

## DU MPhil PhD in Geology

Topic:- GEO MPHIL S2

1) Why do conjugate faults show opposite senses of slip?

Select the correct explanation from below:

[Question ID = 2153]

1. Orientation of stress axes ( $\sigma_1$ ,  $\sigma_2$ , and  $\sigma_3$ ) are opposite for the two conjugate fault planes

[Option ID = 8606]

2.  $\sigma_2$  becomes vertical for one of the two conjugate planes

[Option ID = 8607]

3. both the fault planes are oriented symmetrically with respect to  $\sigma_1$ , but in opposite sense

[Option ID = 8608]

4.  $\sigma_1$  and  $\sigma_2$  axes swap their position after some amount of deformation

[Option ID = 8609]

Correct Answer :-

- both the fault planes are oriented symmetrically with respect to  $\sigma_1$ , but in opposite sense

[Option ID = 8608]

2) In simple shear, the angle between the longest ( $\lambda_1$ ) axis of the finite strain ellipsoid and the shear direction ( $\theta$ ) varies with the amount of shear strain ( $\gamma$ ) according to which of the following relationships?

[Question ID = 2154]

1.  $\theta$  increases as  $\gamma$  increases

[Option ID = 8610]

2.  $\theta$  decreases as  $\gamma$  increases

[Option ID = 8611]

3.  $\theta$  remains constant as  $\gamma$  increases

[Option ID = 8612]

4. these two parameters have no predictable relationship

[Option ID = 8613]

Correct Answer :-

- $\theta$  decreases as  $\gamma$  increases

[Option ID = 8611]

3) In a multilayered rock, the viscosity ratio of the competent and incompetent layers ( $\mu_1/\mu_2$ ) is high and the packing distance between layers ( $n$ ) is low. What is the most likely structure that will develop in such a system under layer-parallel shortening?

[Question ID = 2155]

1. Kink fold

[Option ID = 8614]

2. Cuspate-lobate fold

[Option ID = 8615]

3. Ptygmatic fold

[Option ID = 8616]

4. no folding - only homogeneous thickening of layers

[Option ID = 8617]

Correct Answer :-

- Kink fold

[Option ID = 8614]

4) Brittle deformation of rocks is favoured at a shallow depth, whereas ductile flow takes place at greater depth because

[Question ID = 2156]

1. brittle deformation of rocks leads to increase in volume [Option ID = 8618]

2. ductile deformation is favoured only in rocks with smaller grain size [Option ID = 8619]

3. ductile deformation can take place only in presence of a fluid phase [Option ID = 8620]

4. brittle deformation can occur only at high temperature [Option ID = 8621]

**Correct Answer :-**

- brittle deformation of rocks leads to increase in volume [Option ID = 8618]

5) Which of the following shows a correct sequence of recrystallization mechanism in quartz with increasing temperature?

**[Question ID = 2157]**

1. Subgrain Rotation - Bulging - Grain Boundary Migration

[Option ID = 8622]

2. Bulging - Grain Boundary Migration - Subgrain Rotation

[Option ID = 8623]

3. Bulging - Subgrain Rotation - Grain Boundary Migration

[Option ID = 8624]

4. None of these

[Option ID = 8625]

**Correct Answer :-**

- Bulging - Subgrain Rotation - Grain Boundary Migration

[Option ID = 8624]

6) Trapezoid shaped boudins are characteristically found in

**[Question ID = 2158]**

1. extension fracture boudinage [Option ID = 8626]

2. symmetric shear fracture boudinage [Option ID = 8627]

3. asymmetric shear fracture boudinage [Option ID = 8628]

4. post-boudinage deformation [Option ID = 8629]

**Correct Answer :-**

- symmetric shear fracture boudinage [Option ID = 8627]

7) If, in a folded layered sequence, thinner layers show smaller folds and thicker layers show larger folds, the fold structure will be called:

**[Question ID = 2159]**

1. disharmonic fold [Option ID = 8630]

2. arrowhead fold [Option ID = 8631]

3. polyclinal fold [Option ID = 8632]

4. fan fold [Option ID = 8633]

**Correct Answer :-**

- disharmonic fold [Option ID = 8630]

8) Geostrophic currents

**[Question ID = 2160]**

1. flow inside the mantle [Option ID = 8634]

2. are controlled by a balance between pressure gradient force and Coriolis deflection [Option ID = 8635]

3. are controlled by ocean's tropic levels [Option ID = 8636]

4. generated due to tidal action of moon [Option ID = 8637]

**Correct Answer :-**

- are controlled by a balance between pressure gradient force and Coriolis deflection [Option ID = 8635]

