# gg Gate 2015

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## General Aptitude (GA) Questions

1) Choose the appropriate word/phrase, out of the four options given below, to complete the following sentence: Apparent lifelessness _____ dormant life.

a) harbours b) leads to c) supports d) affects

2) Fill in the blank with the correct idiom/phrase. That boy from the town was a _____ in the sleepy village.

a) dog out of herd
b) sheep from the heap
c) fish out of water
d) bird from the flock

3) Choose the statement where the underlined word is used correctly.
a) When the teacher eludes to different authors, he is being elusive.
b) When the thief keeps eluding the police, he is being elusive.
c) Matters that are difficult to understand, identify or remember are allusive.
d) Mirages can be allusive, but a better way to express them is illusory.

4) Tanya is older than Eric. Cliff is older than Tanya. Eric is older than Cliff. If the first two statements are true, then the third statement is:
a) True
b) False
c) Uncertain
d) Data insufficient

5) Five teams have to compete in a league, with every team playing every other team exactly once, before going to the next round. How many matches will have to be held to complete the league round of matches?

a) 20 b) 10 c) 8 d) 5

6) Select the appropriate option in place of the underlined part of the sentence. Increased productivity necessary reflects greater efforts made by the employees.
a) Increase in productivity necessary
b) Increase productivity is necessary
c) Increase in productivity necessarily
d) No improvement required

7) Given below are two statements followed by two conclusions. Assuming these statements to be true, decide which one logically follows. **Statements:** I. No manager is a leader. II. All leaders are executives.
**Conclusions:** I. No manager is an executive. II. No executive is a manager.
a) Only conclusion I follows.
b) Only conclusion II follows.
c) Neither conclusion I nor II follows.
d) Both conclusions I and II follow.

8) In the given figure angle Q is a right angle, PS:QS = 3:1, RT:QT = 5:2 and PU:UR = 1:1. If area of triangle QTS is 20 $cm^2$, then the area of triangle PQR in $cm^2$ is

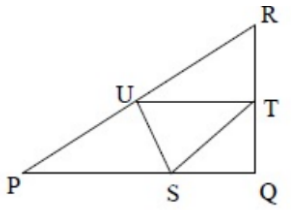


Fig. 1. Image for questions 8

a) 280 b) 140 c) 70 d) 35

9) Right triangle PQR is to be constructed in the xy-plane so that the right angle is at P and line PR is parallel to the x-axis. The x and y coordinates of P, Q, and R are to be integers that satisfy the inequalities: $-4 \leq x \leq 5$ and $6 \leq y \leq 16$. How many different triangles could be constructed with these properties?

a) 110
b) 1,100
c) 9,900
d) 10,000

10) A coin is tossed thrice. Let X be the event that head occurs in each of the first two tosses. Let Y be the event that a tail occurs on the third toss. Let Z be the event that two tails occur in three tosses. Based on the above information, which one of the following statements is TRUE?

a) X and Y are not independent
b) Y and Z are dependent
c) Y and Z are independent
d) X and Z are independent

## Part A: Geology and Geophysics

11) The shape of the earth is best described as

a) spheroid
b) prolate ellipsoid
c) ellipsoid
d) oblate spheroid

12) Which one amongst the following is the CORRECT attitude of a bed?

a) 221Â°, 95Â° b) N45Â°W, 40Â°SE c) 090Â°/ 20Â°W d) 089Â°, 75Â°S

13) Hawaiian Island chain is the result of
a) collision of two oceanic plates
b) intraplate hot spot activity
c) divergence of two oceanic plates
d) interplate hot spot activity

14) In which one of the following configurations the electrodes are uniformly spaced?
a) Schlumberger array
b) Pole-dipole array
c) Wenner array
d) Pole-pole array

15) In Triclinic crystal system, the three crystallographic axes $a, b, c$ are of
   a) equal lengths with angle between $b$ and $c$ as 90Â°
   b) equal lengths with angle between $a$ and $c$ such that $\angle ac \neq 90°$
   c) unequal lengths with angle between $a$ and $c$ such that $\angle ac \neq 90°$
   d) unequal lengths with angle between $b$ and $c$ as 90Â°
16) A landform that results from free fall of rocks is called

   a) talus slope  b) eskers  c) alluvial fan  d) debris flow

17) Which one of the following figures correctly depicts the geomagnetic declination (D) and inclination (I) angles?

