

INSTRUCTION:

This section consists of **FOUR (4)** structured questions. Answer **ALL** questions.

ARAHAN:

Bahagian ini mengandungi **EMPAT (4)** soalan berstruktur. Jawab **SEMUA** soalan.

QUESTION 1**SOALAN 1**

- CLO1 a) Structural traps are formed by deformation of reservoir rock, such as by folding or faulting. Describe all types of structural traps involved.
Struktur “Trap” dihasilkan apabila perubahan pada batu takungan seperti proses kelipatan dan kerosakan. Jelaskan semua jenis “trap” struktur yang terlibat.
[7 Marks]
[7 Markah]
- CLO1 b) There are some different theories that describe the inorganic origin of petroleum. Elaborate the **FOUR (4)** inorganic theories.
*Terdapat beberapa teori berbeza yang menerangkan asal usul petroleum bukan organik. Huraikan **EMPAT (4)** teori-teori bukan organik.*
[10 Marks]
[10 Markah]
- CLO1 c) Drive mechanisms happen when the reservoir may respond to the withdrawal of fluid in a way that tends to maintain the pressure. There are three types of drive mechanisms, namely solution gas drive, gas cap drive and aquifer(water) drive. Demonstrate the solution gas drive along with a labelled diagram.
Mekanisma “drive” berlaku apabila takungan tersebut bertindak balas apabila minyak dan gas dibawa ke permukaan untuk mengekalkan tekanan di dalam takungan. Tiga jenis mekanisma “drive”, iaitu “solution gas drive”, “gas cap drive” dan “drive” air. Tunjukkan “solution gas drive” dengan rajah berlabel yang berkaitan.
[8 Marks]
[8 Markah]

QUESTION 2

SOALAN 2

CLO2

- a) Drill bit is a tool designed to produce a generally cylindrical hole (wellbore) in the earth's crust by the rotary drilling method for the discovery and extraction of hydrocarbons such as crude oil and natural gas. The size usually ranges from 6 inches to 3 feet in diameter. List **FIVE (5)** types of drilling bit used.

*Dalam industri minyak dan gas, bit gerudi adalah alat yang direka untuk menghasilkan lubang berbentuk silinder secara umumnya (lubang sumur) di dalam kerak bumi dengan kaedah penggerudian berputar untuk penemuan dan pengekstrakan hidrokarbon seperti minyak mentah dan gas asli. Senaraikan **LIMA (5)** jenis bit gerudi yang digunakan.*

[5 Marks]

[5 Markah]

b)

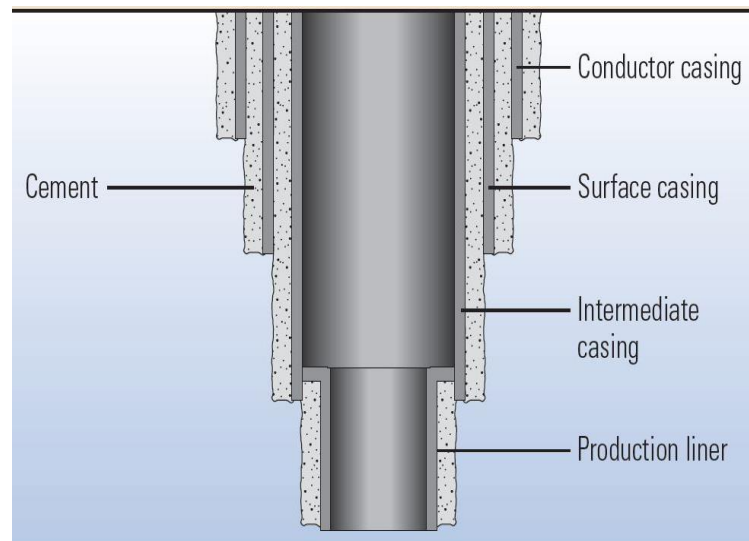


Diagram 1 / Rajah 1

CLO2

Diagram 1 shows cementing process, to prevent fluid movement outside the casing. Expose **TWO (2)** steps for cementing process.

