Section A: Q.1 – Q.10 Carry ONE mark each.	
Q.1	Which one of the following primary structures can be used for paleocurrent measurement?
(A)	Oscillation ripple
(B)	Hummocky cross-strata
(C)	Flute cast
(D)	Load and flame structures

Q.2	Which one of the following minerals does NOT show changes in optical properties upon exposure to UV light?
(A)	Apatite
(B)	Calcite
(C)	Fluorite
(D)	Scheelite
Q.3	Choose the material on which ^{14}C dating technique can be correctly applied.
(A)	Charred food grains from the Indus Valley civilization
(B)	Organic matter in carbonaceous chondrites
(C)	Diamonds from the Earth's interior
(D)	Graphite from Proterozoic sedimentary basins

Q.4	Which one of the following rock combinations is characteristic of volcanic arcs?
(A)	Basalt-andesite-dacite
(B)	Basalt-trachyte-rhyolite
(C)	Andesite-syenite-dacite
(D)	Trachybasalt-basaltic andesite-andesite
Q.5	The rake (pitch) of slickenlines exposed on a moderately dipping fault plane is the angle between
(A)	the magnetic north and strike of the fault plane measured on a horizontal surface
(B)	the strike of the fault plane and the slickenlines measured on the fault plane
(C)	the strike of the fault plane and the slickenlines measured on a vertical plane
(D)	the trend and the plunge directions of slickenlines measured on the fault plane

Q.6 Match the geographic locations listed in Column 1 to the geodynamic features listed in Column 2.

Column 1	Column 2
P. Iceland	i. Triple junction
Q. Afar	ii. Plume-ridge interaction
R. Hawaii	iii. Subduction zone
S. Aleutian Islands	iv. Plume

(A) P-i; Q-ii; R-iv; S-iii

(B) P-ii; Q-i; R-iv; S-iii

(C) P-ii; Q-i; R-iii; S-iv

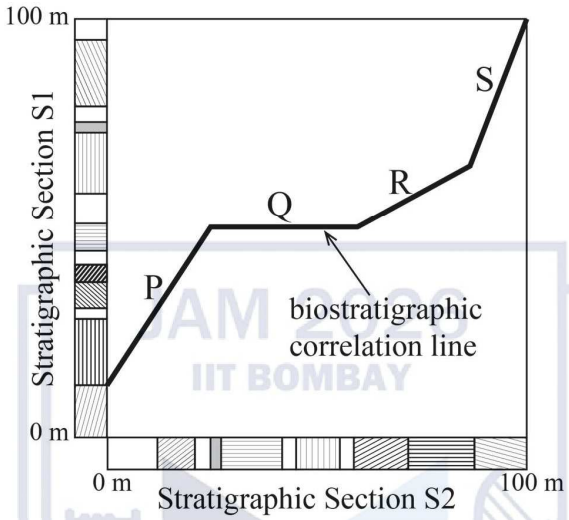
(D) P-ii; Q-iv; R-i; S-iii

Q.7	Which one of the following observations is consistent with the solid nature of the Earth's mantle?
(A)	S waves propagate through the mantle
(B)	S waves do not propagate through the mantle
(C)	P waves propagate through the mantle
(D)	P waves are refracted in the mantle
Q.8	Which one of the following is a nektic bivalve?
(A)	*Gryphaea*
(B)	*Trigonia*
(C)	*Mytilus*
(D)	*Solen*

Q.9	Which one of the following is characteristic of a point bar succession?
(A)	Thick homogenous sandstone
(B)	Upward gradation from sandstone to shale
(C)	Upward gradation from shale to sandstone
(D)	Thick laminated shale
Q.10	Tsunamis are frequently caused by earthquakes at
(A)	slow-spreading ridges
(B)	fast-spreading ridges
(C)	subduction zones
(D)	transform faults

Section A: Q.11 – Q.30 Carry TWO marks each.	
Q.11	In the ^{87}Rb -^{87}Sr isotopic systematics applied to terrestrial rocks, the slope of the isochron $\left(e^{\lambda t}-1\right)$ can be approximated as λt, where λ is the decay constant and t is time. Choose the correct option that justifies this approximation.
(A)	^{87}Rb decays to ^{87}Sr following a linear law
(B)	The Rb/Sr ratio is susceptible to alteration in terrestrial rocks
(C)	λ is very small for ^{87}Rb
(D)	Age of the Earth > half-life of ^{87}Rb