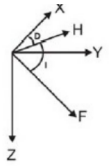


Fig. 2. Image for questions 17

a)

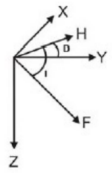


Fig. 3. Image for questions 17

b)

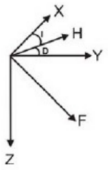


Fig. 4. Image for questions 17

c)

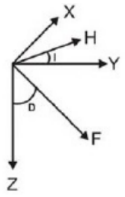


Fig. 5. Image for questions 17

d)

18) Which one of the following logging methods is NOT used to determine porosity?

   a) Sonic  b) SP  c) Neutron  d) Gamma-gamma

19) PcP and ScS phases are reflected from
   a) crust - mantle boundary
   b) core - mantle boundary
   c) inner core - outer core boundary
   d) lithosphere - asthenosphere boundary
20) Identify the CORRECT sequence of the electromagnetic waves in their increasing frequency
   a) radio wave, micro-wave, infrared, visible, ultra violet, X-ray
   b) radio wave, infrared, micro-wave, visible, ultra violet, X-ray
   c) micro-wave, radio wave, infrared, visible, X-ray, ultra violet
   d) infrared, visible, micro-wave, radio wave, X-ray, ultra violet
21) **(NAT)** Considering the Airy isostatic compensation for a mountain having elevation of 2.0 km above mean sea level at a point $P$, the thickness of its root below $P$ would be _____ km.

22) **(NAT)** The reflection coefficient at the interface separating sandstone ($V_p$ = 2000 m/s, $\rho$ = 1.5 g/cm$^3$) underlain by shale ($V_p$ = 2500 m/s, $\rho$ = 2.0 g/cm$^3$) is _____.

23) Gardner's formula relates the seismic P-wave velocity ($V_p$) to

a) density
b) porosity
c) permeability
d) lithology

24) Which one of the following sedimentary basins is related to extension?

a) foredeep
b) half-graben
c) piggyback
d) fore-arc

25) In a seismic section, paraconformity is marked by

a) onlap
b) downlap
c) erosional truncation
d) concordance

26) Match the names listed in Group I with the attributes listed in Group II.

| **Group I** | **Group II** |
|---|---|
| | 1. Aseismic |
| P. Carlsberg Ridge | 2. Subduction |
| Q. Ninetyeast Ridge | 3. Spreading |
| R. Pranhita-Godavari Basin | 4. Transform |
| S. Makran Coast | 5. Rift |

a) P–5; Q–3; R–1; S–4
b) P–3; Q–1; R–5; S–2
c) P–3; Q–4; R–1; S–2
d) P–1; Q–3; R–5; S–4

27) In India, bituminous coal occurs at

a) Panandhro
b) Palana
c) Neyveli
d) Jharia

28) On the Earth, all conditions being same, the time period of a simple pendulum will be maximum at the

a) Poles
b) Tropic of Cancer
c) Tropic of Capricorn
d) Equator

29) The two most abundant elements in the Earth are

a) oxygen and iron
b) iron and magnesium
c) oxygen and silicon
d) iron and silicon

30) The pair of curves that depicts the radioactive decay and growth of a parent-daughter pair is

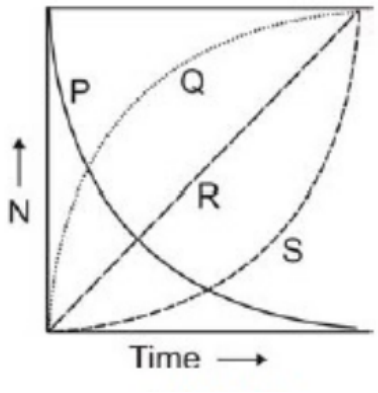


Fig. 6. Image for questions 30

a) P, Q
b) P, R
c) P, S
d) S, Q

31) **(NAT)** A drainage basin with an area of $2.0 \times 10^6$ $m^2$ receives continuous rainfall for 48 hours at a uniform rate of 3 mm/h. The volume of precipitation is _____ $m^3$ of water.

