UG/II/GEOL/H/IV/18(New)

2018

GEOLOGY

[Honours]

PAPER – IV

Full Marks : 90

Time : 4 hours

The figures in the right hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

Illustrate the answers wherever necessary

[NEW SYLLABUS]

GROUP – A

(*Geodynamics*)

Answer the following questions (any **two**) : 5×2

1. (*a*) What do you understand by natural remanent magnetism (*NRM*), thermoremanent

magnetism (TRM) and detrital remanent magnetism (DRM) ?

(*b*) What is apparent polar wandering path (APWP) ? 3 + 2

2. Write a short note on different types of subduction zones. 5

3. (*a*) What is 'triple junction' ?

(*b*) Draw and discuss a Ridge (R)-Trench(T) -transform fault (F) triple junction in a velocity space. 1 + 4

4. (*a*) What is hospot ?

(*b*) Why are rocks older than 200 Ma not found on ocean floor ? 2 + 3

Answer the following questions (any **one**) : 10 × 1

5. (*a*) Describe about transform and transcurrent fault with neat sketches.

(*b*) Write a short note on Vine-Mathews hypothesis. 5 + 5

6. (*a*) Describe the concept of paired metamorphic belt with suitable example ? 5

(*b*) Give a labelled diagram of subduction zone and associated features ? 5

GROUP – B

(*Advanced Structural Geology*)

Answer the following questions (any **two**) : 5 × 2

7. Write in brief with neat sketches different types of surface features of joints. 5

8. Write a note on Ramsay's classification of strain ellipse. Where does a sphere plot in this diagram ? 4 + 1

9. How would you represent stress at a point in three dimensions ? 5

10. Establish the relation between slip and separation of a fault. 5

Answer the following questions (any **one**) : 10×1

11. What do you understand by the terms brittle, plastic and viscous behavior of rocks ? Illustrate your answer with suitable Stress-Strain diagrams. Give example of geological structures that develop during brittle and plastic deformation. $8 + 2$

12. Differentiate among the following with suitable sketches (any *four*) : $2\frac{1}{2} \times 4$

(*a*) Passive and active folding

(*b*) Imbricate structure and duplex structure

(*c*) Fault bend fold and fault propagation fold

(*d*) Kink fold and Chevron fold

(*e*) Orthogonal flexure and flexural flow.

GROUP – C

(*Advanced Igneous Petrology*)

Answer any **three** of the following questions from **13** to **18** : 5×3

13. (*a*) Define alkaline rock. Give example.

(*b*) Classify the alkaline rock according to agpaicity index. 2 + 3

14. (*a*) What is magnesium number ?

(*b*) Write a short note on gravitational segregation and flowage differentiation. 1 + 4

15. What happens when limestone incorporated within basaltic magma ? 5

16. Write a short note on basalt tetrahedron. 5

17. Describe the equilibrium crystallization of Ab rich liquid in Ab-An system. 5

18. (*a*) What is petrogeny's residua system ?

(*b*) Write a short note on the thermal valley of this system. 2 + 3

Answer the following questions (any **one**) : 10×1

19. (*a*) Discuss the equilibrium crystallization of Fo rich liquid in Di-Fo-SiO_2 system.

(*b*) What is the difference between equilibrium and fractional crystallization ? 8 + 2

20. (*a*) Write two differences between massive and layered anorthosite with their Indian occurrences.

(*b*) Write different types of granite according to the depth of origin.

(*c*) Write about the petrography of lamprophyre. 2 + 4 + 4

GROUP – D

(*Advanced Metamorphic Petrology*)

Answer the following questions (any **three** from **21** to **26**) : 5 × 3

21. (*a*) What is devolatization reaction ?

(*b*) Write the different types of devolatization reactions. 1 + 4

22. (*a*) What is the relation between metamorphic grade, zone and facies ?

(*b*) Write the Barrowvian sequence of index minerals. 3 + 2

23. Briefly discuss about UHP and UHT metamorphism. 5

24. (*a*) What is migmatite ?

(*b*) Write a short note on net transfer reaction. 2 + 3

25. Name the regional metamorphic facies indicated by following mineral assemblages : 5

(*a*) Quartz-perthite-almandine-sillimanite

(*b*) Plagioclase-orthopyroxene-clinopyroxene

(*c*) Quartz-albite-chlorite-biotite-spessartine

(*d*) Stauroolite-garnet-plagioclase-quartz

(*e*) Omphasite + pyrope.

26. Write the significance of ACF and AKF diagrams. 5

Answer the following questions (any **one**) : 10 × 1

27. (*a*) State Schrnmaker's rule.

(*b*) Explain the nature of metamorphism in paired metamorphic belt in the light of plate tectonics with suitable example. 3 + 7

28. Briefly describe the regional metamorphism of pelitic rocks following intermediate P-T trend, mentioning mineral assemblages, key reactions and textural changes. 10