Q.12	A halide with octahedral cleavage can scratch calcite and can be scratched by quartz. Identify the halide.
(A)	Sylvite
(B)	Fluorite
(C)	Apatite
(D)	Halite
Q.13	Choose the correct statement about Moho.
(A)	Seismic and petrologic Moho coincide
(B)	Seismic Moho lies at shallower depths relative to the petrologic Moho
(C)	Petrologic Moho lies at shallower depths relative to the seismic Moho
(D)	Petrologic Moho lies above the layered gabbro in ophiolites

Q.14	Stratigraphic sections S1 and S2, separated by tens of kilometers, are shown in the schematic. The line segments in this schematic represent biostratigraphic correlation between S1 and S2. Which one of the segments (P, Q, R, S) of this correlation line represents an unconformity? 
(A)	P
(B)	Q
(C)	R
(D)	S

Q.15	The S wave velocity V_s is given by $V_s = \sqrt{\mu/\rho}$, where μ is shear modulus and ρ is density of the medium. V_s is lower in mantle plumes than in the ambient mantle because of
(A)	lower temperature of mantle plumes
(B)	lower density of mantle plumes
(C)	higher density of mantle plumes
(D)	lower shear modulus of mantle plumes
Q.16	Which one of the following environments best characterizes the natural habitat of boring bivalves, green algae, and herbivorous snails?
(A)	Deep marine
(B)	Rocky intertidal coast
(C)	Outer shelf
(D)	Estuary

Q.17 Match the minerals in Column 1 to their characteristic optical properties in Column 2.

Column 1	Column 2
P. Zircon	i. Pink to green pleochroism
Q. Orthopyroxene	ii. Very high positive relief
R. Muscovite	iii. Cyclic twinning
S. Cordierite	iv. Third order birefringence

(A) P-ii; Q-i; R-iii; S-iv

(B) P-i; Q-ii; R-iv; S-iii

(C) P-ii; Q-i; R-iv; S-iii

(D) P-ii; Q-iv; R-i; S-iii

Q.18 Match the magma series in Column 1 to the geological settings in Column 2.

Column 1	Column 2
P. Alkaline Series	i. Divergent oceanic margin
Q. Shoshonite Series	ii. Oceanic intraplate
R. Calc-alkaline Series	iii. Convergent plate margin
S. Tholeiitic Series	iv. Convergent plate margin close to back arc

(A) P-i; Q-iv; R-iii; S-ii

(B) P-ii; Q-iv; R-iii; S-i

(C) P-ii; Q-i; R-iii; S-iv

(D) P-iv; R-ii; Q-i; S-iii

Q.19 Match the plant fossils in Column 1 to the corresponding geological ages in Column 2.

Column 1	Column 2
P. *Glossopteris*	i. Triassic
Q. *Ptilophyllum*	ii. Devonian
R. *Dicrodium-Thinnfeldic*	iii. Triassic to Lower Cretaceous
S. *Psilophyton*	iv. Permian