32) The main source of error in computing the orientation of planar features from drill cores is
a) rotation of the core during extraction
b) cylindrical shape of the core
c) non-vertical orientation of the drill axis
d) staining during drilling operations

33) Which combination of sorting and roundness of sand grains results in highest permeability?
a) well sorted, poorly rounded
b) well sorted, well rounded
c) poorly sorted, poorly rounded
d) poorly sorted, well rounded

34) Amongst the different gases in the atmosphere, which one of the following pairs DOES NOT contribute to heating of the atmosphere?

a) $CO_2$, $H_2O$
b) $N_2$, $O_2$
c) $H_2O$, $CH_4$
d) $H_2O$, $O_3$

35) The data of which one of the following active electromagnetic techniques can be used to correct static shift effect in magnetotelluric apparent resistivity data?

a) Slingram
b) Turam
c) VLF
d) TEM

36) Which one of the following statements describing aspects of partial melting behavior of a binary eutectic system is NOT TRUE?
a) Melting is complete at temperature just above the liquidus temperature.
b) Two solid phases and one liquid phase co-exist at eutectic temperature.
c) The lowest temperature at which partial melting occurs is independent of the chemical composition.
d) The composition of the first liquid to form depends on the composition of the sample.

37) Find the CORRECT statement amongst the following.
a) Delthyrium is a triangular cavity in cephalopod
b) Madreporite is a skeletal part of Brachiopoda
c) Pleuron is a part of thorax in Trilobite

d) Endocone is the jaw of an Ammonoid

38) Which one of the following statements is NOT true regarding REEs partitioning?

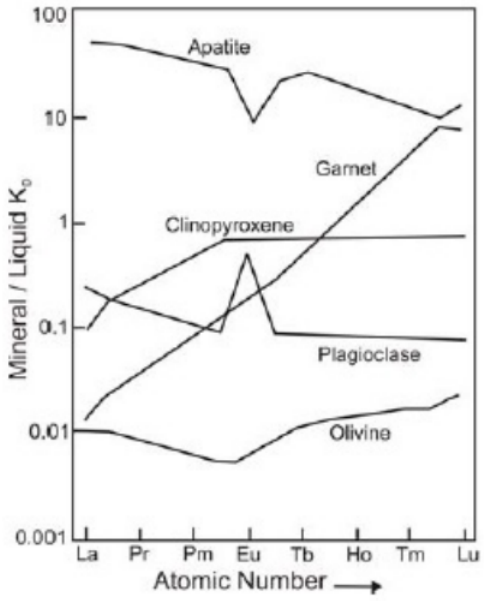


Fig. 7. Image for questions 38

a) REEs are compatible only in apatite.
b) Heavy REEs are compatible whereas Light REEs are incompatible in garnet.
c) REEs are incompatible only in apatite.
d) REEs are incompatible in olivine.

39) Which one of the following is NOT a set of polymorphous minerals?
a) calcite, aragonite, vaterite
b) quartz, coesite, tridymite
c) graphite, anthracite, diamond
d) kyanite, sillimanite, andalusite

40) Chemical analysis reveals that basalts contain much more aluminum ($Al_2O_3$ 15
a) very little olivine
b) higher proportion of pyroxene
c) feldspars as dominant mineral
d) no quartz

41) **(NAT)** A sandstone bed whose attitude is 090°, 30° is exposed on a flat surface. The true thickness of the bed is 100 m. The width of the outcrop of the sandstone bed along a N–S traverse on the ground is _____ m.

42) Assertion (a): The $^{18}O/^{16}O$ ratio in natural systems can be used as a thermometer. Reason (r): The fractionation of $^{18}O/^{16}O$ depends on temperature.
a) Both (a) and (r) are True and (r) is the correct reason for (a).
b) Both (a) and (r) are not True.
c) (a) is True but (r) is not True
d) Both (a) and (r) are True but (r) is not the correct reason for (a).

43) Match the boreholes in Group I with their features in Group II.

