
UNIVERSITI SAINS MALAYSIA

First Semester Examination
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*Peperiksaan Semester Pertama
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EBS 101/3 - Engineering Geology *EBS 101/3 - Geologi Kejuruteraan*

Time : 3 hours
Masa : 3 jam

Please ensure that this paper consists of SEVENTEEN printed pages before you proceed with the examination.

This paper contains SIXTY SEVEN objectives questions in PART A and SIX subjective questions in PART B.

Answer ALL questions in PART A and FOUR questions from PART B. For PART B if a candidate answers more than four questions only the first four answer will be examined and awarded marks.

Answer to any question must start on a new page.

All questions could be answered in Bahasa Malaysia or English.

Sila pastikan bahawa kertas peperiksaan ini mengandungi TUJUH BELAS muka surat yang bercetak sebelum anda memulakan peperiksaan.

Kertas soalan ini mengandungi ENAM PULUH TUJUH soalan objektif pada BAHAGIAN A dan ENAM soalan subjektif pada BAHAGIAN B.

Jawab SEMUA soalan pada BAHAGIAN A dan EMPAT soalan daripada BAHAGIAN B. Bagi soalan di BAHAGIAN B, jika calon menjawab lebih daripada empat soalan hanya empat soalan pertama mengikut susunan dalam skrip jawapan akan diberi markah.

Mulakan jawapan anda untuk setiap soalan pada muka surat yang baru.

Semua soalan boleh dijawab samada dalam Bahasa Malaysia atau Bahasa Inggeris.

PART A
BAHAGIAN A

1. Current estimates put the age of Earth at about
 - A) 4.6 million years
 - B) 15 thousand years
 - C) 66.4 million years
 - D) 4.6 billion years
 - E) 15 billion years
 2. Relative dating involves
 - A) placing events in their proper sequence or order without knowing their absolute ages in years
 - B) comparing fossils found in rock layers
 - C) using radioactivity to find the age of a rock
 - D) using the law of superposition to compare the ages of rock layers
 - E) A, B, and C
 3. Earth's physical environment is divided into three major parts
 - A) the solid Earth, the hydrosphere, and the atmosphere
 - B) the solid Earth, the core, and the mantle
 - C) the hydrosphere, the atmosphere, and the thermosphere
 - D) the surface, the atmosphere, and space
 - E) the Arctic, the desert, and the forest
 4. The crust of the Earth is divided into pieces called
 - A) boundaries
 - B) plates
 - C) trenches
 - D) layers
 5. Which of the following is not part of the definition of a mineral?
 - A) It must have a definite chemical composition that can vary within specified limits
 - B) It must be a solid
 - C) It must contain silicon and oxygen
 - D) It must be inorganic
 - E) It must occur naturally
1. *Anggaran sekarang meletakkan usia bumi*
 - A) *4.6 juta tahun*
 - B) *15 ribu tahun*
 - C) *66.4 juta tahun*
 - D) *4.6 bilion tahun*
 - E) *15 bilion tahun*
 2. *Penentuan masa nisbi*
 - A) *meletakkan peristiwa yang berlaku dalam tertib atau jujukan yang sebetulnya tanpa mengetahui usia mutlaknya dalam tahun*
 - B) *membandingkan fosil yang ditemui di dalam lapisan batuan*
 - C) *menggunakan keradioaktifan untuk menentukan usia batuan*
 - D) *menggunakan prinsip supertindanan untuk membandingkan usia lapisan batuan*
 - E) *A, B dan C*
 3. *Struktur fizikal bumi dibahagikan kepada tiga bahagian utama*
 - A) *bumi yang pejal, hidrosfera, dan atmosfera*
 - B) *bumi yang pejal, teras, dan mantel*
 - C) *hidrosfera, atmosfera, termosfera*
 - D) *permukaan, atmosfera, dan ruang*
 - E) *artik, gurun, dan hutan rimba*
 4. *Kerak bumi dibahagikan kepada*
 - A) *sempadan*
 - B) *keping*
 - C) *juram*
 - D) *lapisan*
 5. *Bahagian berikut manakah yang bukan sebahagian daripada takrif mineral?*
 - A) *Ia mesti memiliki komposisi kimia yang tertentu yang boleh berubah di dalam had-had yang tertentu*
 - B) *Ia mestilah pepejal*
 - C) *Ia mesti mengandungi silikon dan oksigen*
 - D) *Ia bukan organik*
 - E) *Ia mesti berlaku secara tabii*