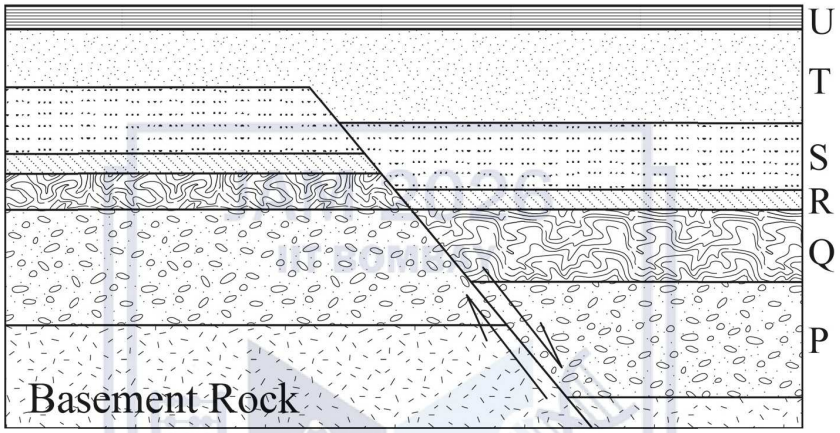
(A) P-iv; Q-iii; R-i; S-ii

(B) P-iii; Q-iv; R-i; S-ii

(C) P-iv; Q-iii; R-ii; S-i

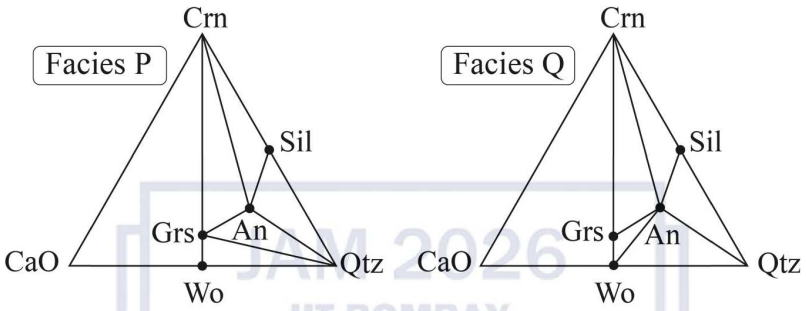
(D) P-iv; Q-i; R-iii; S-ii

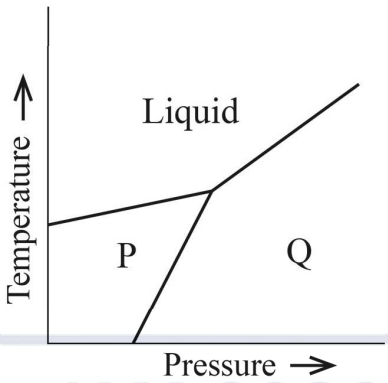
Q.20	Which one of the following reasons best explains the occurrence of large number of earthquakes at the active plate boundaries compared to the plate interiors?
(A)	Strain energy accumulation is higher at the plate boundaries
(B)	Stiffness is higher at the plate boundaries
(C)	Heat flow is lower at the plate boundaries
(D)	Crust is thinner at the plate boundaries
Q.21	If P, Q, R, and S refer to Rainfall induced landslide, Bolide impact, Milankovitch cycle, and Supercontinent cycle, respectively, then which one of the following correctly represents the decreasing order of their duration?
(A)	S, R, P, Q
(B)	Q, P, R, S
(C)	S, Q, P, R
(D)	S, P, Q, R

Q.22	The schematic shows a geological cross-section of a faulted region of sedimentary rocks (beds P to U). Assuming continuous sedimentation, select the beds that record the **earliest** activation and the **latest** reactivation of the fault. 
(A)	Q, T
(B)	P, T
(C)	Q, R
(D)	Q, U

Q.23	In a single layer of an anticline, the dip isogons converge towards the inner surface (core). Which one of the following statements is correct for the curvature of the inner surface of this folded layer?
(A)	Curvature of the inner surface > Curvature of the outer surface
(B)	Curvature of the inner surface < Curvature of the outer surface
(C)	Curvature of the inner surface = Curvature of the outer surface
(D)	Curvature of the inner surface = Curvature of the median surface

Q.24	In an arid environment, winds of similar intensity blow in nearly opposite directions in alternate seasons. Which dune type is most likely to form in such an environment?
(A)	Barkhan
(B)	Transverse dunes
(C)	Seif
(D)	Lunate
Q.25	Which one of the following features is used to define the K-Pg boundary globally?
(A)	Absence of dinosaur fossils
(B)	Presence of iridium anomaly in sediments
(C)	Presence of high mercury content in sediments
(D)	End of Deccan volcanism

Q.26	The figure shows chemogenic mineral projections for Facies P and Facies Q. Which one of the following reactions best represents change from Facies P to Facies Q?  Crn: Corundum; Grs: Grossular; Wo: Wollastonite; An: Anorthite; Sil: Sillimanite; Qtz: Quartz
(A)	Wo + An = Sil + Qtz
(B)	An + Sil = Wo
(C)	Wo + Crn = Grs
(D)	Grs + Qtz = Wo + An

Q.27	The figure depicts stability fields of minerals P and Q. Which one of the following statements is INCORRECT? 
(A)	P and Q can coexist at different temperatures only if pressures are different
(B)	P and Q can coexist with liquid only at one pressure and temperature
(C)	Q has a higher melting temperature at higher pressures than at lower pressures
(D)	A reaction forming Q from P at constant pressure will require an input of heat

Q.28 Match the metal associations in Column 1 to corresponding hosts in Column 2.