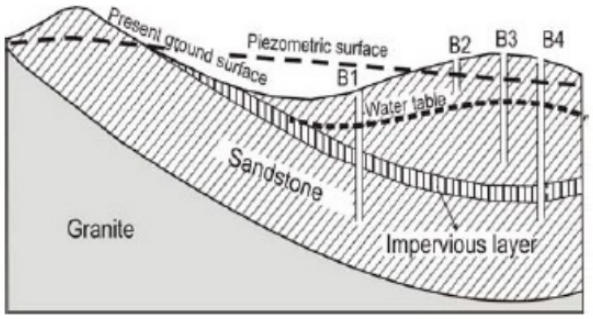


Fig. 8. Image for questions 43

| **Group I** | **Group II** |
|---|---|
| P. Borehole B1 | 1. Well in unconfined aquifer |
| Q. Borehole B2 | 2. Artesian well with water not flowing to surface |
| R. Borehole B3 | 3. Artesian well with water flowing to surface |
| S. Borehole B4 | 4. Dry well |

a) P–1; Q–3; R–2; S–4
b) P–2; Q–4; R–1; S–3
c) P–3; Q–4; R–1; S–2
d) P–3; Q–1; R–4; S–2

44) **(NAT)** If the total volume of water in the Earth's atmosphere is $1.29 \times 10^4$ km$^3$, and it were to uniformly cover the Earth's surface (area = $5.1 \times 10^8$ km$^2$), the height of the resulting water column would be _____ cm.

45) **(NAT)** Samples of copper ores are drawn from locations X1, X2 and X3. The values of %Cu at sampling locations are: X1 = 2.2%, X2 = 1.1%, X3 = 3.3%. Using inverse distance weighting, the estimated grade at point X is _____ %.

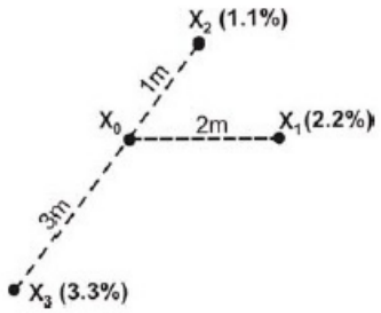


Fig. 9. Image for questions 45

46) Match the point group (HM symbol) in Group I with its corresponding general form in Group II.

| **Group I** | **Group II** |
|---|---|
| P. 62m | 1. Ditrigonal Dipyramid |
| Q. 3/m | 2. Tetragonal Scalenohedron |
| R. 422 | 3. Trigonal Dipyramid |
| S. 42m | 4. Tetragonal Trapezohedron |
| | 5. Hexagonal Dipyramid |

a) P–5; Q–1; R–2; S–4
b) P–1; Q–3; R–4; S–2
c) P–1; Q–3; R–2; S–5
d) P–3; Q–5; R–2; S–4

47) Identify the CORRECT pair of minerals both of which show optic axis figure and Becke line behavior.

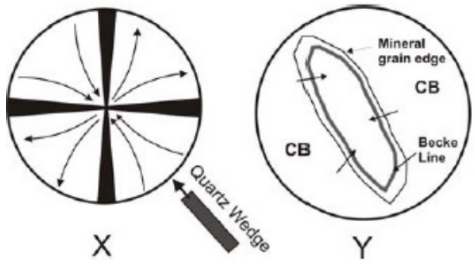


Fig. 10. Image for questions 47

a) Quartz, Stishovite
b) Cordierite, Chlorite
c) Apatite, Tourmaline
d) Nosean, Halite

48) **(NAT)** From a recovered core of total length 200 cm, the RQD (Rock Quality Designation) is

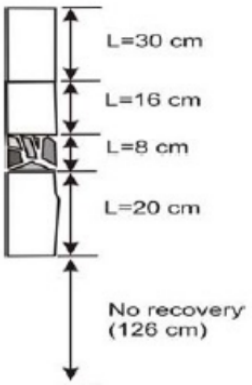


Fig. 11. Image for questions 48

_____%.

49) Interlimb angle and shape of a fold is best studied in a
a) section parallel to the plunge of the fold axis
b) section parallel to the axial plane of the fold
c) section parallel to dip of bedding in the fold
d) section whose pole is the fold axis

50) The thrust fault cross-section shows a hanging wall. Which combination is correct?