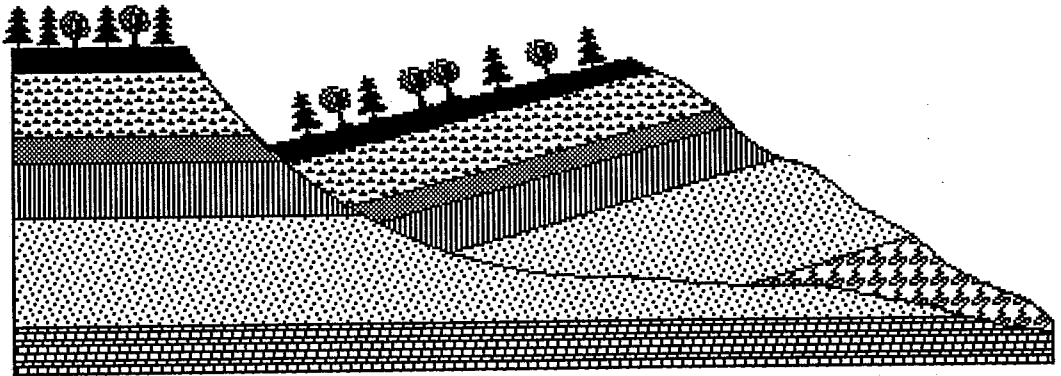
6. This property is the least reliable when identifying a mineral:
- streak
 - color
 - specific gravity
 - hardness
 - luster
7. The two most common elements in the continental crust are:
- oxygen and silicon
 - oxygen and aluminum
 - iron and magnesium
 - hydrogen and helium
 - iron and aluminum
8. The silicon-oxygen tetrahedron has what chemical formula?
- SiO_2
 - Al_2SiO_5
 - TeSiO_3^{2-}
 - SiO_4^{4-}
 - Si_2O^{6+}
9. Ferromagnesian silicates
- are light colored
 - have a higher specific gravity than nonferromagnesian silicates
 - contain iron and/or magnesium
 - all of the above
 - only B and C
10. Minerals that have the same chemical composition but different structures, such as diamond and graphite, are called:
- polymorphs
 - isotopes
 - polycrystals
 - isomorphs
 - molymorphs
11. The circulation of water among the hydrosphere, atmosphere, solid Earth and biosphere is called:
- the hydrologic cycle
 - uniformitarianism
 - precipitation
 - transpiration
 - the water system
6. Sifat yang paling kurang berkesan untuk mengancam mineral ialah:
- warna corekan
 - warna
 - graviti tentu
 - kekerasan
 - kilauan
7. Dua unsur paling utama di dalam kerak bumi ialah:
- oksigen dan silikon
 - oksigen dan aluminium
 - ferum dan magnesium
 - hidrogen dan helium
 - ferum dan aluminium
8. Tetrahedron silikon-oksigen mempunyai formula kimia yang mana?
- SiO_2
 - Al_2SiO_5
 - TeSiO_3^{2-}
 - SiO_4^{4-}
 - Si_2O^{6+}
9. Silikat feromagnesium
- berwarna cerah
 - mempunyai graviti tentu yang lebih tinggi daripada silikat bukan feromagnesium
 - mengandungi ferum dan/atau magnesium
 - semua yang di atas
 - hanya B dan C
10. Mineral yang mempunyai komposisi kimia yang sama tetapi berlainan struktur seperti intan dan grafit dikenali:
- polimorf
 - isotop
 - polihablur
 - isomorf
 - molimorf
11. Kitaran air di antara hidrosfera, atmosfera, bumi dan biosfera dipanggil:
- kitar hidrologi
 - keseragaman
 - pemendakan
 - penyejatan
 - sistem air