Column 1	Column 2
P. Cu, Co, Zn	i. Tectonized dunite and harzburgite
Q. Mn, Co, Ni	ii. MORB
R. Cr	iii. I-Type granite in volcanic arc
S. Cu, Mo, Pb	iv. Pelagic sediment

(A) P-ii; Q-iv; R-i; S-iii

(B) P-iv; Q-ii; R-i; S-iii

(C) P-ii; Q-iv; R-iii; S-i

(D) P-ii; Q-i; R-iv; S-iii

Q.29	Which one of the following mineral associations is diagnostic of the highly-oxidized zone of a weathered primary base metal vein?
(A)	Smithsonite, Malachite, Anglesite
(B)	Calcite, Fluorite, Pyrite
(C)	Limonite, Realgar, Chalcocite
(D)	Goethite, Orpiment, Boehmite

Q.30 Match the features in Column 1 to the most appropriate description in Column 2.

Column 1	Column 2
P. Ash layer	i. Part of a turbidite sequence
Q. Graded bedding	ii. Subaerial episode in the sedimentary record
R. Hiatus	iii. Dating of sedimentary rocks
S. Soil profile	iv. Missing faunal zone

(A) P-iii; Q-i; R-iv; S-ii

(B) P-i; Q-iii; R-iv; S-ii

(C) P-iii; Q-i; R-ii; S-iv

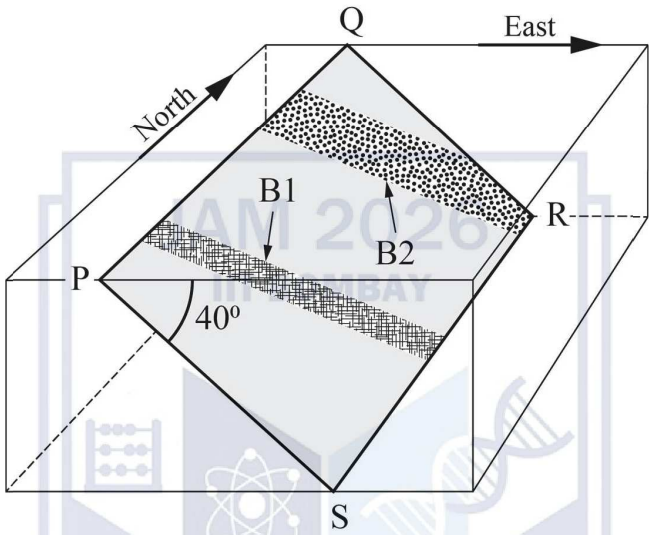
(D) P-iii; Q-iv; R-i; S-ii

Section B: Q.31 – Q.40 Carry TWO marks each.	
Q.31	Choose the correct statement(s) related to different aspects of volcanism.
(A)	Andesites are the most common rock type associated with stratovolcanoes
(B)	Explosiveness of volcanism depends on viscosity and fluid content of the magma
(C)	Shield volcanoes represent one of the largest magmatic vent landforms
(D)	Pillow lavas reflect sub-aerial volcanic eruptions

Q.32	Which of the following processes is/are responsible for the alternate bands of magnetic polarity observed in seafloor basalts?
(A)	Convection in the mantle
(B)	Convection in the outer core
(C)	Convection in the inner core
(D)	Seismicity at mid-oceanic ridges
Q.33	The Earth's gravitational acceleration is higher at the poles compared to that at the equator due to
(A)	higher density rocks at the poles
(B)	shorter polar radius
(C)	lower centrifugal acceleration at the poles
(D)	higher topography at the poles