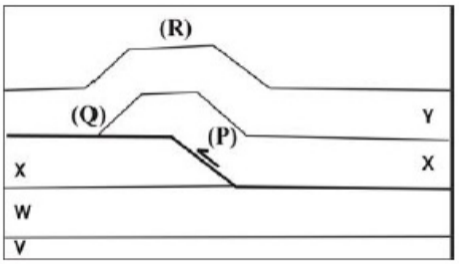


Fig. 12. Image for questions 50

a) Ramp (P), Flat (Q), Fault Bend Fold (R)
b) Ramp (P), Flat (Q), Fault Propagation Fold (R)
c) Flat (P), Ramp (Q), Fault Bend Fold (R)
d) Flat (P), Ramp (Q), Fault Propagation Fold (R)

51) Euler Poles defined for plate motions on a spherical earth are
a) parallel to associated transform faults
b) perpendicular to associated transform faults
c) not related to associated transform faults
d) oblique to associated transform faults

52) Which one of the following sedimentary structures CANNOT be identified in vertical sections?

a) Convolute lamination
b) Gutter cast
c) Dish structures
d) Skip marks

53) A predominantly siliciclastic Mesozoic stratigraphic unit in mainland Kutch containing Trigonia and abundant plant fossils including Ptillophyllum is

a) Baisakhi Formation
b) Chari Formation
c) Pachcham Formation
d) Umia Formation

54) Match the texture in Group I with its corresponding description in Group II.

| **Group I** | **Group II** |
|---|---|
| | 1. Triple point junction |
| | 2. Banding and crustification in open spaces |
| | 3. Protuberances of replacing mineral with replaced host |
| P. Cumulus texture | 4. Spindles or lamellae of one mineral in another |
| Q. Exsolution texture | 5. Aggregates of minerals with non-penetrative mineral boundaries |
| R. Caries texture | |
| S. Cockade texture | |

a) P–5; Q–4; R–3; S–2
b) P–4; Q–5; R–3; S–1
c) P–5; Q–4; R–2; S–3
d) P–4; Q–3; R–2; S–5

55) Choose the CORRECT statement regarding coal.
a) Sapropelic coal is a potential source rock of oil
b) Vitrinite reflectance value (Ro %) should be ¿1 for a lignite sample
c) H/C content of the vitrinite maceral groups is more than that of liptinite maceral groups
d) In Ranigunj field coal seams alternate with limestone beds

56) Match the stratigraphic units in Group I with the economic deposits in Group II.

| Group I | Group II |
|---|---|
| | 1. Mn |
| P. Bailadila Group | 2. Phosphorite |
| Q. Nallamalai Group | 3. BIF |
| R. Udaipur Group | 4. Pb-Zn |
| S. Sausar Group | 5. Pyrite |

a) P–3; Q–4; R–2; S–1
b) P–4; Q–2; R–3; S–5
c) P–2; Q–3; R–4; S–5
d) P–3; Q–4; R–1; S–2

57) Match the igneous bodies in Group I with the cratons where they occur in Group II.

| Group I | Group II |
|---|---|
| | 1. Singhbhum craton |
| P. Untala Granite | 2. Aravalli craton |
| Q. Dalma Volcanics | 3. Bastar craton |
| R. Chamundi Granite | 4. Dharwar craton |
| S. Bijli Rhyolite | 5. Bundelkhand craton |

a) P–2; Q–1; R–5; S–3
b) P–2; Q–1; R–4; S–3
c) P–3; Q–4; R–1; S–5
d) P–1; Q–3; R–1; S–5

58) The reflectance spectrum of solar energy by hydrous molecules in plant leaves is best represented in the wavelength range of
a) Near Infrared (0.7–1.3 Î¼m)
b) Short Infrared (1.3–3.0 Î¼m)
c) Mid Infrared (3–8 Î¼m)
d) Long Infrared (8–15 Î¼m)

59) Match the type of mantled porphyroclasts in Group I with the corresponding figure in Group II.