9) Porosity of a formation is summation of:

**[Question ID = 2161]**

1. Hydraulic conductivity and Transmissivity [Option ID = 8638]

2. Specific storage and Specific retention [Option ID = 8639]

3. Specific retention and Specific yield [Option ID = 8640]

4. Hydraulic conductivity & Transmissivity [Option ID = 8641]

**Correct Answer :-**

- Specific retention and Specific yield [Option ID = 8640]

10) Conodonts are useful microfossils in the biostratigraphic subdivision of

**[Question ID = 2162]**

1. Archean [Option ID = 8642]

2. Cenozoic [Option ID = 8643]

3. Cretaceous [Option ID = 8644]

4. Paleozoic [Option ID = 8645]

**Correct Answer :-**

- Paleozoic [Option ID = 8645]



11)  $\delta^{18}\text{O}$  of Mixed layer planktic foraminiferal test formed during a glacial period would be

[Question ID = 2163]

1. Higher compared to that formed during interglacial period

[Option ID = 8646]

2. Equal to that of formed during interglacial period

[Option ID = 8647]

3. Lower compared to that formed during interglacial period

[Option ID = 8648]

4. None of these

[Option ID = 8649]

Correct Answer :-

• Higher compared to that formed during interglacial period

[Option ID = 8646]

12) Why was Paleomagnetism so important in discovering plate tectonics?

[Question ID = 2164]

1. it illustrated the location of the North Pole [Option ID = 8650]

2. It illustrated sea floor spreading [Option ID = 8651]

3. it allowed measurement of mountain building rates [Option ID = 8652]

4. It allowed the depth of the oceans to be measured [Option ID = 8653]

Correct Answer :-

• It illustrated sea floor spreading [Option ID = 8651]

13) A polar wandering curve:

[Question ID = 2165]

1. shows that the magnetic poles wandered relative to fixed continents [Option ID = 8654]

2. shows that the rotational poles wandered to fixed continents [Option ID = 8655]

3. shows that the continents wandered relative to generally-fixed pole positions [Option ID = 8656]

4. is a graph of the Mercalli Index [Option ID = 8657]

Correct Answer :-

• shows that the continents wandered relative to generally-fixed pole positions [Option ID = 8656]

14) The 'Lehmann discontinuity' in the Earth is identified by

[Question ID = 2166]

1. 5-6% decrease in P and S wave velocity [Option ID = 8658]

2. 3-4% increase in P and S wave velocity [Option ID = 8659]

3. 5% decrease in density [Option ID = 8660]

4. 5% increase in S wave velocity [Option ID = 8661]

Correct Answer :-

• 3-4% increase in P and S wave velocity [Option ID = 8659]

15) Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R

Assertion A : Assemblage zones are not good for intercontinental correlation.

Reason R : They are very much environmentally controlled.

In light of the above statements, choose the correct answer from the options given below

[Question ID = 2167]

1. R explains A [Option ID = 8662]

2. R does not explain A [Option ID = 8663]

3. A and R are false [Option ID = 8664]

4. R is false [Option ID = 8665]

Correct Answer :-

• R does not explain A [Option ID = 8663]

16) In steady state/equilibrium groundwater flow situation, the water table head during pumping:

[Question ID = 2168]

1. Does not change with time [Option ID = 8666]

2. Changes with time [Option ID = 8667]

3. Changes without time [Option ID = 8668]

4. Remains constant [Option ID = 8669]

Correct Answer :-

• Does not change with time [Option ID = 8666]

17) In unconfined aquifer Storage coefficient is approximately equal to:

[Question ID = 2169]

1. Conductivity [Option ID = 8670]
2. Intrinsic permeability [Option ID = 8671]
3. Specific retention [Option ID = 8672]
4. Specific yield [Option ID = 8673]

Correct Answer :-

- Specific yield [Option ID = 8673]

18) Preservation of fossils represent

[Question ID = 2170]

1. Stagnation deposits [Option ID = 8674]
2. Ostracod deposits [Option ID = 8675]
3. Concentration deposits [Option ID = 8676]
4. Conservation traps [Option ID = 8677]

Correct Answer :-

- Conservation traps [Option ID = 8677]

19) Which of this typically represents elastic scattering?

