Name: **Enrolment No:**	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2020

Course: HSE Management **Semester: VIII**
Program: B. Tech AP Upstream **Time 03 hrs.**
Course Code: ENVO 401 **Max. Marks: 100**

Instructions: Please read all instruction carefully

SECTION A

S. No.	MCQ/TF type questions	Marks	CO
Q 1	An unwanted, unplanned event that causes injuries, illnesses, or property damage. a) True b) False	**6**	**CO1**
Q 2	Incident Investigation = Accident investigation + Near miss a) True b) False	**6**	**CO1**
Q 3	An 'undesirable change in the physical, chemical or biological characteristics of air, water and land is called Pollution" a) True b) False	**6**	**CO1**
Q 4	Suspended solids and floating materials are removed in which stage of waste water treatment? a) Tertiary b) Primary c) Secondary d) All of the above	**6**	**CO1**
Q 5	The treatment which is carried out by microorganism in the presence of oxygen is a) Aerobic b) Anaerobic c) Both Aerobic and Anaerobic d) Neither Aerobic and Anaerobic	**6**	**CO1**
Q 6	Which among the following is an oil spill management technique a) Skimmers b) Solidifiers c) Sorbents d) All of the above		
	SECTION B (Short answers of one or two sentences)		
Q 7	Explain the terms a) Pre start up safety review b) Management of change	**10**	**CO2**
Q 8	The plant has been down for extensive maintenance and repair. You are in charge of bringing the plant up and on-line. There is considerable pressure from the sales department to deliver product. At about 4 A.M. a problem develops. A slip plate or blind has accidentally been left in one of the process lines. An experienced maintenance person suggests that she can remove the slip plate without depressurizing the line. She said that she routinely performed this operation years ago. Since you are in charge, what would you do? OR	**10**	**CO3**

	Discuss salient features on Air/ Water and Solid waste pollution and their remedial and mitigation measures and techniques.		
Q 9	Discuss the solid waste management scenario in India .Also explain vermicomposting and incineration	**10**	**CO2**
Q 10	Illustrate the various oil spill control and management techniques.	**10**	**CO3**
Q 11	You have just begun work at a drilling rig. After several weeks on the job you determine that the plant manager runs the plant with an iron fist. He is a few years away from retirement after working his way up from the very bottom. Also, a number of unsafe practices are performed at the plant, including some that could lead to catastrophic results. You bring up these problems to your immediate supervisor, but he decides to do nothing for fear that the plant manager will be upset. After all, he says, "We've operated this plant for 40 years without an accident." What would you do in this situation?	**10**	**CO2**
SECTION-C(Case studies)			
Q 12	The accident at Flixborough, England, occurred on a Saturday in June 1974. The Flixborough Works of Nypro Limited was designed to produce 70,000tons per year of caprolactam, a basic raw material for the production of nylon. The process uses cyclohexane, which has properties similar to gasoline. Under the process conditions in use at Flixborough (155°C and 7.9 atm), the cyclohexane volatilizes immediately when depressurized to atmospheric conditions. The process where the accident occurred consisted of six reactors in series. In these reactors cyclohexane was oxidized to cyclohexanone and then to cyclohexanol using injected air in the presence of a catalyst. The liquid reaction mass was gravity-fed through the series of reactors. Each reactor normally contained about 20 tons of cyclohexane. Several months before the accident occurred, reactor 5 in the series was found to be leaking. Inspection showed a vertical crack in its stainless steel structure. The decision was made to remove the reactor for repairs. An additional decision was made to continue operating by connecting reactor 4 directly to reactor 6 in the series. The loss of the reactor would reduce the yield but would enable continued production because unreacted cyclohexane is separated and recycled at a later stage. The feed pipes connecting the reactors were 28 inches in diameter. Because only 20-inch pipe stock was available at the plant, the connections to reactor 4 and reactor 6 were made using flexible bellows-type piping, as shown in Figure 1-10.It is hypothesized that the bypass pipe section ruptured because of inadequate support and over flexing of the pipe section as a result of internal reactor pressures. Upon rupture of the bypass, an estimated 30 tons of cyclohexane volatilized and formed a large vapor cloud. The cloud was ignited by an unknown source an estimated 45 seconds after the release. The resulting explosion leveled the entire plant facility, including the administrative offices. Twenty-eight people died, and 36 others were injured. Eighteen of these fatalities occurred in the main control room when the ceiling collapsed. Loss of life would have been substantially greater had the accident occurred on a weekday when the administrative offices were filled with employees. Damage extended to 1821 nearby houses and 167 shops and factories. Fifty-three civilians were reported injured. The resulting fire in the plant burned for over 10 days i) Discuss the safety precaution to be taken which can prevent the accident from happening ii) Also discuss the root cause identified by you in the above disaster.	**20**	**CO4**
