

# **SESSION - 1**

## GATE 2022 General Aptitude (GA)

**Q.1 – Q.5 Carry ONE mark each.**

|     |                                                                  |
|-----|------------------------------------------------------------------|
| Q.1 | Inhaling the smoke from a burning _____ could _____ you quickly. |
| (A) | tire / tier                                                      |
| (B) | tire / tyre                                                      |
| (C) | tyre / tire                                                      |
| (D) | tyre / tier                                                      |

|     |                                                                                                                                                                                                 |
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| Q.2 | <p>A sphere of radius <math>r</math> cm is packed in a box of cubical shape.</p> <p>What should be the minimum volume (in <math>\text{cm}^3</math>) of the box that can enclose the sphere?</p> |
| (A) | $\frac{r^3}{8}$                                                                                                                                                                                 |
| (B) | $r^3$                                                                                                                                                                                           |
| (C) | $2r^3$                                                                                                                                                                                          |
| (D) | $8r^3$                                                                                                                                                                                          |



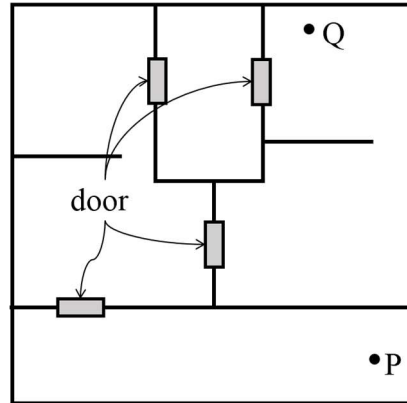
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| Q.3 | <p>Pipes P and Q can fill a storage tank in full with water in 10 and 6 minutes, respectively. Pipe R draws the water out from the storage tank at a rate of 34 litres per minute. P, Q and R operate at a constant rate.</p> <p>If it takes one hour to completely empty a full storage tank with all the pipes operating simultaneously, what is the capacity of the storage tank (in litres)?</p> |
| (A) | 26.8                                                                                                                                                                                                                                                                                                                                                                                                 |
| (B) | 60.0                                                                                                                                                                                                                                                                                                                                                                                                 |
| (C) | 120.0                                                                                                                                                                                                                                                                                                                                                                                                |
| (D) | 127.5                                                                                                                                                                                                                                                                                                                                                                                                |

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| Q.4 | <p>Six persons P, Q, R, S, T and U are sitting around a circular table facing the center not necessarily in the same order. Consider the following statements:</p> <ul style="list-style-type: none"> <li>• P sits next to S and T.</li> <li>• Q sits diametrically opposite to P.</li> <li>• The shortest distance between S and R is equal to the shortest distance between T and U.</li> </ul> <p>Based on the above statements, Q is a neighbor of</p> |
| (A) | U and S                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| (B) | R and T                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| (C) | R and U                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| (D) | P and S                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

Q.5

A building has several rooms and doors as shown in the top view of the building given below. The doors are closed initially.

What is the minimum number of doors that need to be opened in order to go from the point P to the point Q?