12. Chemical weathering always results in the creation of what kind of minerals?
- Felsic minerals
 - Mafic minerals
 - High-temperature minerals
 - Low-temperature minerals
 - Non-silicate minerals
13. What is the definition of erosion?
- The accumulation of sediment following transportation
 - The disintegration and decomposition of rocks at or near the earth's surface
 - The incorporation and transportation of material by mobile agents such as water, wind and ice
 - The transfer of rock material downslope under the influence of gravity
 - The washing out of fine soil components
14. What is the definition of eluviation?
- The accumulation of sediment following transportation
 - The disintegration and decomposition of rocks at or near the earth's surface
 - The dissolution of soil components
 - The incorporation and transportation of material by mobile agents such as water, wind and ice
 - The washing out of fine soil components
15. What is the most abundant type of sedimentary rock?
- Conglomerate
 - Evaporites
 - Limestone
 - Sandstone
 - Shale
16. Which sedimentary rock type is likely to be formed in the most offshore environment?
- Conglomerate
 - Limestone
 - Sandstone
 - Shale
 - Siltstone
12. Luluhawa kimia selalunya menghasilkan mineral jenis apa?
- Mineral felsik
 - Mineral mafik
 - Mineral suhu tinggi
 - Mineral suhu rendah
 - Mineral bukan silikat
13. Apa takrif hakisan?
- Penimbunan sedimen selepas pengangkutan
 - Penguraian dan penyepaian batuan dekat atau pada permukaan bumi
 - Penambahan dan pengangkutan bahan oleh agen yang bergerak seperti air, angin dan ais
 - Pemindahan bahan batuan ke kaki cerun bawah pengaruh graviti
 - Pembebasan keluar jujuk-jujuk halus dalam tanah
14. Apa takrif eluviiasi?
- Penimbunan sedimen selepas pengangkutan
 - Penguraian dan penyepaian batuan dekat atau pada permukaan bumi
 - Pelarutan jujuk-jujuk tanah
 - Penambahan dan pengangkutan bahan oleh agen yang bergerak seperti air, angin dan ais
 - Pembebasan keluar jujuk-jujuk halus tanah
15. Apakah jenis batuan mendak yang paling banyak ditemui?
- Konglomerat
 - Evaporit
 - Batu kapur
 - Batu pasir
 - Syel
16. Batuan mendak manakah yang mungkin ditemui di luar enviromen pesisir?
- Konglomerat
 - Batu Kapur
 - Batu pasir
 - Syel
 - Batu lodak

17. Actual rates of lithospheric plate divergence are generally measured in
- millimeters per 100 years
 - centimeters per year
 - meters per year
 - meters per day
 - meters per hour
18. The key, critical difference between weathering and erosion is that
- weathering always requires water, while erosion never does
 - weathering happens only to igneous rocks, erosion affects all rocks
 - weathering changes the composition of materials, erosion just changes the size of the particles
 - weathering is the breaking down of rocks in place, erosion is removal of materials from a site
19. A poorly sorted, immature sandstone (an arkosic greywacke) is pushed down into the Earth along a subduction zone. It becomes hotter and hotter, and eventually melts. When it eventually crystallizes, the most likely rock that is going to be produced will be a:
- quartzite
 - schist
 - gneiss
 - conglomerate
 - granite
20. An earthquake of magnitude 2 is probably not going to be felt by anyone unless they're sitting on the epicenter. An earthquake of magnitude 7, on the other hand, is capable of causing widespread and major damage and even deaths. How much more ground shaking is involved in an earthquake of magnitude 7 than an earthquake of magnitude 2?
- About 3½ times as much
 - About 10 times as much
 - About 100 times as much
 - About 1000 times as much
 - About 100,000 times as much
17. Kadar sebenar keping litosferik mencapai biasanya diukur dalam
- meter/100 tahun*
 - sm/tahun*
 - meter/tahun*
 - meter/hari*
 - meter/jam*
18. Perbezaan yang jelas di antara luluhawa dan hakisan ialah
- luluhawa memerlukan air sementara hakisan tidak*
 - luluhawa hanya berlaku kepada batuan igneus, hakisan meliputi semua jenis batuan*
 - luluhawa mengubah komposisi bahan, hakisan hanya mengubah saiz partikel sahaja*
 - luluhawa ialah penguraian batuan setempat, hakisan ialah penanggalan bahan dari sesuatu tempat*
19. Batuan pasir yang tak matang, kurang sempurna sisihannya tertolak ke dalam bumi disepanjang zon subduktan. Ia menjadi semakin panas dan akhirnya ia lebur. Apabila ia mula menghablur, batuan yang mungkin terbentuk ialah:
- kuarzit*
 - skis*
 - gneiss*
 - konglomerat*
 - granit*
20. Gempa bumi bermagnitud 2 tidak akan dirasai oleh sesiapa pun kecuali mereka yang berada di epi pusat. Gempa bumi bermagnitud 7 boleh menyebabkan kerosakan yang teruk termasuk kematian. Berapakah gegaran yang dirasai oleh gempabumi bermagnitud 7 jika dibandingkan dengan gempabumi bermagnitud 2?
- 3½ kali ganda*
 - 10 kali ganda*
 - 100 kali ganda*
 - 1000 kali ganda*
 - 100,000 kali ganda*

21. Driving through Bukit Berapit, Kuala Kangsar, you observed a situation that looked a lot like the drawing shown below. What was this?

- A) A rockfall & talus
 B) A slump
 C) A debris flow
 D) An earthflow



21. Jika anda memandu melalui Bukit Berapit, Kuala Kangsar, anda akan dapat lihat keadaan seperti yang dipaparkan dalam rajah berikut. Apa yang anda sedang perhatikan?