[Question ID = 2171]

1. Backscattered electrons [Option ID = 8678]
2. Auger electrons [Option ID = 8679]
3. Secondary electrons [Option ID = 8680]
4. Heating caused by electron beam-matter interaction [Option ID = 8681]

Correct Answer :-

- Backscattered electrons [Option ID = 8678]

20) In-phase diffraction of any electromagnetic wave by a regularly spaced grating is

[Question ID = 2172]

1. Reciprocal and normal [Option ID = 8682]
2. Only reciprocal [Option ID = 8683]
3. Only normal [Option ID = 8684]
4. Destructive interference [Option ID = 8685]

Correct Answer :-

- Reciprocal and normal [Option ID = 8682]

21) Relationship between energy of characteristic X-ray and atomic number is defined by

[Question ID = 2173]

1. Mosely's Law [Option ID = 8686]
2. Steno's Law [Option ID = 8687]
3. Beers Law [Option ID = 8688]
4. Harper's Index [Option ID = 8689]

Correct Answer :-

- Mosely's Law [Option ID = 8686]

22) This cannot provide the width of distribution around a central tendency of any dataset

[Question ID = 2174]

1. Arithmetic average [Option ID = 8690]
2. Standard deviation [Option ID = 8691]
3. Variance [Option ID = 8692]
4. Both Arithmetic average and variance [Option ID = 8693]

Correct Answer :-

- Arithmetic average [Option ID = 8690]

23) The value of "Hue" in the Munsell notations used for colour estimations refers to

[Question ID = 2175]

1. Red, yellow, blue colours  
[Option ID = 8694]
2. Lightness of the colours  
[Option ID = 8695]
3. Strength of the colours  
[Option ID = 8696]
4. All of these  
[Option ID = 8697]

Correct Answer :-



- Red, yellow, blue colours

[Option ID = 8694]

24) Which of the following in petrographic criteria suggests the advanced stage of pedogenic carbonate development?

[Question ID = 2176]

1. Few calcans and micrite [Option ID = 8698]
2. Nodules and calcans [Option ID = 8699]
3. Recrystallised nodules and microspsars [Option ID = 8700]
4. Micrite in the groundmass [Option ID = 8701]

Correct Answer :-

- Recrystallised nodules and microspsars [Option ID = 8700]

25) Removal of organic matter, carbonate, and free iron is required for ..... of the particles during grain size.

[Question ID = 2177]

1. Flocculation [Option ID = 8702]
2. Lithification [Option ID = 8703]
3. Dispersal [Option ID = 8704]
4. Cementation [Option ID = 8705]

Correct Answer :-

- Dispersal [Option ID = 8704]

26) Which of the following sediment size refers to fine clay fraction?

[Question ID = 2178]

1. < 2 mm  
[Option ID = 8706]
2. <0.2 mm  
[Option ID = 8707]
3. <0.2  $\mu\text{m}$   
[Option ID = 8708]
4. <2  $\mu\text{m}$   
[Option ID = 8709]

Correct Answer :-

- <0.2  $\mu\text{m}$

[Option ID = 8708]

27) If a marker bed cut by a fault does not show any displacement across the fault line, the most likely reason is:

[Question ID = 2179]

1. the marker bed is later than the fault [Option ID = 8710]
2. the fault is a reverse fault [Option ID = 8711]
3. the fault is a trace-slip fault [Option ID = 8712]
4. the fault slip is seismic in nature [Option ID = 8713]

Correct Answer :-

- the fault is a trace-slip fault [Option ID = 8712]

28) To assess dislocation density in a deformed crystal, which of the following instruments is best suited?

[Question ID = 2180]

1. Electron Probe Micro-Analyzer (EPMA) [Option ID = 8714]
2. Scanning Electron Microscope (SEM) [Option ID = 8715]
3. X-ray Fluorescence (XRF) [Option ID = 8716]
4. Transmission Electron Microscope (TEM) [Option ID = 8717]

Correct Answer :-

- Transmission Electron Microscope (TEM) [Option ID = 8717]

29) For dating a Precambrian porcellanite bed the most suitable geochronological method is

[Question ID = 2181]

1. C-14 method [Option ID = 8718]
2. Rb-Sr method [Option ID = 8719]
3. Sm-Nd method [Option ID = 8720]
4. U-Pb method [Option ID = 8721]

Correct Answer :-

- U-Pb method [Option ID = 8721]

30) Marine carbonate cement precipitated during glacial period will show

[Question ID = 2182]

1. High  $^{12}\text{C}$  signature [Option ID = 8722]
2. High  $^{13}\text{C}$  signature [Option ID = 8723]
3. High  $^{18}\text{O}$  signature [Option ID = 8724]
4. Low  $^{18}\text{O}$  signature [Option ID = 8725]

Correct Answer :-

- High  $^{18}\text{O}$  signature [Option ID = 8724]