Fig. 13. Image for questions 59

a) P–3; Q–1; R–4; S–2
b) P–3; Q–1; R–2; S–4
c) P–1; Q–3; R–2; S–4
d) P–2; Q–4; R–1; S–3

60) Choose the CORRECT symmetry operations that can create all possible two-dimensional planar point groups.
a) translation, rotation, screw, glide
b) translation, reflection, rotation, glide
c) screw, reflection, rotation, glide
d) translation, reflection, screw, glide

61) In the folded and faulted sequence of beds given in the map, the fault F–F (dipping 30Â° NE) is which type of fault?

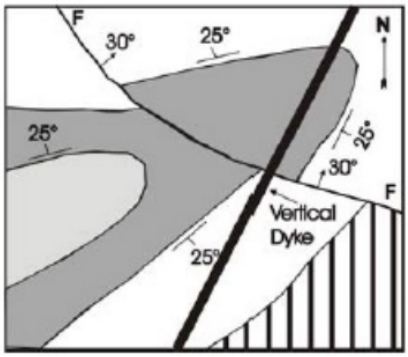


Fig. 14. Image for questions 61

a) sinistral strike-slip
b) reverse
c) normal
d) dextral strike-slip

62) Which one of the following sets of isotopic ratios contains ONLY those that change with time?
a) $^{87}Sr/^{86}Sr$, $^{143}Nd/^{144}Nd$, $^{207}Pb/^{206}Pb$, $^{147}Sm/^{144}Nd$
b) $^{88}Sr/^{86}Sr$, $^{145}Nd/^{144}Nd$, $^{238}U/^{204}Pb$, $^{207}Pb/^{204}Pb$
c) $^{84}Sr/^{86}Sr$, $^{143}Nd/^{144}Nd$, $^{208}Pb/^{204}Pb$, $^{85}Rb/^{87}Sr$
d) $^{145}Nd/^{144}Nd$, $^{86}Sr/^{84}Sr$, $^{147}Sm/^{144}Nd$, $^{208}Pb/^{86}Sr$

63) Sediments derived exclusively from the Deccan basalt are deposited on a high-energy beach and lithified under shallow burial conditions. The sedimentary rock formed would be a/an
a) arkose
b) greywacke
c) lithic arenite
d) quartz arenite

64) Choose the CORRECT mineral assemblages in mafic rocks that indicate eclogite facies metamorphism.
a) *orthopyroxene + plagioclase + garnet*
b) *glaucophane + omphacite + lawsonite + garnet*
c) *ugranditegarnet + omphacite + plagioclase*
d) *pyralspitegarnet + omphacite + kyanite*

65) The maximum velocity of the Indian Plate is observed in

a) Maldives
b) Bangalore
c) Delhi
d) Srinagar

## Part B: Geophysics

66) Which type of VES curve is obtained for a three-layered earth model consisting of wet shale (top layer), poorly water saturated sandstone (middle layer) and impermeable granite (bottom layer)?

a) K b) Q c) H d) A

67) In the estimation of magnetotelluric transfer function, the time-independent conservation of current at conductivity discontinuities will result in

a) phase rotation
b) static-shift
c) null tipper
d) equal bi-modal apparent resistivity values

68) In any given signal, removal of all periods shorter than Nyquist period is achieved by

a) high-pass filtering
b) band-pass filtering
c) low-pass filtering
d) band-reject filtering

69) The magnetic flux density $\mathbf{B}$ and the magnetic vector potential $\mathbf{A}$ are related by

a) $\mathbf{B} = \nabla \cdot \mathbf{A}$
b) $\mathbf{B} = \nabla \times \mathbf{A}$
c) $\mathbf{A} = \nabla \mathbf{B}$
d) $\mathbf{A} = \nabla \times \mathbf{B}$

70) The frequency range (in Hz) that defines dead-band in magnetotelluric source signal is

a) 0.1–10
b) 10–100
c) 100–1000
d) 1000–10000

71) **(NAT)** The maximum foldage obtained from a 48-channel common-depth-point (CDP) reflection survey with geophone and shot point spacing of 50 m and 100 m respectively is _____.

72) The deviation in the geographical locations of the magnetic poles from the geomagnetic poles of the Earth's magnetic field is due to

a) orientation of dipole axis
b) external magnetic field
c) non-dipole component
d) ionospheric currents

73) The analytic signal for the function $f(t) = \sin(\omega t)$ is

a) $-\cos(\omega t)$ b) $-\sin(\omega t)$ c) $e^{i\omega t}$ d) $-ie^{i\omega t}$

74) **(NAT)** The minimum frequency at which a signal comprising of 30 Hz, 50 Hz and 70 Hz should be sampled to avoid aliasing is _____ Hz.