- A) Runtuhan batuan
 B) Nendat
 C) Aliran puing
 D) Aliran tanah

22. The floodplain of a stream or river is:

- A) the land along the river where it normally can be expected to flood
 B) the active stream channel and bare (vegetation-free) parts of the banks
 C) just the bare parts of the banks along the river
 D) all the areas where the stream has ever flowed at any time in the past

22. Limpahan banjir sungai atau anak sungai ialah:

- A) tanah sepanjang sungai yang biasanya dijangkakan boleh banjir
 B) lurah anak sungai yang aktif dan bahagian tebing yang gondol
 C) hanya bahagian tebing yang gondol sepanjang sungai
 D) di kesemua kawasan di mana anak sungai pernah mengalir di masa lampau

23. Karst landscapes are solution-dominated environments that occur mainly in areas underlain by what kind of rock?

- A) Granite
 B) Limestone
 C) Shale
 D) Schists
 E) Basalt

23. Landskap karst adalah satu enviromen biasanya di kawasan yang dilitupi oleh jenis batuan apa?

- A) Granit
 B) Batu kapur
 C) Syel
 D) Skis
 E) Basalt

24. The location of the source of an earthquake is called:

- A) The focus
 B) The displacement
 C) The epicenter
 D) The rebound
 E) Plastic deformation

24. Kedudukan punca gempabumi dipanggil:

- A) Fokus
 B) Anjakan
 C) Epipusat
 D) Balikan
 E) Canggaaan plastik

25. Of the seismic waves produced by an earthquake, which type travels fastest?
- A) long waves
B) surface waves
C) S-waves
D) P-waves
26. Which types of waves are compressional?
- A) P-waves
B) surface waves
C) S-waves
D) long waves
27. Where do most earthquakes occur?
- A) At or near plate boundaries
B) Between 70 and 300 kilometers below the surface
C) Deeper than 300 kilometers below the surface
D) Away from plate boundaries
28. The Mercalli intensity scale ranks earthquakes according to
- A) seismic wave amplitude
B) damage caused by an earthquake
C) magnitude
D) depth below the surface
29. Large waves produced by earthquakes are called:
- A) tsunamis
B) subsidences
C) seiches
D) liquifactions
30. In geology, the term deformation means
- A) breaking a rock into smaller pieces
B) changing the chemical or mineral content of a rock
C) a change of color of a rock unit
D) any change in the volume and/or shape of a rock body
25. Di antara gelombang seismik yang terhasil daripada gempa bumi, yang mana satukah yang bergerak paling pantas?
- A) gelombang panjang
B) gelombang permukaan
C) gelombang S
D) gelombang P
26. Gelombang berikut manakah yang gelombang mampatan?
- A) gelombang P
B) gelombang permukaan
C) gelombang S
D) gelombang panjang
27. Di mana kebanyakan gempa bumi berlaku?
- A) Pada atau dekat sempadan keping
B) Di antara 70 hingga 300 km di bawah permukaan
C) Melebihi 300 km di bawah permukaan
D) Jauh daripada sempadan keping
28. Skala keamatan Mercalli mengukur gempa bumi berdasarkan kepada
- A) amplitud gelombang seismik
B) kerosakan akibat gempa bumi
C) magnitud
D) kedalaman di bawah permukaan
29. Gelombang gergasi yang terhasil daripada gempa bumi dipanggil:
- A) tsunami
B) benam
C) olakan
D) pencairan
30. Istilah canggaan di dalam geologi dimaksudkan
- A) pemecahan batuan kepada saiz yang lebih kecil
B) perubahan kandungan kimia atau mineral di dalam batuan
C) perubahan warna pada batuan
D) sebarang perubahan pada isipadu atau/dan bentuk batuan

31. Strain is:
- the pressure placed on a rock by gravity
 - the amount of force acting on a rock unit
 - a change in volume and/or shape of a rock body caused by stress
 - Only that portion of stress that compresses a rock
32. Sites where rock is exposed at the surface are called:
- outcrops
 - strikes
 - dips
 - structures
33. Tensional stress is a differential stress that
- tends to pull rocks apart
 - is caused by the load of overlying rocks
 - only acts on rock deep in the Earth
 - tends to compress rocks
34. Most folds are a result of what kind of stress?
- Brittle
 - Tensional
 - Shear
 - Compressional
35. Which type of structure is a fold with the oldest rock unit exposed in the center?
- Syncline
 - Anticline
 - Basin
 - Overtured fold
36. Which term describes a fold with a dipping axis
- Plunging
 - Anticlinal
 - Asymmetrical
 - Symmetrical
31. Terikan ialah:
- tekanan pada batuan oleh graviti
 - kadar daya bertindak di atas batuan
 - perubahan isipadu dan/atau bentuk batuan disebabkan oleh tegasan
 - sebahagian tegasan yang memampatkan batuan
32. Tapak di mana batuan terdedah di permukaan dikenali:
- singkapan
 - jurus
 - sudut miring
 - struktur
33. Tegasan tegangan ialah tegasan bezaan yang
- cenderung membuat batuan terpisah
 - disebabkan oleh beban batuan dari atas
 - bertindak hanya ke atas batuan yang terletak jauh di dalam bumi
 - memampatkan batuan
34. Kebanyakan lipatan terhasil daripada tegasan?
- Rapuh
 - Tegangan
 - Ricih
 - Mampatan
35. Struktur lipatan apakah yang unit batumannya paling tua ditengahnya?
- Sinklin
 - Antiklin
 - Lembangan
 - Lipatan terbalik
36. Istilah berikut manakah yang memerihalkan paksi lipatan yang condong?
- Menjunam
 - Antklin
 - Tak bersimetri
 - Bersimetri