**31) Wavelengths of electron beam in SEM is typically**  
[Question ID = 2183]

1. Few picometers to few tens of picometers [Option ID = 8726]
2. Few nanometers [Option ID = 8727]
3. Few hundreds of nanometers [Option ID = 8728]
4. Few tens of nanometers [Option ID = 8729]

Correct Answer :-

- Few picometers to few tens of picometers [Option ID = 8726]

**32) ZAF correction in EPMA refers to**

[Question ID = 2184]

1. Fluorescence, atomic number and absorption correction  
[Option ID = 8730]
2. Atomic number, thickness and fluorescence correction  
[Option ID = 8731]
3. Atomic number, absorption and frequency correction  
[Option ID = 8732]
4. None of these  
[Option ID = 8733]

Correct Answer :-

- Fluorescence, atomic number and absorption correction  
[Option ID = 8730]

**33) Relationship between the incident angle and the diffraction angle in an X-ray diffraction instrument is**  
[Question ID = 2185]

1. Incident angle is twice the diffraction angle [Option ID = 8734]
2. Both are equal [Option ID = 8735]
3. Incident angle is half of the diffraction angle [Option ID = 8736]
4. Diffraction angle is half of incident angle [Option ID = 8737]

Correct Answer :-

- Incident angle is half of the diffraction angle [Option ID = 8736]

**34) Halophytes are the plants that are indicative of**  
[Question ID = 2186]

1. Saline deposits [Option ID = 8738]
2. Fresh water deposits [Option ID = 8739]
3. Hydrocarbons [Option ID = 8740]
4. Non-metallic ores [Option ID = 8741]

Correct Answer :-

- Saline deposits [Option ID = 8738]

**35) Which of the following parameters is considered to determine the reflectance of a vegetation canopy?**

[Question ID = 2187]

1. Chlorophyll content  
[Option ID = 8742]
2. Azimuth angle  
[Option ID = 8743]
3. Solar Zenith angle  
[Option ID = 8744]
4. All of these  
[Option ID = 8745]

Correct Answer :-

- All of these  
[Option ID = 8745]



36) In a collisional orogen, the fold-thrust belts occur:

[Question ID = 2188]

1. along the margins of the orogen, where rocks undergo thrusting above a detachment [Option ID = 8746]
2. in the internal part where rocks have been squeezed up from great depth [Option ID = 8747]
3. in the grabens [Option ID = 8748]
4. in the horsts [Option ID = 8749]

Correct Answer :-

- along the margins of the orogen, where rocks undergo thrusting above a detachment [Option ID = 8746]

37) In XRD studies, persistence of the 14.4 Å peak at 550°C of the K saturated clays confirms the presence of

[Question ID = 2189]

1. Illite [Option ID = 8750]
2. Kaolinite [Option ID = 8751]
3. Smectite [Option ID = 8752]
4. Chlorite [Option ID = 8753]

Correct Answer :-

- Chlorite [Option ID = 8753]

38) A rapid and progressive increase of the smectite in the in the clay mineral assemblage indicates

[Question ID = 2190]

1. Change of the source rock with dominance of Feldspar [Option ID = 8754]
2. Change of the source rock with dominance of Mica [Option ID = 8755]
3. Change of the source rock with dominance of Quartz [Option ID = 8756]
4. Change of the source rock with dominance of Carbonates [Option ID = 8757]

Correct Answer :-

- Change of the source rock with dominance of Feldspar [Option ID = 8754]

39) The Middle-Miocene Climatic Optima at about 15 Ma is marked by

[Question ID = 2191]

1. Warming [Option ID = 8758]
2. Cooling [Option ID = 8759]
3. Extreme warming [Option ID = 8760]
4. Extreme cooling [Option ID = 8761]

Correct Answer :-

- Warming [Option ID = 8758]

40) The values of 50-60 for the chemical index of alteration (CIA) to assess weathering of silicate rock suggest

[Question ID = 2192]

1. Advanced stage of weathering [Option ID = 8762]
2. Incipient stage of weathering [Option ID = 8763]
3. Moderate stage of weathering [Option ID = 8764]
4. Very strong weathering [Option ID = 8765]

Correct Answer :-

- Incipient stage of weathering [Option ID = 8763]

41) Which of the following is true during deep burial?