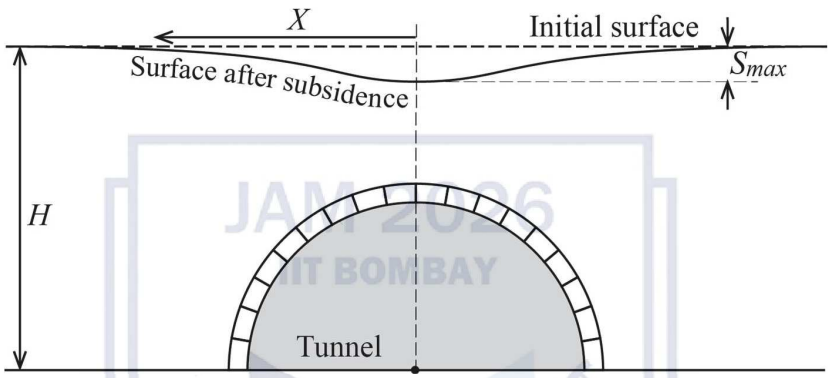
Q.34	During glacier retreat following the last Ice Age, Scandinavia experienced isostatic rebound. Which of the following resulted due to this rebound?
(A)	Fall in water level in glacial lakes
(B)	Rise in water level in glacial lakes
(C)	Raised beaches
(D)	Deep earthquakes
Q.35	Natural accumulation of hydrocarbons are expected to occur
(A)	in an anticline
(B)	in stratigraphic traps
(C)	along synclinal axial troughs
(D)	in ancient delta-mouth bars

Q.36	Which of the following factors affect(s) the intrinsic spatial resolution of remote sensing imagery?
(A)	Sensor pixel size
(B)	Altitude of the satellite
(C)	Wavelength of the captured electromagnetic radiation
(D)	Satellite communication bandwidth
Q.37	Two sandstone reservoir rocks R1 and R2 have 25% porosity each but the permeability of R1 is higher than that of R2. Which of the following can explain this difference in permeability?
(A)	Clay content in R1 is more than that in R2
(B)	Microfracture density in R1 is higher than that in R2
(C)	Sorting in R1 is better than that in R2
(D)	R1 has more angular grains than R2

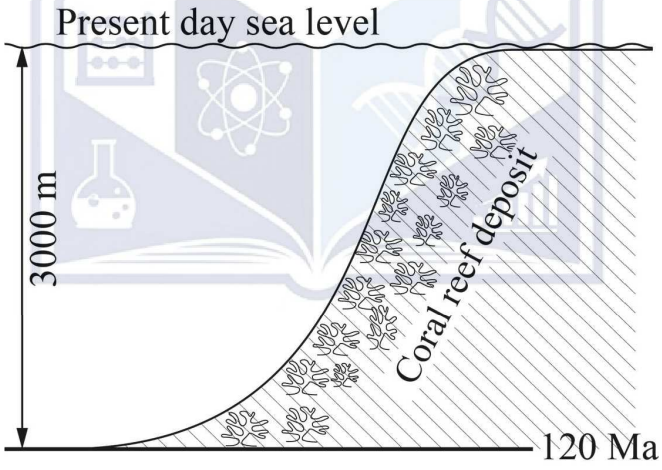
Q.38	In the following illustration, PQRS is an exposed axial planar cleavage, striking north-south and dipping 40° east. B1 and B2 are the traces of two folded bedding planes on this axial planar cleavage. The fold can be classified as 
(A)	horizontal fold
(B)	inclined fold
(C)	plunging fold
(D)	upright fold

Q.39	Intrusion of a 10-meter thick dolerite dyke into a boron-rich quartz-garnet-biotite-muscovite-chlorite schist developed a visible symmetric baked zone. Which of the following minerals can develop in this baked zone, 2 meters away from the margin of the dyke?
(A)	Orthopyroxene
(B)	Clinopyroxene
(C)	Amphibole
(D)	Tourmaline
Q.40	Which of the following ore types form(s) by magmatic differentiation?
(A)	Gold in quartz vein
(B)	Titaniferous magnetite in anorthosite
(C)	Columbite-Tantalite in pegmatite
(D)	Chromite-Pentlandite in pyroxenite

