 – ENVIRONMENTAL ENGINEERING – II**

(Regulations 2013)

Time : Three Hours

**Maximum : 100 Marks**

**Answer ALL questions.**

## PART – A

**(10×2=20 Marks)**

1. Write the various sources of waste water generation.
2. Differentiate sewage, sullage and garbage.
3. What is sewerage ?
4. Write the various types of pumps and their functions.
5. What is an Oxidation Pond.
6. What is Sludge ?
7. What is Sludge Thickening ?
8. What is Sludge Conditioning ?
9. What is Coagulation Process ?
10. What is Biochemical Oxygen Demand ?



## PART – B

(5×16=80 Marks)

11. a) Write in detail the various adverse effects of Waste Water, the estimation of sanitary sewage flow and storm runoff with the different factors affecting the characteristics and composition of sewage. (16)
- (OR)
- b) Write the effluent standards as prescribed by CPCB in India. What are the various legal requirements to be met before discharging any effluent in public sewers or canals or rivers ? (16)
12. a) With the help of neat sketch design a sanitary and storm water sewer to an Indian town with a population of 5 lakhs. (16)
- (OR)
- b) a) Sketch and describe in detail the working a pressure filter. (8)
- b) Explain centrifugal pumps and reciprocal pumps. (8)
13. a) a) Sketch and describe construction and working of a septic tank. (8)
- b) Explain the process of purification of sewage by trickling filter. (8)
- (OR)
- b) a) With the help of neat sketch explain the process of Primary Treatment of Sewage. (8)
- b) What is Grey Water harvesting and how it being carried out ? (8)
14. a) Write the principles, functions and design and drawing of units with reference to Activated Sludge Process. (16)
- (OR)
- b) Write the process of Reclamation and Reuse of Sewage. With the help of neat sketch explain the sewage recycle plant for a residential complex. (16)
15. a) Explain the characteristics of sludge and how biogas can be recovered. (16)
- (OR)
- b) Explain the various advances in the treatment of sludge and mode of disposal. (16)



12. (a) From a topographic map and field survey, the area of the drainage basin upstream was found out to be 35 hectares. Determine the maximum rate of run-off for a 10 year. The length of overflow slope is 45 meter with an average overland slope of 2%. The length of main basin channel is 700 meter with a slope of 1.8%. Ratio of area and perimeter is found out to be 0.6 meters. Take mannings roughness coefficient to be 0.09 and total runoff coefficient to be 0.35.

Or

- (b) A combined sewer was designed to serve an area of 60 sq. km with an average population density of 185 persons/hectare. The average rate of sewage flow is 350 L/Capita/day. The maximum flow is 50% in excess of the average sewage flow. The rainfall equivalent of 12 mm in 24 h can be considered for design, all of which is contributing to surface runoff. What will be the discharge in the sewer? Find the diameter of the sewer if running full at maximum discharge and velocity of 0.9 m/s.

13. (a) What do you mean by primary treatment for sewage treatment and write a short note on bar screens, grid chamber and primary sedimentation tanks.

Or

- (b) What is septic tank? Discuss the design features of septic tank in detail.
14. (a) What do you mean by secondary treatment process of sewage treatment? Write short notes on trickling filters, activated sludge process and Oxidation ponds.

Or

- (b) Expand UASB and draw the schematic diagram of UASB. Given that the influent to UASB reactor has following characteristics: flow rate = 8000 m<sup>3</sup>/day, depth of sludge blanket = 2.2 m, reactor height (including settler) = 5 m, effective coefficient (ratio of sludge to total volume in sludge blanket) = 0.85, and average concentration of sludge = 70 kg/m<sup>3</sup>. Determine HRT and reactor area. Take BOD removal efficiency as 80% and sludge age as 30 days.

15. (a) Write short notes on lagooning dumping landfilling and incineration of solid wastes.

Or

- (b) What do you mean by sludge thickening process? Explain Gravity thickening and air flotation unit with a neat diagram.

