

# National Testing Agency

<b>Question Paper Name :</b>	Metamorphic Petrology and Thermodynamics 26th March 2021 Shift 1
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## Metamorphic Petrology and Thermodynamics

<b>Group Number :</b>	1
<b>Group Id :</b>	864351179
<b>Group Maximum Duration :</b>	0
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<b>Show Attended Group? :</b>	No
<b>Edit Attended Group? :</b>	No
<b>Break time :</b>	0
<b>Group Marks :</b>	100
<b>Is this Group for Examiner? :</b>	No

## Metamorphic Petrology and Thermodynamics-1

<b>Section Id :</b>	864351625
<b>Section Number :</b>	1
<b>Section type :</b>	Online
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	20

<b>Number of Questions to be attempted :</b>	20
<b>Section Marks :</b>	20
<b>Mark As Answered Required? :</b>	Yes
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	864351797
<b>Question Shuffling Allowed :</b>	Yes

**Question Number : 1 Question Id : 86435114663 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

For thermodynamic calculations, the temperature is measured in:

1. Kelvin ( $K = ^\circ C + 273.15$ )
2.  $^\circ$ Centigrade
3. Centimeter
4. None of the above

**Options :**

- 86435149489. 1
- 86435149490. 2
- 86435149491. 3
- 86435149492. 4

**Question Number : 2 Question Id : 86435114664 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Phase Rule is expressed by the simple formulation:

1.  $P + F = C + 2$
2.  $F = C - P + 2$
3. Both 1 & 2
4. None of the above

**Options :**

- 86435149493. 1

86435149494. 2

86435149495. 3

86435149496. 4

**Question Number : 3 Question Id : 86435114665 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Choose the correct sequence of deformation and metamorphism:

1. Shale --> Slate --> Phyllite --> Schist --> Gneiss
2. Shale --> Slate --> Phyllite --> Gneiss --> Schist
3. Shale --> Phyllite --> Schist --> Gneiss --> Slate
4. Slate --> Phyllite --> Schist --> Gneiss --> Shale

**Options :**

86435149497. 1

86435149498. 2

86435149499. 3

86435149500. 4

**Question Number : 4 Question Id : 86435114666 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

The protolith of Ultramafic metamorphic rock is:

1. Lherzolite
2. Calcareous rock
3. Granite
4. Gabbro

**Options :**

86435149501. 1

86435149502. 2

86435149503. 3

86435149504. 4

**Question Number : 5 Question Id : 86435114667 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

The mineral assemblage Larnite - Spurrite - Merwinite is typical of:

1. Sanidinite facies
2. Zeolite facies
3. Blue schist facies
4. Granulite facies

**Options :**

- 86435149505. 1
- 86435149506. 2
- 86435149507. 3
- 86435149508. 4

**Question Number : 6 Question Id : 86435114668 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Metamorphism is mainly due to the operation of:

1. Pressure only
2. Temperature only
3. Fluids only
4. P, T and fluids

**Options :**

- 86435149509. 1
- 86435149510. 2
- 86435149511. 3
- 86435149512. 4

**Question Number : 7 Question Id : 86435114669 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No**

**Correct Marks : 1 Wrong Marks : 0**

When shales are subjected to thermal metamorphism, the product formed is?

1. Hornfels
2. Phyllite
3. Schist
4. Amphibolite

**Options :**

- 86435149513. 1
- 86435149514. 2
- 86435149515. 3
- 86435149516. 4

**Question Number : 8 Question Id : 86435114670 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

The term Ocean-floor metamorphism was coined by:

1. Coombs, (1954)
2. Miyashiro et al., (1971)
3. Winkler (1974)
4. Thompson (1977)

**Options :**

- 86435149517. 1
- 86435149518. 2
- 86435149519. 3
- 86435149520. 4

**Question Number : 9 Question Id : 86435114671 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Which mineral is commonly present in amphibolite facies?