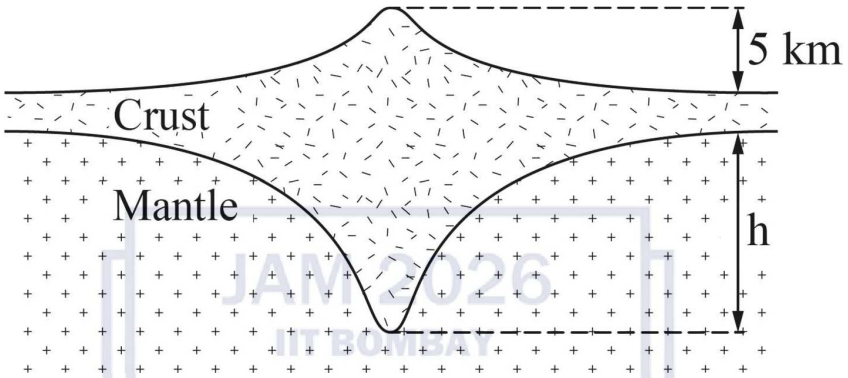
Section C: Q.41 – Q.50 Carry ONE mark each.	
Q.41	One mole of a parent nuclide is undergoing radioactive decay. The fraction of atoms of this nuclide that has decayed after three half-lives is _____. (*Round off to three decimal places*)
Q.42	The lithostatic pressure at the base of a 35 km thick continental crust of average density of 2.8 g/cc is _____ $\times 10^8$ Pa. (*Round off to one decimal place*) (Consider the value of acceleration due to gravity as 9.8 m/s^2)
Q.43	A hypothetical mineral has the formula $X_7Si_8O_{22}(OH)_2$, where X is a cation. The valence state of X is _____. (*In integer*)

Q.44	The surface subsidence at a horizontal distance X from the centerline of a cylindrical tunnel is given by $S_{max} \times \exp\left(\frac{-X^2}{0.5H^2}\right)$, where S_{max} is the maximum subsidence above the tunnel and $H = 50$ m is the depth of the tunnel centerline. The ratio of surface subsidence at $X = 10$ m to that at $X = 20$ m is _____. (*Round off to one decimal place*) 
Q.45	An aquifer with a hydraulic conductivity of 60 m/day experiences a head loss of 20 m over a length of 1000 m. The flow of water per unit area, in millimeter per minute, is _____ . (*Round off to two decimal places*)

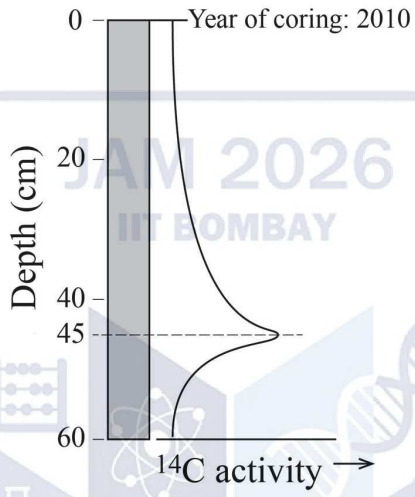
Q.46	Sphalerite shows limited isomorphism. Consider a colourless sphalerite having 33% S and 67% Zn. Then, in a black-coloured sphalerite, with a 15% Fe substitution, the ratio of atomic proportions of Zn to that of Fe is _____ (*Round off to one decimal place*) (Given: atomic weight of Zn = 65.37, Fe = 55.85, and S = 32.06)
Q.47	The true dip of a normal limb associated with asymmetric folding is 20° and the angle that this limb makes with the axial planar cleavage is 35°. The true dip of the axial planar cleavage, in degree, is _____ . (*In integer*)
Q.48	A metallic mineral weighs 44 g and displaces 11 mL of water when fully immersed. The density of the mineral is _____ g/cc. (*In integer*)

