3 (Sem–4/CBCS) GLG HC1

2022

GEOLOGY

(Honours)

Paper : GLG–HC–4016

(Metamorphic Petrology)

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Choose the correct answer : ***(any seven)*** 1×7=7

(a) Which of the following rocks indicates initiation of metamorphism ?

(i) Phyllite

(ii) Schist

(iii) Shale

(iv) Slate

(b) The pressure-temperature ranges of the metamorphic facies increase in the order P : Granulite, Q : Zeolite, R : Amphibolite, S : Greenschist.

(i) Q < R < S < P

(ii) Q < P < R < S

(iii) Q < S < R < P

(iv) Q < R < P < S

(c) A snowball garnet is an example of

(i) inter-kinematic mineral growth

(ii) syn-kinematic mineral growth

(iii) post-kinematic mineral growth

(iv) pre-kinematic mineral growth

(d) Pyrometamorphism generally includes

(i) high pressure changes

(ii) high temperature changes

(iii) low pressure and temperature changes

(iv) high pressure and temperature changes

(e) The metamorphic rock with maculose structure is

(i) granulose

(ii) hornfels

(iii) cataclastic

(iv) schistose

(f) The glaucophane and lawsonite mineral assemblage is diagnostic of

(i) eclogite facies

(ii) amphibolite facies

(iii) blueschist facies

(iv) greenschist facies

(g) Staurolite, andalusite and sillimanite form during progressive regional metamorphism of

(i) arenaceous rocks

(ii) siliceous carbonate rock

(iii) basic igneous rocks

(iv) argillaceous rocks

(h) In the thermal metamorphism of impure calcareous rocks, grossularite and diopside are associated with

(i) wollastonite

(ii) anorthite

(iii) enstatite

(iv) None of the above

(i) Fenite is a rock of syenitic composition formed due to

(i) alkali metasomatism

(ii) lime metasomatism

(iii) load metamorphism

(iv) retrograde metamorphism

(j) The process of complete mixing and melting of rocks with the production of neomagma is described as

(i) anatexis

(ii) palingenesis

(iii) ultrametamorphism

(iv) autometamorphism

2. Answer ***any four*** of the following : 2×4=8

(a) What is 'hornfels' ?

(b) Write on geothermobarometry in metamorphism.

(c) What are index minerals ?

(d) What is fault zone deformation ?

(e) What do you mean by metamorphic grade ?

(f) How will you distinguish gneiss and schist in a thin section ?

(g) What do you mean by 'anatexis' ?

(h) What is charnockite ?

3. Write explanatory notes on ***any three*** of the following : 5×3=15

(a) Chemographic projections

(b) Metamorphic reactions

(c) Migmatites

(d) Impact metamorphism

(e) Role of fluids in metamorphism

(f) Khondalite

(g) Mineralogical phase rule

(h) Metamorphic zones

4. Answer ***any three*** of the following : 10×3=30

(a) Discuss the role of temperature and pressure on metamorphism. State the difference between metamorphism and metasomatism. 6+4=10

(b) Give an account on metamorphic facies and facies series. 7+3=10

(c) What do you mean by chemical equilibrium in metamorphism ? Give the criteria that identify the attainment of chemical equilibrium in metamorphic rocks. 3+7=10

(d) Write a note on structure and texture of metamorphism. 5+5=10

(e) Write a note on relationship in between metamorphism and deformation.

(f) Write a note on contact and regional metamorphism. 5+5=10

(g) What mineral assemblages generally form during contact thermal metamorphism of impure calcareous sediment ? State the relevant metamorphic reactions those occur during this progressive heating. 4+5=9

(h) Write notes on : 5+5=10

(i) Blue schists

(ii) Eclogite

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