PART C — (1 × 15 = 15 marks)

16. (a) Imagine that you have a bio-gas reactor and you are constantly feeding it with food wastes in your home. On an average, you feed 2 kg of food waste daily and obtain around 200 liters of bio gas per day. For next 5 days, you are going to load the following food wastes in the digester. Find out the day in which you can expect the maximum amount of bio gas and explain why? Also explain on what day, you can expect high amount of nitrogen in the bio-gas? (5)

Day	Food waste	Nutrition amount
1	Rice waste, Sāmbhar and curd	Mostly carbohydrates
2	Roti	60% carbohydrates and 10% proteins
3	Fish	50% carbohydrates and around 25% proteins
4	Mixture of rice and Roti	You know it!
5	Sweet potatoes	20% carbohydrates and mostly rest water.

- (b) The no of cows (includes bull, ox and buffaloes too) in India is around 30 crores. Biogas can also be produced from cow's dung. In that case, it is called by the name GOBAR GAS. Even today, in rural India, people use dried cow dung for cooking purposes. On an average, a cow gives around 20 kg of cow dung/day, estimate how much energy can be obtained from these animals per year? Find out the no of LPG cylinders equivalent to the total energy obtained from these animals in a year. (10)

USEFUL DATA: Calorific value of LPG is 50 MJ/kg and calorific value of methane is 56 MJ/kg. 1 LPG cylinder contains 15 kg of LPG. 1 kg of cow dung produces around 100 litres of bio-gas with 60% methane content by volume basis. Density of methane is 0.656 kg/m<sup>3</sup>.



13/11/19 / AM



Reg. No. :

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**Question Paper Code : 91315**

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Sixth Semester

Civil Engineering

CE 6605 : ENVIRONMENTAL ENGINEERING – II

(Regulations 2013)

(Common to PTCE 6605 – Environmental Engineering II for B.E. (Part-Time)  
– Fifth Semester – Civil Engineering – Regulations – 2014)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

PART – A

(10×2=20 Marks)

1. Define a) Sullage, b) MINAS.
2. What is meant by Population equivalent ?
3. Define small bore systems.
4. Write the objective of screen chamber.
5. State the objectives of grey water harvesting.
6. What are the objectives of primary treatment of sewage ?
7. What is oxidation ditches ?
8. What is the principle of UASB ?
9. What are the methods of sludge conditioning ?
10. What are the objectives of sludge dewatering ?

PART – B

(5×13=65 Marks)

11. a) Enumerate and explain the various physico-chemical characteristics of sewage and state their environmental significance..

(OR)

- b) Explain the various sources of wastewater and their effects on environment.

91315



12. a) Design a sewer running 0.7 times full at maximum discharge for a town provided with the separate system serving a population of 1 Lakh. Water is supplied from the water works at a rate of 200 litres per capita per day. Take a constant value of  $n = 0.013$  at all depths of flow. The permissible slope is 1 in 600. Take peak factor of 2.25. Assume 80% of water turns as sewage.

(OR)

- b) Explain the step by step procedure for laying and testing of a sewer line.

13. a) i) Explain briefly the operation and maintenance of Sewage Treatment Plants. (7)

- ii) Design a primary clarifier of full scale STP with ASP for an average sewage flow of 12 Mld. Assume suitable data if necessary. (6)

(OR)

- b) Explain with neat sketch component parts, functioning advantages and disadvantages of septic tank. Also discuss various methods of disposal of septic tank effluent. (13)

14. a) Determine the size of a high rate Trickling Fitter for the following data :

Sewage flow = 6 Mld

Recirculation Ratio = 1.5

BOD of Raw Sewage = 230 mg/l

BOD removal in PST = 30%

Final BOD effluent = 20 mg/L.

(OR)

- b) i) Explain the Reclamation and Reuse of Sewage. (6)

- ii) Discuss in detail about waste stabilization pond. (7)

15. a) Explain the factors affecting self purification of surface waters.

(OR)

- b) Explain the different methods of sludge dewatering.

PART – C

(1×15=15 Marks)

16. a) i) Discuss any one recent advancement in Sewage Treatment. (7)

- ii) Explain the factors affecting characteristics and composition of sewage. (8)

(OR)

- b) i) Explain about Sludge Disposal methods. (8)

- ii) Discuss about the Bio-gas treatment and its advantages. (7)