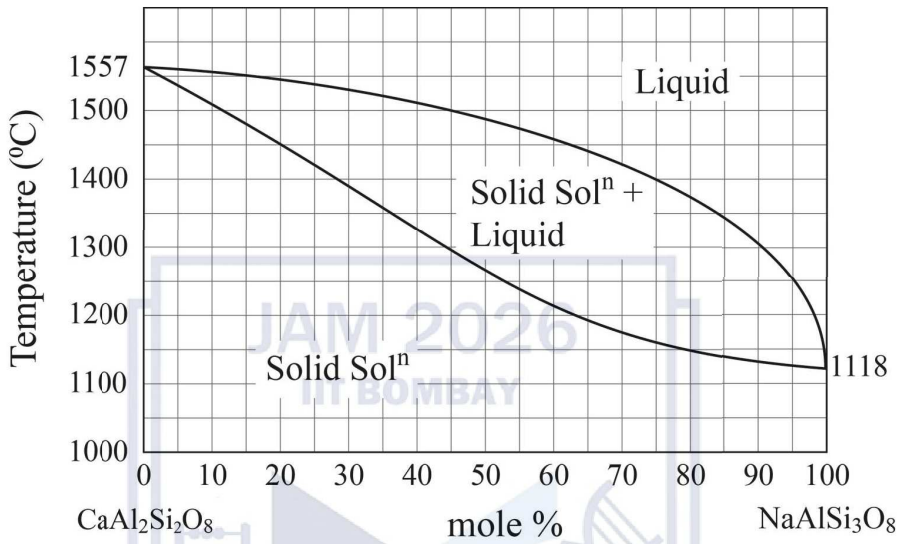
Q.49	A clinopyroxene crystal in a basalt, measured to have a composition of $Mg_{1.2}Fe_{0.4}Ca_{0.4}Si_2O_6$, will have Mg-number (Mg#) of _____ %. (*In integer*)
Q.50	The figure shows a coral reef deposit at the continental margin since 120 Ma. Assuming that there was no sea-level change, the average subsidence rate of this continental margin is _____ mm/year. (*Round off to three decimal places*) 

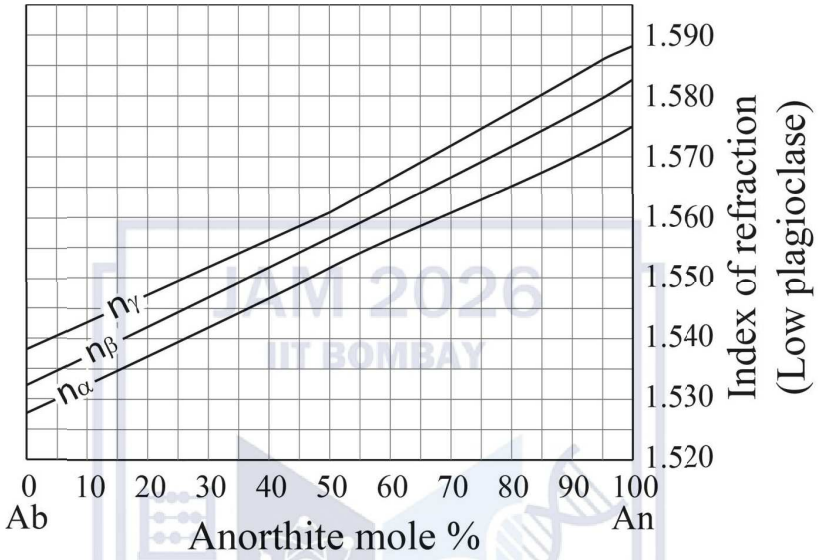
Section C: Q.51 – Q.60 Carry TWO marks each.	
Q.51	ε_{Nd} is the deviation of $^{143}Nd/^{144}Nd$ of a sample relative to CHUR in parts per 10^4. For a pyroxenite with measured $^{143}Nd/^{144}Nd = 0.512838$ and $^{147}Sm/^{144}Nd = 0.21$, the initial ε_{Nd} at 1 Ga is _____ . *(Round off only the final answer to one decimal place*) (Given: for CHUR, $^{143}Nd/^{144}Nd = 0.512638$ and $^{147}Sm/^{144}Nd = 0.1967$. The decay constant for ^{147}Sm is 6.54×10^{-12} yr^{-1})
Q.52	A sandstone sample with 100% quartz has a porosity of 30%. The sample is dry and the density of quartz is 2.65 g/cc. The bulk density of the sandstone sample is _____ g/cc (*Round off to one decimal place*)

Q.53	A mountain of height 5 km is in static equilibrium with a crustal block of zero elevation. If the density of the crust and the mantle are 2700 and 3300 kg/m^3, respectively, the thickness of the mountain root (h) is _____ km (*Round off to one decimal place*) 
Q.54	In a mineralized staurolite-garnet-biotite schist, the estimated metasomatic sulfide mineralization is 4%, with ore mineral proportions as 30% chalcopyrite, 20% pyrite and the rest being magnetite. The maximum grade of Cu will be _____ g/ton (*Round off to the nearest integer*) (Given: 1 ton = 1000 kg; atomic weight of Cu = 63.55, Fe = 55.85, O = 16.00 and S = 32.06)

