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UNIVERSITY OF PETROLEUM & ENERGY STUDIES

End Semester Examination – December, 2019

Program/course: MBA(Oil and Gas Management) **Semester – I**
Subject: Introduction to Information System Management **Max. Marks : 100**
Code : DSIT 7002 **Duration : 3 Hrs**
No. of page/s: 3

All questions are compulsory.

Section A (5 * 6 = 30 marks)

1. Write Short notes on any five

(a) Cloud computing	CO-1	6 MARKS
(b) Block chain Technology	CO-1	6 MARKS
(c) Customer Relationship Management (CRM) systems	CO-3	6 MARKS
(d) Data Warehouse	CO-2	6 MARKS
(e) Executive Support System	CO-3	6 MARKS
(f) Business intelligence	CO-3	6 MARKS

Section B (5 * 8 = 40 marks)

2. Attempt any 5 questions:

(a) How are information systems categorized? Give examples of different information systems being used in oil and gas industry.	CO-3	6 MARKS
(b)What is an enterprise system? Why is it preferred over other software in the enterprise?	CO-2	6 MARKS
(c)What is a business process? Explain with the help of an example.	CO-2	6 MARKS
(d)What factors are important for selecting an Information System by an organization? Take an example	CO-4	6 MARKS

and explain the selection process for procurement of this system.		
(e)What strategic business objectives can be achieved by information systems? Give examples.	CO-4	6 MARKS
(f)Explain three most common security threats to information systems with examples.	CO-2	6 MARKS

Section C **(3 * 10 = 30 marks)**

3. Study the article attached and answer following questions in your own language.

Digital oil field technologies have delivered clear benefits to E&P operations by facilitating timely decision making, which in turn has increased uptime, production efficiency and safety levels. Monitoring instruments havefoundtheirwaytothedrillheadand beyond, taking digital oil fields into the reservoir and linking all aspects of E&P with onshore operations. More recent developments– suchasanalyticssoftware –haveenabledmonitoringtomorphinto predictive modelling. However, pioneers and early adopters of data driven practices have conducted successful pilot programmes and developed effective solutions,whiletheglobalindustriallandscapehasbeenchangingaround them. Changes in the industry The most obvious change is the shift in demandandsupplytoemergingmarkets. China now consumes more energy than the US, according to the International EnergyAgency(IEA)1,andthemajorityof oil reserves are under the control of national oil companies (NOCs). We will therefore see yet more collaboration between NOCs, international oil companies (IOCs) and oil field service companies as the industry pursues more complex opportunities in more difficult locations, includingbasinsinareassuchastheArctic. That requires improved capabilities in entering market places quickly or upgrading processes and workflows. It also requires a greater application of global standards and leading practices to help streamline E&P assets and exploit new opportunities while maintaining high safety standards and healthy returns oninvestment. Perhaps less tangible is the transformationoftheworkforce.Inmaturemarkets, the industry suffers from an ageing demography, while in some emerging
basins the supply of specialist skills is not keeping up with growth. However, beyondavailabilityoflabouristhenature of new recruits, who have fresh expectations of the way they work and, in particular, the use of collaboration technology. These expectations are also held by a growingpercentageoftheexistingworkforce. Inasurveyconductedwith275industry professionals in early 2010, Microsoft and Accenture2 found that 31% relied more on collaboration to get their jobs done than they did one year before. A total of 73% saw the business value in adding socialmediatotheircollaborationoptions – up from the 40% who responded positively in a similar poll the previous year. Globalisation, changing regulatory demands and the scarcity of talent were identified as major drivers. Over three quarters of respondents pointed to complex projects as the main reason to move tonewformsofcommunicationanddata sharing. These trends support the case for even morewidelyusedandsophisticatedforms of information technology. To date, digital oil fields have achieved some success in managing upstream assets. The application of real time data on the drilling platform has enabled the control room environment to respond to changes quickly. It has also allowed onshore management to see more deeply into the physical attributes of assets, revealing previously