37. A broad, nearly circular downwarp with the youngest rock units exposed in the center is called:
- a basin
 - a dome
 - a plunge
 - an anticline
38. A fault in which the hanging wall moves downward relative to the footwall is called:
- thrust
 - reverse
 - normal
39. What is discharge?
- a stream's cross-sectional area multiplied by its velocity
 - the volume of a stream divided by its cross-sectional area
 - the width of a stream times its depth
 - the amount of water flowing past a certain point in a given amount of time
40. Which of these best describes a delta?
- a triangular-shaped deposit
 - a sweeping bend in a river
 - a deposit that forms where a river meets an ocean or lake
 - a cone or fan-shaped deposit formed in mountains regions
41. When do floods occur?
- when a stream's discharge exceeds the capacity of its channel
 - only during the spring
 - when a stream is diverted by the headward erosion of another stream
 - when the artificial levees are overrun
 - when a stream channel is altered to speed the flow of water
37. Sesuatu yang besar, bulat di mana unit batuan ditengahnya adalah paling muda dipanggil
- lembangan
 - dom
 - junam
 - antiklin
38. Sesar yang tembok gantung bergerak ke bawah nisbi kepada tembok kaki dipanggil:
- "thrust"
 - songsang
 - normal
39. Apa itu luahan?
- luas keratan anak sungai didarab dengan kelajuan
 - isipadu anak sungai dibahagi dengan luas keratan rentas
 - lebar anak sungai didarab dengan kedalaman
 - kadar air yang mengalir sesuatu titik pada masa tertentu
40. Pernyataan berikut manakah paling sesuai memperihalkan tentang delta?
- mendapan berbentuk segitiga
 - lekok pada sebuah sungai
 - mendapan yang membentuk apabila sungai bertemu
 - mendapan berbentuk kon atau kipas yang terjadi di kawasan pergunungan
41. Bila banjir berlaku?
- apabila luahan anak sungai melebihi muatan alur
 - hanya semasa musim bunga
 - apabila anak sungai terlencong oleh anak sungai yang lain
 - apabila empangan buatan manusia dilimpahi air
 - apabila alur anak sungai bergerak melebihi pengaliran air

42. Two different drainage basins are separated from each other by an imaginary line called:
- a gully
 - a floodplain
 - a divide
 - a trellis
 - a terrace
43. Porphyritic texture forms from
- initial rapid cooling then slow cooling of magma
 - initial slow cooling then rapid cooling of magma
 - extremely rapid cooling of magma
 - escape of gas bubbles during cooling of lava
44. During crystallization of a basaltic magma _____ is the first mineral to crystallize.
- olivine
 - pyroxene
 - plagioclase
 - quartz
45. How does water influence the formation of magma?
- Rocks with higher water content melt at higher temperatures
 - Rocks with higher water content melt at lower temperatures
 - Rocks with higher water content produce basaltic magma
 - Rocks with higher water content produce rhyolitic magma
46. According to theory, if fractional crystallization occurs (e.g. by early-formed crystals settling to the bottom of the magma chamber)
- the remaining magma becomes more mafic-rich
 - the remaining magma does not change in composition
 - the remaining magma becomes more rich in silica
 - the magma cools faster
42. Dua lembangan saliran yang berbeza dipisahkan daripada satu sama lain oleh satu garisan maya dikenali:
- gaung
 - limpahan banjir
 - pembahagi
 - trellis
 - teres
43. Tekstur porfiri terbentuk daripada
- pemejalan pantas pada permukaan
 - pemejalan perlahan pada awalnya diikuti pemejalan pantas magma
 - pemejalan tersangat pantas magma
 - pembebasan gelembung gas semasa penyejukan lava
44. Semasa pemejalan magma basalt _____ adalah mineral pertama yang menghablur.
- olivin
 - piroksen
 - plagioklas
 - kuarza
45. Bagaimana air mempengaruhi pembentukan magma?
- Batuan yang mengandungi banyak air lebur pada suhu yang lebih tinggi
 - Batuan yang mengandungi banyak air lebur pada suhu yang lebih rendah
 - Batuan yang mengandungi banyak air menghasilkan magma basalt
 - Batuan yang mengandungi banyak air menghasilkan magma riolitik
46. Menurut teori, jika penghabluran berperingkat berlaku, yakni apabila hablur yang terjadi awal mengendap ke bawah kebek magma
- magma yang terbaki menjadi kaya dengan magnesium-ferum
 - magma yang terbaki tidak berubah komposisinya
 - magma yang terbaki akan jadi lebih kaya dengan silika
 - magma menyejuk dengan lebih cepat