(A) 4

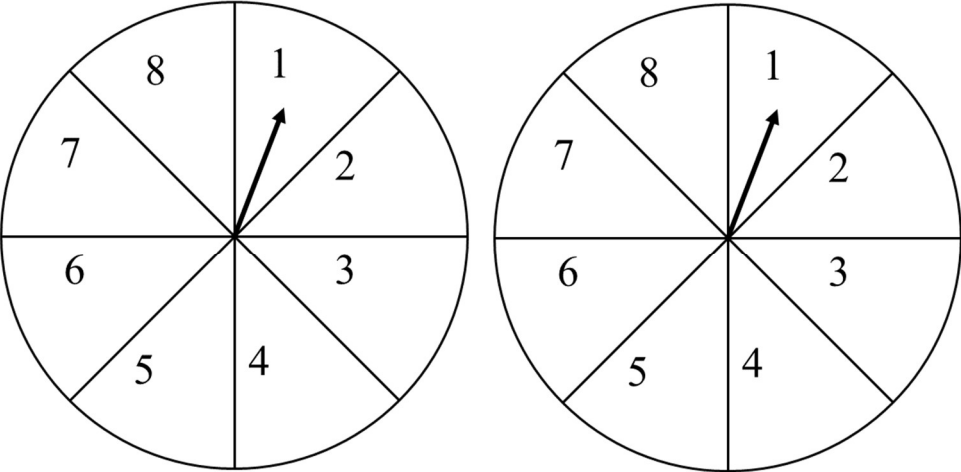
(B) 3

(C) 2

(D) 1

**Q. 6 – Q. 10 Carry TWO marks each.**

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
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| Q.6 | <p>Rice, a versatile and inexpensive source of carbohydrate, is a critical component of diet worldwide. Climate change, causing extreme weather, poses a threat to sustained availability of rice. Scientists are working on developing Green Super Rice (GSR), which is resilient under extreme weather conditions yet gives higher yields sustainably.</p> <p>Which one of the following is the CORRECT logical inference based on the information given in the above passage?</p> |
| (A) | GSR is an alternative to regular rice, but it grows only in an extreme weather                                                                                                                                                                                                                                                                                                                                                                                                       |
| (B) | GSR may be used in future in response to adverse effects of climate change                                                                                                                                                                                                                                                                                                                                                                                                           |
| (C) | GSR grows in an extreme weather, but the quantity of produce is lesser than regular rice                                                                                                                                                                                                                                                                                                                                                                                             |
| (D) | Regular rice will continue to provide good yields even in extreme weather                                                                                                                                                                                                                                                                                                                                                                                                            |

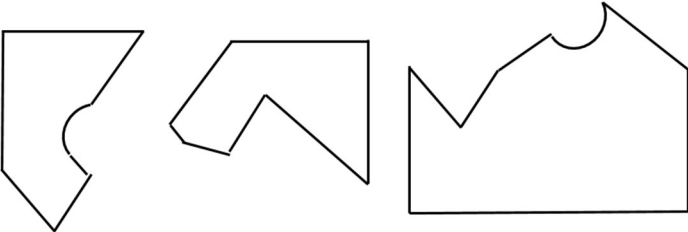
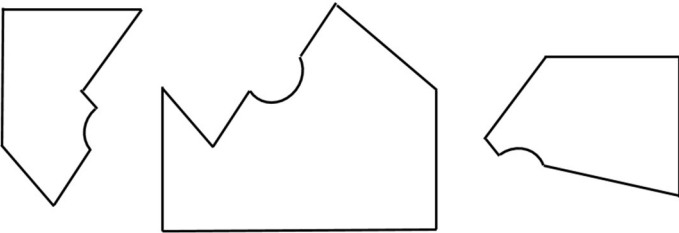
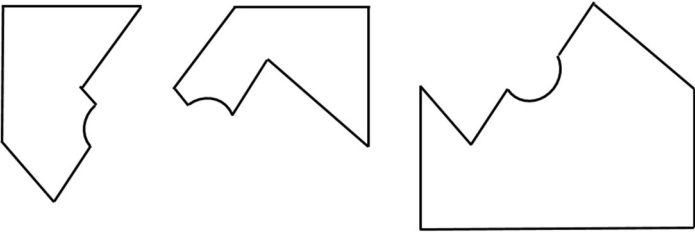
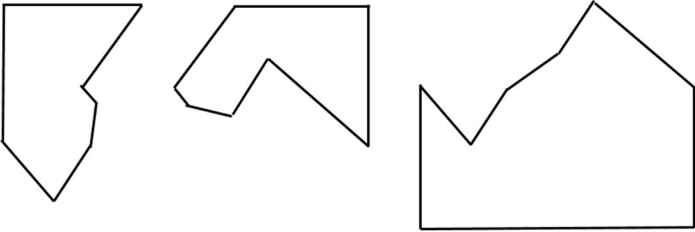
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| <p>Q.7</p> | <p>A game consists of spinning an arrow around a stationary disk as shown below. When the arrow comes to rest, there are eight equally likely outcomes. It could come to rest in any one of the sectors numbered 1, 2, 3, 4, 5, 6, 7 or 8 as shown.</p> <p>Two such disks are used in a game where their arrows are independently spun.</p> <p>What is the probability that the sum of the numbers on the resulting sectors upon spinning the two disks is equal to 8 after the arrows come to rest?</p> <div style="text-align: center;">  </div> |
| <p>(A)</p> | <p><math>\frac{1}{16}</math></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p>(B)</p> | <p><math>\frac{5}{64}</math></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p>(C)</p> | <p><math>\frac{3}{32}</math></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p>(D)</p> | <p><math>\frac{7}{64}</math></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |



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| Q.8 | <p>Consider the following inequalities.</p> <p>(i) <math>3p - q &lt; 4</math></p> <p>(ii) <math>3q - p &lt; 12</math></p> <p>Which one of the following expressions below satisfies the above two inequalities?</p> |
| (A) | $p + q < 8$                                                                                                                                                                                                         |
| (B) | $p + q = 8$                                                                                                                                                                                                         |
| (C) | $8 \leq p + q < 16$                                                                                                                                                                                                 |
| (D) | $p + q \geq 16$                                                                                                                                                                                                     |



|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
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| Q.9 | <p>Given below are three statements and four conclusions drawn based on the statements.</p> <p>Statement 1: Some engineers are writers.</p> <p>Statement 2: No writer is an actor.</p> <p>Statement 3: All actors are engineers.</p> <p>Conclusion I: Some writers are engineers.</p> <p>Conclusion II: All engineers are actors.</p> <p>Conclusion III: No actor is a writer.</p> <p>Conclusion IV: Some actors are writers.</p> <p>Which one of the following options can be logically inferred?</p> |
| (A) | Only conclusion I is correct                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| (B) | Only conclusion II and conclusion III are correct                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| (C) | Only conclusion I and conclusion III are correct                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| (D) | Either conclusion III or conclusion IV is correct                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

|      |                                                                                                                                              |
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| Q.10 | Which one of the following sets of pieces can be assembled to form a square with a single round hole near the center? Pieces cannot overlap. |
| (A)  |                                                            |
| (B)  |                                                            |
| (C)  |                                                          |
| (D)  |                                                          |