Q.55	Four vertical boreholes are drilled on a flat topography at 50 m intervals along the east-west direction. The boreholes intersect a coal seam at depths of 100 m, 130 m, 160 m and 190 m. The true dip of the coal seam, in degree, is _____. (*Round off to two decimal places*)
Q.56	Consider a perfect Geocentric Axial Dipole model for the geomagnetic field. At a latitude of 30°N, the inclination of a freely suspended magnetic needle, in degree, is _____ . (*Round off to the nearest integer*)

Q.57	The figure shows the ^{14}C activity with depth in a sediment core from a lake, where the sedimentation rate was uniform. The maximum ^{14}C activity, marking the signature of bomb carbon, was measured at a depth of 45 cm. The rate of sedimentation is _____ mm/year (*In integer*) (Given: the core top reflects the year of coring and bomb carbon reached its global maximum in 1965) 

Q.58	Based on the figure, the anorthite content of first formed plagioclase crystals from a liquid composition having 50 mole % anorthite is _____ mole % (*In integer*) 

Q.59	The figure shows variation in optical properties of plagioclase feldspars with composition. A feldspar from a lunar anorthosite, with anorthite mole% of 85, will have a birefringence of _____ (*Round off to three decimal places*) 
Q.60	In the isometric system, the difference in the number of symmetry planes in class $\bar{4}3m$ (Hextetrahedral) class and $\frac{2}{m}\bar{3}$ (Diploidal) is _____ (*In integer*)

JAM 2026: Geology (GG)
Master Answer Key

Question No.	Subject	Question Type	Answer Key/Range	Mark(s)
1	GG	MCQ	C	1
2	GG	MCQ	A	1
3	GG	MCQ	A	1
4	GG	MCQ	A	1
5	GG	MCQ	B	1
6	GG	MCQ	B	1
7	GG	MCQ	A	1
8	GG	MCQ	MTA	1
9	GG	MCQ	B	1
10	GG	MCQ	C	1
11	GG	MCQ	C	2
12	GG	MCQ	B	2
13	GG	MCQ	B	2
14	GG	MCQ	B	2
15	GG	MCQ	D	2
16	GG	MCQ	B	2
17	GG	MCQ	C	2
18	GG	MCQ	B	2
19	GG	MCQ	A	2
20	GG	MCQ	A	2
21	GG	MCQ	A	2
22	GG	MCQ	A	2
23	GG	MCQ	A	2
24	GG	MCQ	C	2
25	GG	MCQ	B	2
26	GG	MCQ	D	2
27	GG	MCQ	D	2
28	GG	MCQ	A	2
29	GG	MCQ	A	2
30	GG	MCQ	A	2

Question No.	Subject	Question Type	Answer Key/Range	Mark(s)
31	GG	MSQ	A;B;C	2
32	GG	MSQ	A;B	2
33	GG	MSQ	B;C	2
34	GG	MSQ	A;C	2
35	GG	MSQ	A;B;D	2
36	GG	MSQ	A;B;C	2
37	GG	MSQ	B;C	2
38	GG	MSQ	B;C	2
39	GG	MSQ	C;D	2
40	GG	MSQ	B;D	2
41	GG	NAT	0.875 to 0.875	1
42	GG	NAT	9.5 to 9.7	1
43	GG	NAT	2 to 2	1
44	GG	NAT	1.2 to 1.4	1
45	GG	NAT	0.80 to 0.85	1
46	GG	NAT	2.9 to 3.1	1
47	GG	NAT	55 to 55	1
48	GG	NAT	4 to 4	1
49	GG	NAT	75 to 75	1
50	GG	NAT	0.025 to 0.025	1
51	GG	NAT	2.1 to 2.3	2
52	GG	NAT	1.8 to 2.0	2
53	GG	NAT	22.4 to 22.6	2
54	GG	NAT	4100 to 4200	2
55	GG	NAT	30.00 to 32.00	2
56	GG	NAT	48 to 50	2
57	GG	NAT	10 to 10	2
58	GG	NAT	85 to 90	2
59	GG	NAT	0.010 to 0.015	2
60	GG	NAT	3 to 3	2