47. A very large igneous intrusion, such as the one that forms the core of the Sierra-Nevada mountain range, is called a:
- A) sill
B) dike
C) stock
D) batholith
48. Obsidian, or volcanic glass forms by
- A) lava cools so fast minerals can't crystallize
B) lava cools so fast minerals are very fine-grained
C) rock is shattered during an eruption
D) volcanic mudflow deposition
49. Extrusive igneous rocks have smaller crystals than intrusive igneous rocks because _____.
- A) intrusive igneous rocks cool slower than extrusive rocks
B) extrusive igneous rocks cool slower than intrusive rocks
C) intrusive igneous rocks melt slower than extrusive rocks
D) extrusive igneous rocks melt slower than intrusive rocks
50. Most common rock-forming minerals are _____.
- A) carbonates
B) oxides
C) silicates
D) sulfides
51. What type of rocks form from the solidification of molten rock?
- A) Igneous
B) Mineralogic
C) Sedimentary
D) Metamorphic
52. What types of rocks form from pre-existing rocks that are subjected to high temperature and pressure?
- A) Igneous
B) Mineralogic
C) Sedimentary
D) Metamorphic
47. *Rejahan igneus yang sangat besar seperti yang menjadi teras di pergunungan Sierra-Nevada dipanggil:*
- A) *sil*
B) *daik*
C) *stok*
D) *batolitos*
48. *Obsidian atau kaca gunung berapi terhasil*
- A) *apabila lava memejal dengan pantas hinggalakan mineral tak sempat menghablur*
B) *lava menyejuk pantas jadi mineral menjadi sangat halus*
C) *apabila batuan retak semasa letupan*
D) *pemendakan aliran lumpur gunung berapi*
49. *Batuan igneus jenis ekstrusif mempunyai hablur yang lebih halus daripada batuan igneus jenis intrusif kerana _____.*
- A) *batuan intrusif menyejuk lebih perlahan daripada batuan igneus jenis ekstrusif*
B) *batuan ekstrusif menyejuk lebih perlahan daripada batuan intrusif*
C) *batuan intrusif melebur lebih perlahan daripada batuan ekstrusif*
D) *batuan ekstrusif melebur lebih perlahan daripada batuan intrusif*
50. *Kebanyakan mineral pembentukan batuan adalah _____.*
- A) *karbonat*
B) *oksida*
C) *silikat*
D) *sulfide*
51. *Apakah jenis batuan yang terbentuk daripada pemejalan leburan batuan?*
- A) *Igneus*
B) *Mineralogi*
C) *Mendak*
D) *Metamorf*
52. *Jenis batuan apakah yang terbentuk apabila batuan yang wujud sebelumnya terdedah kepada suhu dan tekanan yang tinggi?*
- A) *Igneus*
B) *Mineralogi*
C) *Mendak*
D) *Metamorf*

