



<b>OR</b>			
<b>Q.6</b>	<b>(a)</b>	Discuss in detail the process of Deoxygenation and Reoxygenation with respect to self-purification of Natural water with a neat sketch.	10
	<b>(b)</b>	A stream, saturated with D O, has a flow of $1.2 \text{ m}^3/\text{sec}$ , BOD of $4 \text{ mg/L}$ and rate constant of $0.3$ per day. It receives an effluent discharge of $0.25 \text{ m}^3/\text{sec}$ having BOD of $20 \text{ mg/L}$ , D O $5 \text{ mg/L}$ and rate constant $0.13$ per day. The average velocity of flow of the stream is $0.18 \text{ m/sec}$ . Calculate the D O deficit at point $20 \text{ kms}$ and $40 \text{ kms}$ downstream. Assume the temperature as $20^\circ\text{C}$ , throughout the BOD is measured at $5$ days. Take saturation D O at $20^\circ\text{C}$ as $9.17 \text{ mg/L}$	10
<b>Module – 4</b>			
<b>Q.7</b>	<b>(a)</b>	Explain the working of conventional activated sludge process (ASP) with flow diagram	10
	<b>(b)</b>	Design a primary sedimentation tank of circular cross-section, for a sewage of $10 \text{ MLD}$ , detention period of $2$ hours and assume the surface loading rate to be $30 \text{ m}^3/\text{m}^2/\text{d}$ .	10
<b>OR</b>			
<b>Q.8</b>	<b>(a)</b>	Explain briefly the different stages of sludge digestion process in a “Digester”. With a neat sketch, explain the constructional details of sludge digestion tank.	10
	<b>(b)</b>	Determine the size of the High rate trickling filters for the following data: i) sewage flow = $4.5 \text{ MLD}$ ii) Recirculation ratio = $1.5$ iii) BOD of Raw sewage = $250 \text{ mg/L}$ iv) BOD removal in primary tank = $30\%$ v) Final effluent BOD desired = $30 \text{ mg/L}$	10
<b>Module – 5</b>			
<b>Q.9</b>	<b>(a)</b>	What do you understand by advanced wastewater treatment? How is it different from the conventional treatment? Give, in a tabular form, important AWT processes.	10
	<b>(b)</b>	Draw a neat sketch of septic tank with soak pit, Write the design criteria required for septic tank.	10
<b>OR</b>			
<b>Q.10</b>	<b>(a)</b>	Discuss in brief the biological and chemical methods of removal of phosphorous from wastewater.	10
	<b>(b)</b>	Write a short note on: a) eco toilet.      b) two pit latrines.	10

Table showing the Bloom's Taxonomy Level, Course Outcome and Programme Outcome				
Question		Bloom's Taxonomy Level attached	Course Outcome	Programme Outcome
Q.1	(a)	L1	i	1, 2, 3, 6 and 7
	(b)	L1	i	1,2,3 and 6
Q.2	(a)	L1	i	1,2,3 and 6
	(b)	L2	i	1,2,3 and 6
Q.3	(a)	L3	ii	1,2,3 and 6
	(b)	L2	ii	1,2,3 and 6
Q.4	(a)	L1	ii	1,2,3 and 6
	(b)	L3	ii	1,2,3 and 6
	(c)	L2	ii	1,2,3 and 6
Q.5	(a)	L2	iii	1,2,3 and 6
	(b)	L1	ii	1,2,3 and 6
Q.6	(a)	L2	iii	1,2,3 and 6
	(b)	L3	iii	1,2,3 and 6
Q.7	(a)	L2	ii	1,2,3 and 6
	(b)	L3	ii	1,2,3 and 6
Q.8	(a)	L2	ii	1,2,3 and 6
	(b)	L3	ii	1,2,3 and 6
Q.9	(a)	L1	v	1,2,3 and 6
	(b)	L2	v	1,2,3 and 6
Q.10	(a)	L1	v	1,2,3 and 6
	(b)	L1	v	1,2,3 and 6
Bloom's Taxonomy Levels	<b>Lower order thinking skills</b>			
	Remembering (knowledge): $L_1$	Understanding (Comprehension): $L_2$	Applying (Application): $L_3$	
	<b>Higher order thinking skills</b>			
	Analyzing (Analysis): $L_4$	Valuating (Evaluation): $L_5$	Creating (Synthesis): $L_6$	