unseen levels of insight into performance. Limitations of digital oil fields However, it is clear that the many digital oil field implementations have been limitedinscopeandisolated.So,whileatypical early adopter project has succeeded withrealtimedata,ithasbeenheldback by insufficient changes to workflows and
processes.Theinitiativeoftenwouldhave amounted to a technology experiment, undertaken with a pilot mentality, but without having been driven by broader businessneeds.Assuch,itislikelytohave resulted in a point solution implemented by a semi-autonomous unit, with limited ability to scale within its own division, let alonebereplicatedacrossothers. Meanwhile, some digital oil field projectshaveoftenresultedinoverwhelming users with the volume of data. According toamorerecentMicrosoftandAccenture survey3 of upstream oil and gas professionals within NOCs, IOCs and service and supply companies, 44% of respondents felt the upstream data explosion has had a negative effect on their ability to get their work done. Among the major problems identified was the difficulty and time-consuming search of diverse systems tofind information. Other deficiencies reported were data appearing in unstructured forms or informationstuckinindividualrepositoriesand therefore not easily shared across disciplines.Athirdofrespondentsfeltthattoo much data was redundant. They also pointed to a disconnect between themselves and management. While professionals pointed to more extensive IT standards, cloud computing and social media as the most valuable technologies in the upstream sector, less than onequarter said their company had fully implementedthesetools. In short, oil companies have struggled to support their staff with the use of information technology solutions and have often been unable to scale-up their solutionsorcreateasingleprogrammeto leveragetheirachievements.Manyofthe solutions, while working well, have been overtaken by newer methodologies and technologies. While those companies have taken digital operations to where it is considered the only way to operate, somenewentrantsarebeginningtoleap frog the early adopters with better, cheaper and easier to implement solutions.
Integrated oil field solutions A fresh approach to asset management is now required to sweep away the traditional barriers between siloed vertical disciplines working in isolation. The integrated oil field model must embrace a range of priorities in the same way, including optimising reservoir, well and facility performance through to asset operations, and health, safety and environmental processes. In order to do this, fragmented structures must be replaced with an integrated, holistic approach to asset management.AtitsheartshouldbeanIT platform that facilitates common data, standards and processes, and real-time
The oil industry has seen an evolution of digital oil fields in the last decade thanks to advances in both hardware and software that have enabled operators to extend the monitoring of assets and flows throughout their operations. However, as the industry contends with more complex challenges, it now recognises that more integrated models and business processes are required to enable digital oil field technology to tackle emerging operational challenges. Johan Nell, Global Upstream Lead, Accenture, explains information flows. That architecture should be modular, flexible and adaptable to the existing IT environment, allowing the aggregation of multiple data types and structures. It should be made up of familiar and commonly used components to enable easy and widespread use. Such architectures are now becoming available. Beyond the architecture itself, the new IT environment must support advanced applications such as analytics and predictive modelling to maximise the value extracted from the data. Likewise, data quality issues must be addressed. In
complexfieldoperations,faultyorerraticsensors, interference and communications problemsarecommon.Consequently,the newplatformmustenableadvanceddata processing, validation and reconciliation techniques,aswellascalculations,performance indicators, event detection and notificationcapabilities. People, process, governance Before these technology solutions are considered,

however, other components must be developed (see Figure 1). Workflows and processes must be reengineered and re-integrated in ways that align with the chosen business goals and drivers. These processes should be real time and event-based and, wherever possible, automated. As they extend to multiple operations, they must also incorporate disciplines and functions of all levels, maximising participation and data sharing. The human element should also be taken further. To deliver truly integrated oil field operations requires the incorporation of collaborative and other technologies that we now know are eagerly demanded by upstream workers. Similarly, oil companies must take into account the new ways in which the younger generation of professionals wishestowork.Trainingandbusinesssim
ulation will be critical components to ensure that participants can exploit new workflows and data access in ways that arealignedwithbusinesspriorities. Finally,stronggovernanceandsponsorship are critical. For staff, the cultural transformationtowardscollaborative,less hierarchicalknowledgesharingshouldbe explicitly supported by leadership. As we have already seen, such ways of working are being demanded by staff, but to some extent, may be seen as almost subversive in out of date environments. Business leaders should be seen to champion the new working culture that integrated oil field solutions can foster, notwithstanding the requirements of health and safety processes. A universal change management programme may berequiredtocoordinatethetransformation in processes, responsibilities and humancapital. Given limited resources, this new comprehensive approach should be applied to those parts of the business where value creation is greatest. Experience shows that a gradual expansion should be undertaken, supported by the modular nature of the underlying data infrastructure. Accenture identifies seven areas where integrated oil field solutions are likely to deliver most value (see Figure 2). These include the four key functional domainsthatcanbeoptimisedinthefollowing ways: Well performance – the application of virtual flow meters, as well as well test automation and simulation to support diagnosisandpredictivemaintenance. Reservoirperformance–lesswelldeveloped through today's existing digital solutions, reservoir performance can be enhanced through real-time data gathering and automated reservoir monitoring. Well delivery – from well design throughdrillingtooperations,thissolu
tionspeedsuptheprocessofdelivering wells and improves the quality of the deliveredwell. Surface facilities will benefit from improved surveillance of both static and rotating equipment and diagnosis tominimiserepairtime. Beyond the functional domains, integrated oil field solutions can also be applied to help improve overall asset performanceandoutput: Asset optimisation – the use of processes and quality surveillance data to improve asset operations. This includes event reporting and event management. Asset performance – improved crossdisciplinary workflows and integrated planning can be implemented to improve assets, such as those that help optimise energy utilisation or water handling. Healthandsafety–theimplementation of monitoring and processes to ensure equipment and well integrity, and to help respond to spills and emissions, andmanagewaste. As competitive and regulatory pressures mount on an oil industry getting to grips with greater complexity and international reach, data solutions clearly play animportantrole.However,theevidence pointstothelimitationsofexistingdigital solutions. Although there is a case for moresophisticatedITinnovations,suchas analytics, the greater step forward comes in an entirely new and integrated way of working, in which a more widely applied technologybackboneplaysapart.

Questions:-

a) What are the constituent elements of a digital oil field?	CO-3	6 MARKS
b) What are the challenges in introducing digital oil field in oil and gas sector?	CO-2	6 MARKS
c) Assume you are the Chief Technology Officer for an upstream oil and gas company, and you have to give your recommendations for adoption / rejection of digital oil field solution for your company. Based on the paper what is your recommendation and why?	CO-4	6 MARKS