53. A basalt is an example of a(n) _____ rock.
- A) igneous
B) mineralogic
C) sedimentary
D) metamorphic
54. Which best describes basalt?
- A) A foliated metamorphic rock
B) A non-foliated metamorphic rock
C) A coarse-grained light colored igneous rock
D) A fine-grained dark colored igneous rock
55. Clastic sediments form from _____.
- A) rapid cooling of molten sediments
B) physically deposited particles of sediment
C) precipitation of sediments from sea water
D) accumulation of calcium carbonate shells
56. Limestone, a rock that forms from the shelly remains of organisms, is an example of a(n) _____.
- A) extrusive igneous rock
B) intrusive igneous rock
C) clastic desimentary rock
D) chemical sedimentary rock
57. An igneous rock that is coarse-grained and contains abundant quartz is _____.
- A) granite
B) rhyolite
C) basalt
D) gabbro
58. Which of the following properties is diagnostic of a sedimentary rock?
- A) Layering
B) Foliation
C) Glassy texture
D) Orogeny
53. Batuan basalt adalah contoh batuan jenis _____.
- A) igneus
B) mineralogi
C) mendak
D) metamorf
54. Pernyataan berikut manakah yang memperihalkan tentang batuan basalt?
- A) Batuan metamorf terfoliat
B) Batuan metamorf tak terfoliat
C) Batuan igneus berwarna cerah berbutiran kasar
D) Batuan igneus berwarna gelap berbutiran halus
55. Sedimen klastik terbentuk daripada _____.
- A) penyejukan pantas sedimen yang cair
B) pemendapan zarah-zarah secara fizikal
C) pemendakan sedimen daripada air laut
D) timbunan cengkerang kalsium karbonat
56. Batu kapur yang terdiri daripada cengkerang organisma adalah contoh _____.
- A) batuan igneus ekstrusif
B) batuan igneus intrusif
C) batuan mendak klastik
D) batuan mendak kimia
57. Batuan igneus yang butirannya kasar dan mengandungi kuarza yang banyak ialah _____.
- A) granit
B) riolit
C) basalt
D) gabbro
58. Sifat berikut manakah yang diagnostik batuan mendak?
- A) Berlapis
B) Berfoliasi
C) Tekstur berkaca
D) Orogeni

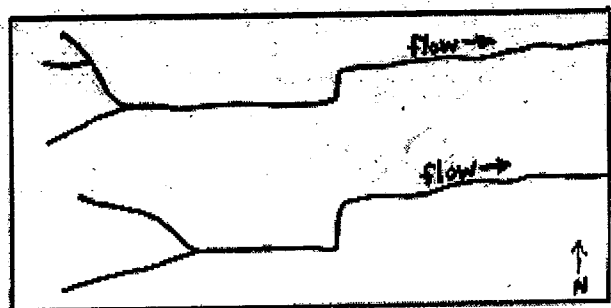
59. Which soil horizon forms from accumulation of material that was removed from surface materials by leaching?
- A) A horizon
B) B horizon
C) C horizon
D) D horizon
60. Dark colouring in soils commonly results from the presence of
- A) iron oxides
B) hematite
C) calcite nodules
D) organic matter
61. A horizons are formed by
- A) deposition of material brought in from O horizons
B) leaching and transport of materials away from this zone
C) saturating the soil with water
D) extensive weathering primarily by
62. Feldspars weather primarily by
- A) hydrolysis
B) oxidation
C) dissolution
D) exfoliation
63. In which of the following sedimentary environments would you least expect to find gravel?
- A) River channel
B) Glacial
C) Aeolian dune
D) Beach
64. Clastic sedimentary rocks are classified based on
- A) mineral composition
B) texture
C) bulk composition
D) sorting
59. Lapisan tanah berikut manakah yang terbentuk daripada timbunan bahan yang ditanggalkan daripada bahan permukaan oleh larutlesap?
- A) Lapisan A
B) Lapisan B
C) Lapisan C
D) Lapisan D
60. Warna gelap pada daripada tanah lazimnya terhasil
- A) ferum oksida
B) hematite
C) butiran kalsit
D) bahan organan
61. Lapisan A terjadi melalui
- A) pemendapan bahan yang terangkut dari lapisan O
B) pelarutlesapan dan pengangkutan bahan dari lapisan A
C) penepuan tanah dengan air
D) luluhawa dan penguraian batuan
62. Feldspar terluluhawa terutama melalui
- A) hidrolisis
B) pengoksidaan
C) pelarutan
D) pengelupasan
63. Dalam environmen mendak berikut manakah batu kelikir jarang ditemui?
- A) Lurah sungai
B) Glasier
C) Gumuk angin
D) Pantai
64. Batuan mendak klastik dikelaskan berdasarkan kepada
- A) komposisi mineral
B) tekstur
C) komposisi pukal
D) sisihan

65. Refer to the map below. Offset of the streams shows that there is a fault in the subsurface. What type of a fault is it?

- A) Right-lateral
- B) Left-lateral
- C) Normal
- D) Reverse

65. Rujuk kepada rajah berikut. Keadaan tak selanjar anak sungai menandakan wujud sesar di subpermukaan. Jenis apakah sesar itu?