*Rajah 1 menunjukkan proses penyimenan, untuk mengelakkan pergerakan bendalir di luar selongsong. Dedahkan **DUA (2)** langkah untuk proses penyimenan.*

[10 Marks]

[10 Markah]

CLO2

- c) Rotary drilling equipment consists of five main systems in drilling operations. This equipment is the main requirement of an oil rig. The function of rotary rig is to drill the hole. Expose all functions of the main systems.

Alat penggerudian berputar mengandungi lima sistem utama dalam operasi penggerudian. Alat ini adalah satu keperluan di pelantar minyak. Pelantar berputar berfungsi untuk menggerudi lubang. Dedahkan semua fungsi-fungsi sistem utama tersebut.

[10 Marks]

[10 Markah]

QUESTION 3**SOALAN 3**

CLO2

- a) Wellhead is the component at the surface of an oil or gas well that provides the structural and pressure-containing interface for the drilling and production equipment. Explain the functions of wellhead operations.

Kepala telaga adalah komponen di permukaan telaga minyak atau gas yang menyediakan antara muka struktur dan tekanan untuk peralatan penggerudian dan pengeluaran. Jelaskan fungsi-fungsi operasi kepala telaga.

[5 Marks]

[5 Markah]

CLO2

- b) Wellheads are typically welded onto the first string of casing, which has been cemented in place during drilling operations, to form an integral structure of the well. Wellhead is a combination of casing head, tubing head, tubing hangers and Christmas tree. Draw the wellhead with labels.

Kepala telaga biasanya dikimpal pada sarung pertama, yang telah disemenkan di tempatnya semasa operasi penggerudian, untuk membentuk struktur integral telaga.

Kepala telaga adalah gabungan kepala selongsong, kepala tiub, penyangkut tiub dan "Christmas tree". Lukiskan kepala telaga dengan label.

[10 Marks]

[10 Markah]

CLO2

- c) An assembly of spools, valves, and fittings used for oil and other types of wells is called a Christmas Tree. Several types of valves were installed on the Christmas Tree. Expose **FIVE (5)** types of valves installed.

Hasil pemasangan injap-injap, gelendong, dan kelengkapan yang digunakan untuk telaga minyak, dan jenis-jenis telaga yang lain adalah dipanggil "Christmas Tree". Terdapat beberapa jenis injap yang dipasang pada "Christmas Tree". Dedahkan LIMA (5) jenis injap yang dipasang.

[10 Marks]

[10 Markah]

QUESTION 4**SOALAN 4**

CLO2

- a) A gas processing plant (GPP) has been designed and built for treatment of hydrocarbon gas mixture received from some gas field. Several factors that need to be taken into account when designing Gas Processing Plant. List out these **THREE (3)** factors.

Sebuah loji pemprosesan gas direka dan dibina untuk merawat campuran gas hidrokarbon yang diterima dari beberapa medan gas.

Beberapa faktor perlu diambil kira semasa mereka bentuk Loji Pemprosesan Gas. Nyatakan TIGA (3) faktor-faktor tersebut.

[3 Marks]

[3 Markah]

CLO2

- b) Natural gas is a naturally occurring mixture of gaseous hydrocarbons consisting primarily of methane in addition to various smaller amounts of other higher alkanes.

Explain **THREE (3)** categories of raw natural gas.

Gas asli ialah campuran semula jadi hidrokarbon gas yang terdiri terutamanya daripada metana sebagai tambahan kepada pelbagai jumlah alkana lain yang lebih tinggi. Terangkan TIGA (3) kategori gas asli mentah.

[10 Marks]

[10 Markah]

CLO2

- c) Fractional distillation is the process by which oil refineries separate crude oil into different, more useful hydrocarbon products based on their relative molecular weights in a distillation tower. Draw a labelled diagram of fractional distillation of crude oil with its products.

Penyulingan pecahan ialah proses di mana kilang penapisan minyak mengasingkan minyak mentah kepada produk hidrokarbon yang berbeza dan lebih berguna berdasarkan berat molekul relatifnya dalam menara penyulingan. Lukiskan gambarajah berlabel penyulingan pecahan minyak mentah dengan produknya.

[12 Marks]

[12 Markah]

SOALAN TAMAT