**Roll No. _____**

**University of Petroleum Energy Studies**
**School of Business**
**End -semester Examination, April 2018**

**Subject : HSE Challenges in Petroleum Industry** **Semester: VI**
**Course : BBA (OG)** **Time: 3 hrs**
**Course Code : BDSM 152** **MM: 100**
**This paper has three sections.**

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## SECTION – A

**Each question carries 10 marks (Any Five)** **Max Marks – 50**

**Write Notes /Comments**

A.1. Make a list of accidents/incidents that occurred in your installation in the last ten years.

A.2 Define the top ten challenges of HSE on the parameters for Oil & Gas Industry.

A.3. What are the regulatory/statutory agencies for HSE?

A.4. List out the requirements of environmental clearance of your installation and find out the status of its compliance.

A.5. What are the limitations of regulatory agencies for HSE in oil and gas?

A.6. Make a list of various permits, permissions, clearances etc. pertaining to your installation. Are these up to date? When is the next renewal date of each of these documents?

## SECTION- B

**Each question carries 10 marks** **Max Marks – 30**

The Gulf oil spill is recognized as the worst oil spill in U.S. history. Within days of the April 20, 2010 explosion and sinking of the Deepwater Horizon oil rig in the Gulf of Mexico that killed 11 people, underwater cameras revealed the BP pipe was leaking oil and gas on the ocean floor

about 42 miles off the coast of Louisiana. By the time the well was capped on July 15, 2010 (87 days later), an estimated 3.19 million barrels of oil had leaked into the Gulf.

The well was located over 5,000 feet beneath the water's surface in the vast frontier of the deep sea—a permanently dark environment, marked by constantly cold temperatures just above freezing and extremely high pressures. Scientists divide the ocean into at least three zones, and the deep ocean accounts for about three-quarters of Earth's total ocean volume .Immediately after the explosion, workers from BP and Transocean (owner of the Deepwater Horizon rig), and many government agencies tried to control the spread of the oil to beaches and other coastal ecosystems using floating booms to contain surface oil and chemical oil dispersants to break it down underwater. Additionally, numerous scientists and researchers descended upon the Gulf region to gather data. Researchers are still trying to understand the spill and its impact on marine life, the Gulf coast, and human communities .Georgia Department of Natural Resources:- Over the course of 87 days, the damaged Macondo wellhead, located around 5,000 feet beneath the ocean's surface, leaked an estimated 3.19 million barrels (over 130 million gallons) of oil into the Gulf of Mexico—making the spill the largest accidental ocean spill in history. Once the oil left the well, it spread throughout the water column. Some floated to the ocean's surface to form oil slicks, which can spread more quickly by being pushed by winds. Some hovered suspended in the midwater after rising from the wellhead like a chimney and forming several layers of oil, dispersant and seawater mixtures drifting down current; during the spill a 22-mile long oil plume was reported. This plume formed because chemical dispersants, released into the water to break up the oil so it could wash away, allowed the oil to mix with seawater and stay suspended below the surface. And some oil sunk to the seafloor by gluing together falling particles in the water such as bacteria and phytoplankton to form marine snow. As much as 20 percent of the spilled oil may have ended up on top of and in the seafloor, damaging deep sea corals and potentially damaging other ecosystems that are unseen at the surface.

B.1. What are the learnings from this disaster.

B.2. What is marine snow and how it is dangerous for marine life.

B.3. What type of sanctions and penalty was given to BP by US government.

## SECTION- 3

**Case Study** **Max Marks – 20**

The requirement to develop a formal safety case for any major oil and gas facility has been in place for many years in regulated environments such as the UK and Australia. Today, oil companies and industry associations are applying this requirement in other regions of the world where such legislation does not currently exist. This provides an opportunity to learn from experience and develop concise and pragmatic health, safety and environment (HSE) cases. Well-developed HSE cases not only protect lives and the environment, but help a business manage its assets, maintain its competency and reduce the risk of lost production .Use what you've got, work out what you're missing. All facilities will have at least some, and probably many, existing HSE studies. There is no need to re-do everything from scratch. A useful approach is to conduct a 'gap analysis' of these studies against a set of requirements, e.g. an international or industry standard, to identify what is missing or inadequate .Qualitative risk approaches can identify most improvements .There is no need to rush into time consuming, full quantification of HSE risks. Experience based, qualitative risk assessment can often identify the vast majority of possible risk reduction improvements. Record all HSE risks, that way nothing is overlooked. Identifying and assessing all health effects, environmental impacts, workplace safety hazards and major accident events provides an all-encompassing approach. Using a 'risk register' to document these risks creates a valuable reference guide for the facility. Having separate, but inter-linked, registers for health, safety and environment risks can be even better - it improves understanding of the subtleties in how they are managed. But don't neglect major accident events While some workplace tasks such as grit blasting can be risky for an individual, they usually rely on the competency of the individual supported by robust procedures to assess and control the risk. It is only major accident events such as loss of hydrocarbon containment that have the potential for massive fatalities, environmental impact, economic loss and reputation damage. They warrant detailed and thorough analysis, followed by an appropriate level of verification. Quantifying risk levels do help in some situations. The purpose of quantitative risk assessment (QRA) is to help reduce risk by supporting risk-based decision-making. It is especially powerful when applied with cost-benefit analysis to compare options during the design phase or modifications during operations. But estimating absolute risk levels solely for comparison with quantitative criteria can be open to manipulation of data, methods and assumptions.
There is no easy formula for demonstrating risk is ALARP.The ALARP level is reached when the time, trouble and cost of further risk reduction becomes unreasonably disproportionate to the benefit gained. This implies a mathematical formula but in practice it amounts to taking a balanced view and reaching a defensible consensus on prioritized improvements. A convincing ALARP demonstration lies in the documented consideration of improvement options, both implemented and discounted, at a level of resolution appropriate to the facility life-cycle and magnitude of risk. Involve people, they know what's really going on. Involving personnel in developing the HSE case is critical in gaining ownership of HSE risk management. Commissioning a consultancy to arrive, collect information and then leave to produce a report from their office is a recipe for inaction. Opportunities to involve personnel include participating in workshops, highlighting where safety systems or procedures do not have the benefits claimed,

commenting on the accuracy of technical reports, and participating in training. A major benefit of the case comes from the process of preparing it, rather than the document itself. Don’t just analyse risk, understand how it is managed.One of the most potent and increasingly popular risk assessment techniques is the 'bow-tie' method because it highlights the crucial link between risk controls (whether hardware or procedural) and the management system and personnel competencies necessary for their ongoing effectiveness. It thus helps to ensure that risks are truly managed by competent people, rather than just analysed. Live by the HSE case, don't stick it on the shelf.It is only through the continued communication and implementation of the HSE case that sustainable improvements in HSE are likely to be maintained. Examples of deliverables in a roll-out plan include information presentations, leaflets, booklets, e-learning packages, accountability packs and intranet websites and finally, risk management requires action not words .It is surprising how many people need reminding that risk levels will remain the same, or even increase, until real improvements are fully implemented. A case can generate a large number of recommendations and these needs to be properly managed. More analysis or rousing speeches are not the solution.

C.1. What are the top ten HSE guidelines in this case study.

C.2. Define the role of IT in HSE.