- A) Gerak ke kanan
- B) Gerak ke kiri
- C) Normal
- D) Songsang

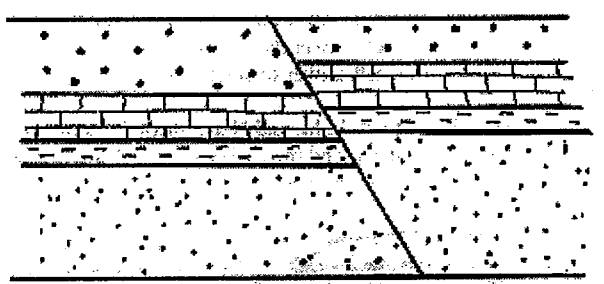


66. Refer to the cross-section below. What type of fault is depicted?

- A) Right-lateral
- B) Left-lateral
- C) Normal
- D) Reverse

66. Rujuk keratan rentas berikut. Jenis sesar apakah yang terpapar?

- A) Gerak ke kanan
- B) Gerak ke kiri
- C) Normal
- D) Songsang

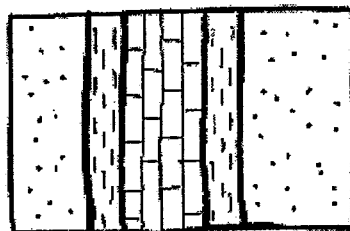


67. Refer to the map below. The limestone is the oldest rock unit, the shale is next oldest, and the sandstone is youngest. What type of fold is depicted?

- A) Anticline
- B) Syncline
- C) Basin
- D) Dome

67. Rujuk peta berikut. Batu kapur adalah lapisan batuan paling tua, syel lapisan tertua kedua dan batu pasir adalah lapisan paling muda. Jenis lipatan apakah yang terpapar?

- A) Antklin
- B) Sinklin
- C) Limbangan
- D) Dom



Lime - stone

Shale

Sand - stone

(60 marks)

PART B

BAHAGIAN B

1. Write short notes on the following items:

- (a) Porosity
- (b) Permeability
- (c) Aquifer
- (d) Aquitard
- (e) Uniaxial compressive strength
- (f) Texture
- (g) Mohr hardness
- (h) Unconformity
- (i) Grouting
- (j) Rock bolting

(10 marks)

1. *Tulis nota ringkas mengenai perkara berikut:*

- (a) *Keliangan*
- (b) *Kebilehtelapan*
- (c) *Akuifer*
- (d) *Akuitard*
- (e) *Kekuatan mampatan ekapaksi*
- (f) *Tekstur*
- (g) *Kekerasan mohr*
- (h) *Ketakselarasan*
- (i) *Grouting*
- (j) *Pemboltan batuan*

(10 markah)

2. Igneous rocks formed in several ways.

- (a) Describe how the igneous rock formed
- (b) Discuss what is meant by Bowen Reaction Series?
- (c) Sketch the igneous rock classification as used preferably by geologist and engineers.

(10 marks)

2. *Batuan igneus terjadi pelbagai cara.*

- (a) *Perihalkan bagaimana batuan igneus terbentuk?*
- (b) *Bincang apa yang dikatakan Siri Tindakbalas Bowen?*
- (c) *Lakarkan sistem pengelasan batuan igneus yang digunakan oleh ahli geologi dan jurutera.*

(10 markah)

3. (a) Sketch the rock cycle, names all the processes and products involved.
(b) Sketch the hydrologic cycle.
(c) Discuss the importance of each of them.

(10 marks)

3. (a) *Lakarkan kitar batuan, nyatakan yang mana produk, yang mana proses.*
(b) *Lakarkan kitar hidrologi.*
(c) *Huraikan kepentingan kitar batuan dan kitar hidrologi.*

(10 markah)

4. Gua Tempurung failed as a result of soil and rock failures. With sketches, discuss the various factors that contributed to the failure of the slope, including the geological and engineering parameters.

(10 marks)

4. *Gua Tempurung gagal hasil daripada kegagalan tanah dan batuan. Dengan menggunakan lakaran, huraikan faktor-faktor yang menyumbang ke arah kegagalan cerun tersebut termasuk parameter-parameter geologi dan kejuruteraan.*

(10 markah)

5. Site investigation is an important early phase of engineering works. Suggest reasons why do you need to carry out the site investigations and discuss what sort of informations do you want to gather prior and during the site investigation phase.

(10 marks)

5. *Kajian tapak adalah fasa awal yang penting di dalam kerja-kerja kejuruteraan. Nyatakan sebab-sebab kenapa anda perlu menjalankan kajian tapak dan maklumat apakah yang anda mahu kumpulkan sebelum dan semasa fasa kajian tapak.*

(10 markah)

6. As budding engineers, you are required to study geology. What is geology? Why do you think it is important to study geology? How does it help you directly and indirectly in shaping your career as engineers?

(10 marks)

6. *Sebagai bakal jurutera, anda diwajibkan mempelajari subjek geologi. Apa itu geologi? Kenapa anda fikir adalah penting untuk belajar geologi? Bagaimana ia membantu secara langsung atau tidak langsung dalam membentuk kerjaya anda sebagai jurutera?*

(10 markah)