75) Assertion (a): The Gutenberg-Richter frequency-magnitude relation of earthquakes globally suggests that subduction zones in general are characterized by lower b-values compared to mid-oceanic ridges. Reason (r): Earthquakes in subduction zones occur at deeper focal depths, whereas those along mid-oceanic ridges occur at shallow depths.

a) (a) is false but (r) is true
b) Both (a) and (r) are true; and (r) is correct reason for (a)
c) Both (a) and (r) are true; and (r) is not a reason for (a)

d) Both (a) and (r) are false

76) Deduce which one of the following statements is NOT correct from the given data on radioactive heat generation in Earth's layers:

| **Region** | **Mass** ($\times 10^{21}$ **kg**) | **Radioactive Heat Generation** ($\times 10^{8}$ **mWkg**$^{-1}$) |
|---|---|---|
| Upper continental crust | 8 | 96.40 |
| Lower continental crust | 8 | 40.00 |
| Oceanic crust | 7 | 18.60 |
| Mantle | 4080 | 0.26 |
| Core | 1880 | 0.00 |

a) Core does not contain any radioactive isotope
b) Lower continental crust is depleted in heat-producing elements compared to upper crust
c) Mantle produces the highest radiogenic heat
d) Upper continental crust produces the highest radiogenic heat

77) Which ONE of the following statements is CORRECT with regard to the application of reduction-to-pole (RTP) technique on magnetic anomaly maps?
a) RTP is efficient near the equator (below $\pm 20^{\circ}$ latitude)
b) RTP assumes mainly induced magnetization
c) RTP cannot be applied at higher latitudes (above $\pm 60^{\circ}$ latitude)
d) RTP eliminates remnant magnetization sources

78) After migration, an anticline observed on an unmigrated seismic section becomes

a) broader b) tighter c) unaltered d) flat

79) A clean, thick, hydrocarbon-bearing sandstone bed can be identified through a combination of
a) low SP and high resistivity
b) large SP and high resistivity
c) low transit time and high resistivity
d) large SP and low resistivity

80) **(NAT)** In a consolidated sandstone formation, the interval transit times of the formation, matrix, and fluid are 70 Î¼s, 55 Î¼s, and 190 Î¼s respectively. The porosity of the formation is _____.

81) Which one of the following statements is NOT CORRECT?
a) A well-conditioned matrix has a condition number close to 1
b) An ill-conditioned matrix has a large condition number
c) The inverse of a well-conditioned matrix can be computed accurately
d) A non-invertible matrix has a condition number close to 1

82) Match the type of inverse problem in Group I with its solution in Group II.

| **Group I** | **Group II** |
|---|---|
| | 1. $m = [G^T G + k^2 I]^{-1} G^T d$ |
| P. Overdetermined | 2. $m = (G^T G)^{-1} G^T d$ |
| Q. Underdetermined | 3. $m = G^T (G G^T)^{-1} d$ |
| R. Mixed determined | 4. $m = (G G^T)^{-1} G^T d$ |
| S. Even determined | 5. $m = G^{-1} d$ |

a) P–2; Q–4; R–1; S–5
b) P–2; Q–3; R–1; S–5
c) P–2; Q–1; R–3; S–4
d) P–3; Q–5; R–2; S–1

83) In frequency domain IP, which frequency range (in Hz) is used to measure apparent resistivity at DC and AC limits?

a) 0.01–0.1 b) 0.1–1 c) 0.1–10 d) 10–100

84) The expression for electrical potential $V$ at a distance $r$ from a subsurface point source of current in a homogeneous medium is

a) $V = \frac{\rho I}{2\pi r}$ b) $V = \frac{\rho I}{4\pi r}$ c) $V = \frac{2\rho I}{\pi r}$ d) $V = \frac{\rho r}{4\pi I}$

85) The Bouguer anomaly obtained after applying all necessary corrections is due to
a) topographic undulations
b) increase in crustal rock density with depth
c) lateral density variations
d) vertical density contrast across Moho