1. Hornblende
2. Tremolite
3. Anthophyllite
4. All of the above

**Options :**

- 86435149521. 1
- 86435149522. 2
- 86435149523. 3
- 86435149524. 4

**Question Number : 10 Question Id : 86435114672 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Complete the reaction: Epidote + Calcite + Quartz = ----- + H<sub>2</sub>O

1. Dolomite
2. Grossularite
3. Anthophyllite
4. Kyanite

**Options :**

- 86435149525. 1
- 86435149526. 2
- 86435149527. 3
- 86435149528. 4

**Question Number : 11 Question Id : 86435114673 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Complete the reaction: Muscovite + Quartz = K-feldspar + ----- + H<sub>2</sub>O

1. Sillimanite
2. Almandine
3. Andalusite
4. Mg-anthophyllite

**Options :**

- 86435149529. 1
- 86435149530. 2
- 86435149531. 3
- 86435149532. 4

**Question Number : 12 Question Id : 86435114674 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Complete the reaction: Tremolite + Calcite + Quartz = ----- + CO<sub>2</sub> + H<sub>2</sub>O

1. Pyrophyllite
2. Almandine
3. Andalusite
4. Diopside

**Options :**

- 86435149533. 1
- 86435149534. 2
- 86435149535. 3
- 86435149536. 4

**Question Number : 13 Question Id : 86435114675 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

What is the composition of Charnockite?

1. Hypersthen + K-feldspar + Quartz
2. Hornblende + K-feldspar + Quartz
3. Sillimanite + K-feldspar + Quartz
4. Epidote + Plagoclase + Quartz

**Options :**

- 86435149537. 1
- 86435149538. 2
- 86435149539. 3
- 86435149540. 4

**Question Number : 14 Question Id : 86435114676 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Maculose structure generally develops in

1. Argillaceous rock
2. Arenaceous rocks
3. Calcareous
4. Rudaceous rocks

**Options :**

- 86435149541. 1
- 86435149542. 2
- 86435149543. 3
- 86435149544. 4

**Question Number : 15 Question Id : 86435114677 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**



Mylonites are product of which type of metamorphism?

1. Cataclastic
2. Contact
3. Static
4. Optalic

**Options :**

- 86435149545. 1
- 86435149546. 2
- 86435149547. 3
- 86435149548. 4

**Question Number : 16 Question Id : 86435114678 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

During the process of concretion principle, which of the following occur?

1. The growth of large porphyroblasts and crystalline aggregates
2. Development of Paleosom
3. Development of Neosome
4. Development of Leucosome

**Options :**

- 86435149549. 1
- 86435149550. 2
- 86435149551. 3
- 86435149552. 4

**Question Number : 17 Question Id : 86435114679 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Pressure is defined as force acting equally from all directions. It is a type of stress, called:

1. Stress
2. Hydrostatic stress
3. Uniform stress
4. Both (2) and (3)

**Options :**

- 86435149553. 1
- 86435149554. 2
- 86435149555. 3
- 86435149556. 4

**Question Number : 18 Question Id : 86435114680 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

Complete the reaction: Montmorillonite --> ----- + Epidote + Chlorite + H<sub>2</sub>O

1. Pyrophyllite
2. Biotite
3. Kyanite
4. Quartz

**Options :**

- 86435149557. 1
- 86435149558. 2
- 86435149559. 3
- 86435149560. 4

**Question Number : 19 Question Id : 86435114681 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

The *Tremolite + Calcite + Quartz = Diopside + H<sub>2</sub>O + CO<sub>2</sub>* is a

1. Exchange reaction
2. Mixed volatile reactions
3. Net transfer reaction
4. All of the above

**Options :**

- 86435149561. 1
- 86435149562. 2
- 86435149563. 3
- 86435149564. 4

**Question Number : 20 Question Id : 86435114682 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 1 Wrong Marks : 0**

On melting the paleosome changes its composition which is now observed as restite (unmelted component) and is designated as:

