Part II (*Five questions eight marks each*)

2) State stratigraphic and climatic significance of Lower Gondwana flora (LGF) of India with their geographic distribution. How do you think the LGF can be used to support the theory of plate tectonics?

3) Define and distinguish between sparite, micrite and microspar.

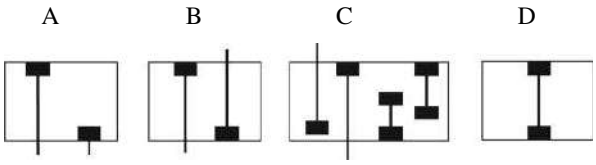
4) What is geomagnetic reversal? Why geomagnetic equator does not always coincide with geographic equator?

5) Why shear fractures do not form at an angle of 45º to σ_1, where the resolved shear stress is at its maximum?

6) Briefly define metamorphic differentiation. Throughout the history of metamorphic petrology, several mechanisms have been proposed to explain metamorphic differentiation. Name these mechanisms.

Part III (*Choose the correct answer from the given alternatives and justify. Four marks each*)

7)



Diagrams A, B, C and D illustrate principal kinds of biozones. The correct sequence that can be interpreted from the above diagrams is:

a. A: Interval biozone, B: Concurrent-range biozone,
C: Assemblage biozone, D: Taxon-range biozone.
b. A: Taxon-range biozone, B: Assemblage biozone,
C: Concurrent- range biozone, D: Interval biozone
c. A: Taxon-range biozone, B: Concurrent range biozone,
C: Interval biozone, D: Assemblage biozone
d. A: Concurrent-range biozone, B: Interval biozone,
C: Assemblage biozone, D: Taxon range Biozone

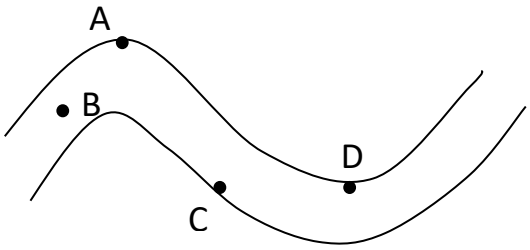
8) *Hyperodapedon huxleyi* is known from

a. Barakar Formation
b. Chinji Formation
c. Maleri Formation
d. Lameta Formation

9) Choose and justify the right combination of functional morphological characters noted in deep burrowing bivalves –

a. Anisomyarian muscle scar and deep pallial sinus.
b. Equivalved and equilateral shell
c. Thick and streamlined shell
d. Not very elongate shells with gapes at both ends.

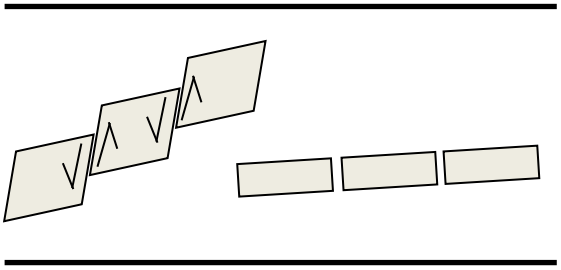
10) A field geologist measures local longitudinal strains ($\acute{\varepsilon}$) at different locations of a large-scale pure flexural fold structure, as schematically illustrated below.



The correct combination of $\acute{\varepsilon}$ - values the geologist measured at A, B, C and D, respectively is:

a. 0.2; 0; 0.1 and -0.15
b. 0.2; -0.1; -0.1 and -0.15
c. 0.1; -0.1; 0.1 and -0.15
d. -0.2; 0.2; 0 and 0.2

11) The figure below illustrates an extensional and a shear fracture boudinage structure in a shear zone.



These structures indicate:

a. Dextral shear with shear-parallel shortening
b. Sinistral shear with or without shear-normal extension
c. Dextral shear with or without shear-normal shortening
d. No finite strain

Part IV (*Choose the correct answer from the given alternatives. No justification is required. One mark each*)

12) Which of the following mass extinction events in geological history is associated with the conspicuous iridium anomaly?

a. Permian /Triassic
b. Precambrian /Ordovician
c. Cretaceous /Tertiary
d. Eocene /Oligocene

13) Which pair of taxa are closer relatives than the other pairs?

a. Cephalopoda and Bivalvia
b. Cephalopoda and Brachiopoda
c. Gastropoda and Foraminifera
d. Echinodermara and Scaphopoda

14) Match the stratigraphic units in column I with their corresponding ages in column II

	I		II
P	Uttatur Group	C	Jurassic
Q	Kota Formation	D	Cretaceous
R	Kundaram Formation	E	Devonian
S	Muth Quartzite	F	Permian

a. P- C, Q-D, R - E, S - F
b. P- D, Q - C , R - F, S - E
c. P- E, Q-D, R – F, S - C
d. P- D, Q -F, R - C, S – E

15) Which one of the following groups appeared earliest on the Earth?

a. Temnospondyls
b. Archaeopteryx
c. Morganucodon
d. Prokaryotes

16) The clay mineral Montmorillonite belongs to

a. Smectite Group
b. Feldspar Group
c. Mica Group
d. Pyroxene Group

17) Chlorites are

a. Phylosilicates
b. Orthosilicates
c. Pyrosilicates
d. Cyclosilicate

18) Which one of the following options is not a shear sense indicator?

a. δ type porphyroclast
b. S-C fabric
c. Φ type porphyroclast
d. σ type porphyroclast

19) One can expect high angle relationship between bedding and cleavage at:

a. Fold limb
b. Any part of a fold
c. Only when the fold is overturned
d. Fold hinge

20) Which fold has two hinges?

a. Fan fold
b. Chevron fold
c. Isoclinal fold
d. Box fold

21) Find the odd person out

a. Lamination
b. Slaty cleavage
c. Schistosity
d. Foliation

22) Water formed at the time of consolidation of magma is called

a. Connate water
b. Meteoric water
c. Vadose water
d. Juvenile water

23) As one moves from the Tropical zone to the Polar region, the concentration of limestone

a. Increases
b. Decreases
c. First increases then decreases
d. First decreases then increases

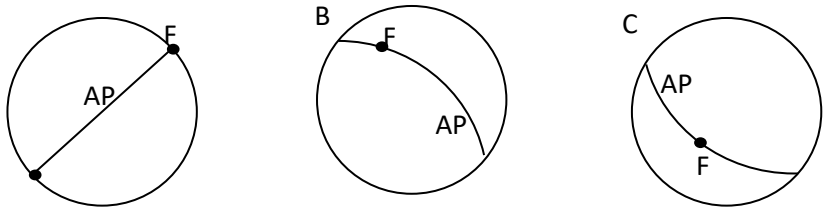
24) The clinometer compass can be used to find the attitudes of a stratum if the rocks contain the minerals given below

a. Magnetite, Pyrite and Sphalerite
b. Chromite, Magnetite and Galena
c. Galena, Sphalerite and Gold
d. Chromite, Pyrite and Magnetite

25) The characteristic amphibole of high-pressure metamorphism is

a. Actinolite
b. Hornblende
c. Glaucophane
d. Cummingtonite

26) A field geologist report fold structures using stereographic projections, as shown below.



AP: Axial plane; F: Fold axis

The right combination to describe the fold geometry is:

a. A: Upright, horizontal; B: Inclined, plunging; C: Reclined
b. A: Upright, horizontal; B: Reclined; C: Inclined, horizontal
c. A: Recumbent; B. Inclined; plunging; C: Inclined, vertical
d. A: Reclined; B: Inclined, horizontal; C: Upright, plunging