[Question ID = 2193]

1. Possible addition and re-distribution of K [Option ID = 8766]
2. Possible addition and re-distribution of Ti [Option ID = 8767]
3. Possible addition and re-distribution of Al [Option ID = 8768]
4. Possible addition and re-distribution of Na [Option ID = 8769]

Correct Answer :-

- Possible addition and re-distribution of K [Option ID = 8766]

42) The meandering rivers are marked by

[Question ID = 2194]

1. Shallowest section at crossovers and the deepest section at bends [Option ID = 8770]
2. Deepest section at crossovers and the shallowest section at bends [Option ID = 8771]
3. Uniform depth at crossovers and at the bends [Option ID = 8772]
4. Deep sections both at crossovers and the bends [Option ID = 8773]

Correct Answer :-

- Shallowest section at crossovers and the deepest section at bends [Option ID = 8770]

43) Facies analysis of the gravel dominated braided rivers shows

[Question ID = 2195]

1. St as the main facies [Option ID = 8774]
2. Gm as the main facies [Option ID = 8775]

3. Ss as the main facies [Option ID = 8776]
4. Fm as the main facies [Option ID = 8777]

**Correct Answer :-**

- Gm as the main facies [Option ID = 8775]

**44) The meandering rivers are characterized by**

**[Question ID = 2196]**

1. Sinuosity >1.3 and bed load <11%  
[Option ID = 8778]
2. Sinuosity <1.3 and bed load >11%  
[Option ID = 8779]
3. Sinuosity >1.3 and bed load >11%  
[Option ID = 8780]
4. Sinuosity <1.3 and bed load <11%  
[Option ID = 8781]

**Correct Answer :-**

- Sinuosity >1.3 and bed load <11%  
[Option ID = 8778]

**45) In braided rivers, the width/depth ratio is ..... and the bed load is .....**

**[Question ID = 2197]**

1. Width/Depth ratio <40 and bed load <11%  
[Option ID = 8782]
2. Width/Depth ration >40 and bed load >11%  
[Option ID = 8783]
3. Width/Depth ratio <40 and bed load >11%  
[Option ID = 8784]
4. Width/Depth ratio > 40 and bed load <11%  
[Option ID = 8785]

**Correct Answer :-**

- Width/Depth ration >40 and bed load >11%  
[Option ID = 8783]

**46) The longitudinal/medial bars in braided rivers occur as**

**[Question ID = 2198]**

1. Bar deposits elongated transvers to the flow direction [Option ID = 8786]
2. Bar deposits elongated parallel to the flow directions [Option ID = 8787]
3. Bar deposits along the convex side of the of the banks [Option ID = 8788]
4. Bar deposits along the concave side of the banks [Option ID = 8789]

**Correct Answer :-**

- Bar deposits elongated parallel to the flow directions [Option ID = 8787]

**47) Which of the following geophysical method is most suitable for groundwater exploration?**

**[Question ID = 2199]**

1. Resistivity  
[Option ID = 8790]
2. Magnetic  
[Option ID = 8791]
3. Sonic  
[Option ID = 8792]
4. Gravity  
[Option ID = 8793]

**Correct Answer :-**

- Resistivity  
[Option ID = 8790]

**48) Theim's equation for steady state radial flow to a tubewell in confined aquifer can be used to estimate:**  
**[Question ID = 2200]**



1. Transmissivity only [Option ID = 8794]
2. Storativity only [Option ID = 8795]
3. Specific yield only [Option ID = 8796]
4. Both Transmissivity and Storativity [Option ID = 8797]

**Correct Answer :-**

- Transmissivity only [Option ID = 8794]

**49) The major ions considered for hydrochemical facies analysis using trilinear plot are**  
[Question ID = 2201]

1. Sodium, Potassium, Phosphorus, Magnesium, Chloride, Sulphate, Carbonate and Nitrate [Option ID = 8798]
2. Sodium, Potassium, Calcium, Magnesium, Chloride, Sulphate, Carbonate and Bicarbonate [Option ID = 8799]
3. Arsenic, Potassium, Calcium, Lead, Fluoride, Sulphate, Carbonate and Bicarbonate [Option ID = 8800]
4. Zinc, Mercury, Calcium, Magnesium, Aluminium, Sulphate, Carbonate and Bicarbonate [Option ID = 8801]

**Correct Answer :-**

- Sodium, Potassium, Calcium, Magnesium, Chloride, Sulphate, Carbonate and Bicarbonate [Option ID = 8799]

**50) Rainwater harvesting and artificial recharge to groundwater is generally done in**  
[Question ID = 2202]

1. Shallow groundwater level areas [Option ID = 8802]
2. In wetlands [Option ID = 8803]
3. In areas with deeper water levels, where water table is declining heavily [Option ID = 8804]
4. In areas along and close to water bodies [Option ID = 8805]

**Correct Answer :-**

- In areas with deeper water levels, where water table is declining heavily [Option ID = 8804]