1. Melanosome
2. Neosome
3. Leucosome
4. Paleosome

**Options :**

- 86435149565. 1
- 86435149566. 2
- 86435149567. 3
- 86435149568. 4

<b>Section Id :</b>	864351626
<b>Section Number :</b>	2
<b>Section type :</b>	Offline
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	10
<b>Number of Questions to be attempted :</b>	10
<b>Section Marks :</b>	30
<b>Mark As Answered Required? :</b>	Yes
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	864351798
<b>Question Shuffling Allowed :</b>	No

**Question Number : 21 Question Id : 86435114683 Question Type : SUBJECTIVE**  
**Correct Marks : 3**

Write about the significance of dehydration & decarbonation reaction.

**Question Number : 22 Question Id : 86435114684 Question Type : SUBJECTIVE**  
**Correct Marks : 3**

Write short notes on basic assemblage observed during amphibolite facies with the help of suitable diagram.

**Question Number : 23 Question Id : 86435114685 Question Type : SUBJECTIVE**  
**Correct Marks : 3**

Write short notes on structure of metamorphic rock.

**Question Number : 24 Question Id : 86435114686 Question Type : SUBJECTIVE**  
**Correct Marks : 3**

Define metamorphism.

**Question Number : 25 Question Id : 86435114687 Question Type : SUBJECTIVE**

**Correct Marks : 3**

How the grossularite and diopside are formed during amphibolite facies metamorphism?

**Question Number : 26 Question Id : 86435114688 Question Type : SUBJECTIVE**

**Correct Marks : 3**

Write short note on metasomatism.

**Question Number : 27 Question Id : 86435114689 Question Type : SUBJECTIVE**

**Correct Marks : 3**

Explain in short the grade of Metamorphism.

**Question Number : 28 Question Id : 86435114690 Question Type : SUBJECTIVE**

**Correct Marks : 3**

Write short notes on paired metamorphic belts.

**Question Number : 29 Question Id : 86435114691 Question Type : SUBJECTIVE**

**Correct Marks : 3**

Draw the ACF diagram for Sillimanite – Muscovite zone of amphibolite facies.

**Question Number : 30 Question Id : 86435114692 Question Type : SUBJECTIVE**  
**Correct Marks : 3**

Write about the significance of exchange transfer reaction.

### **Metamorphic Petrology and Thermodynamics-3**

<b>Section Id :</b>	864351627
<b>Section Number :</b>	3
<b>Section type :</b>	Offline
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	7
<b>Number of Questions to be attempted :</b>	5
<b>Section Marks :</b>	50
<b>Mark As Answered Required? :</b>	Yes
<b>Sub-Section Number :</b>	1
<b>Sub-Section Id :</b>	864351799
<b>Question Shuffling Allowed :</b>	No

**Question Number : 31 Question Id : 86435114693 Question Type : SUBJECTIVE**  
**Correct Marks : 10**

Write short notes on partial melting of pelitic rocks during regional metamorphism.

**Question Number : 32 Question Id : 86435114694 Question Type : SUBJECTIVE**  
**Correct Marks : 10**

Discuss about the factors controlling metamorphism.

**Question Number : 33 Question Id : 86435114695 Question Type : SUBJECTIVE**

**Correct Marks : 10**

Give a detail accounts of zeolite facies.

**Question Number : 34 Question Id : 86435114696 Question Type : SUBJECTIVE**

**Correct Marks : 10**

Describe amphibolite facies under the following heads:

- a. Mineral paragenesis with the suitable diagram
- b. Important metamorphic reactions
- c. P-T condition of metamorphism

**Question Number : 35 Question Id : 86435114697 Question Type : SUBJECTIVE**

**Correct Marks : 10**

Describe migmatite in detail.

**Question Number : 36 Question Id : 86435114698 Question Type : SUBJECTIVE**

**Correct Marks : 10**

Describe with suitable diagram, the regional metamorphism of basic rocks.

**Question Number : 37 Question Id : 86435114699 Question Type : SUBJECTIVE**

**Correct Marks : 10**

Give a detailed account of ACF diagram.