86) In a 3-D seismic survey, the bin size for the maximum frequency ($f_{max}$ = 80 Hz) at the target having a reflector dip of 15° and interval velocity of 3600 m/s is:
**(NAT)** _____

87) A spherical body with its centre located at a depth of 1040 m gives a symmetric residual gravity anomaly high with $\Delta g_{max}$ = 5.2 mGal. If the same anomaly were to be obtained over a 2-D horizontal cylinder, the depth to the centre of the horizontal cylinder (in m) is:
**(NAT)** _____

88) Seismic velocities from a 3-component broadband station yield $V_p$ = 7.0 km/s and $V_s$ = 3.87 km/s for the lower crust. The Poisson's ratio of the lower crustal rocks is:

a) 0.24 b) 0.26 c) 0.28 d) 0.30

89) Match the geometry of multiple reflections shown in Group I with their corresponding names in Group II.

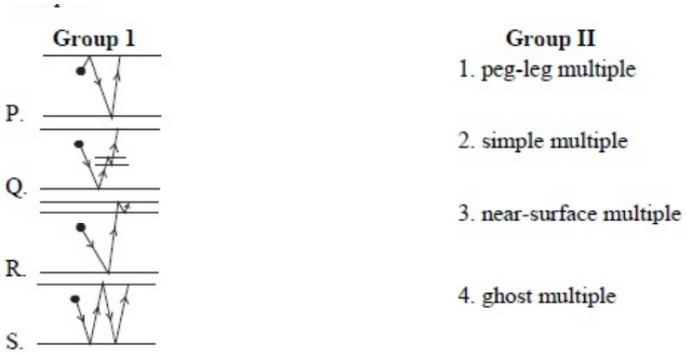


Fig. 15. Image for questions 89

a) P–1; Q–4; R–2; S–3
b) P–4; Q–1; R–3; S–2
c) P–2; Q–4; R–1; S–3
d) P–3; Q–1; R–4; S–2

90) The KÃ¶nigsberger ratio $Q_u \ll 1$ is characteristic of:

a) Sandstone
b) Continental shield rocks
c) Oceanic basalt
d) Continental volcanic rocks

91) In free-space, the integral form of Faraday's law is:

a) $\oint \mathbf{H} \cdot d\mathbf{l} = \iint \left(\frac{\partial \mathbf{E}}{\partial t}\right) d\mathbf{s}$ b) $\oint \mathbf{E} \cdot d\mathbf{l} = -\iint \left(\frac{\partial \mathbf{B}}{\partial t}\right) d\mathbf{s}$ c) $\iint \mathbf{E} \cdot d\mathbf{s} = 0$ d) $\iint \mathbf{B} \cdot d\mathbf{s} = 0$

92) Four point charges $Q_1 = 40$ nC, $Q_2 = 50$ nC, $Q_3 = 20$ nC, $Q_4 = -60$ nC are enclosed by a Gaussian surface. The net flux crossing the surface is:
**(NAT)** _____

93) The highest frequency range (in Hz) of an inducing electromagnetic wave that can penetrate up to a depth of 178 m in a medium with resistivity 10 Ω·m is:

a) 1–10 b) 15–25 c) 70–100 d) 800–1000

94) **(NAT)** For the given near-offset reflection geometry, the RMS velocity to the bottom of the second layer is:

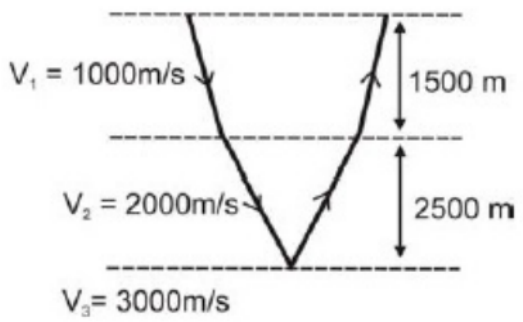


Fig. 16. Image for questions 94

_____

95) In seismic exploration, the dynamite source is generally considered to be a wavelet of:

a) Zero phase
b) Minimum phase
c) Mixed phase
d) Maximum phase