**PART A: COMPULSORY SECTION FOR ALL CANDIDATES**

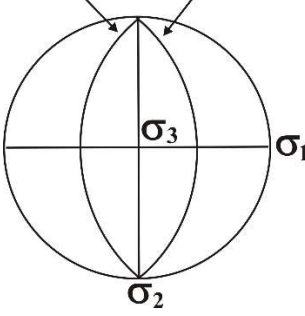
**Q.11 – Q .17 Carry ONE mark each**

|      |                                                                                                 |
|------|-------------------------------------------------------------------------------------------------|
| Q.11 | Which one of the following is the typical product of ductile deformation?                       |
| (A)  | Gouge                                                                                           |
| (B)  | Breccia                                                                                         |
| (C)  | Cataclasite                                                                                     |
| (D)  | Mylonite                                                                                        |
|      |                                                                                                 |
| Q.12 | Which one among the following coastal erosional landforms is caused by the action of sea waves? |
| (A)  | Ventifact                                                                                       |
| (B)  | Kettle                                                                                          |
| (C)  | Cirque                                                                                          |
| (D)  | Cliff                                                                                           |
|      |                                                                                                 |
|      |                                                                                                 |
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| Q.13 | In which one of the following regions of the electromagnetic spectrum does the maximum atmospheric scattering occur? |
| (A)  | UV                                                                                                                   |
| (B)  | IR                                                                                                                   |
| (C)  | Radiowave                                                                                                            |
| (D)  | Microwave                                                                                                            |
|      |                                                                                                                      |
| Q.14 | Which one of the following is the Poisson's ratio for an incompressible fluid?                                       |
| (A)  | 0                                                                                                                    |
| (B)  | 0.25                                                                                                                 |
| (C)  | 1                                                                                                                    |
| (D)  | 0.5                                                                                                                  |
|      |                                                                                                                      |
| Q.15 | Which among the following Period(s) belong(s) to the Paleozoic Era?                                                  |
| (A)  | Carboniferous                                                                                                        |
| (B)  | Paleogene                                                                                                            |
| (C)  | Silurian                                                                                                             |
| (D)  | Cretaceous                                                                                                           |

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| Q.16 | The average bulk density of a fully saturated sandstone reservoir with a fractional porosity of 0.23 is _____ g/cc. [round off to 2 decimal places]<br><br>[Assume matrix density for sandstone = 2.63 g/cc and fluid density = 1.05 g/cc] |
|      |                                                                                                                                                                                                                                            |
| Q.17 | For a productive alluvial aquifer with hydraulic conductivity = 105 m/day and hydraulic gradient = 0.01, the flow rate is _____ m/day. [round off to 2 decimal places]                                                                     |

**Q.18 – Q .26 Carry TWO marks each**

|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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| Q.18 | <p>The relationship between conjugate shear fractures and the principal stresses in a homogenous, isotropic, deformed body is shown in the stereoplot given below (<math>\sigma_1</math>, <math>\sigma_2</math> and <math>\sigma_3</math> are compressive stresses). Which one of the given fault regimes is indicated according to the Anderson's theory of faulting for the formation of conjugate shear fractures under plane strain?</p> <p style="text-align: center;">Conjugate Fractures</p>  |
| (A)  | Dextral strike-slip                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| (B)  | Sinistral strike-slip                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| (C)  | Reverse                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| (D)  | Normal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

|      |                                                                                                                                              |
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| Q.19 | How many independent elastic parameters are needed to describe a homogenous isotropic material?                                              |
| (A)  | 21                                                                                                                                           |
| (B)  | 2                                                                                                                                            |
| (C)  | 36                                                                                                                                           |
| (D)  | 3                                                                                                                                            |
|      |                                                                                                                                              |
| Q.20 | Which one of the following is a mafic volcanic rock?                                                                                         |
| (A)  | Dacite                                                                                                                                       |
| (B)  | Trachyte                                                                                                                                     |
| (C)  | Rhyolite                                                                                                                                     |
| (D)  | Basalt                                                                                                                                       |
|      |                                                                                                                                              |
| Q.21 | The intercepts of a crystal face on the crystallographic axes are $\infty a$ , $2b$ , $3c$ . Which one of the following is its Miller Index? |
| (A)  | (032)                                                                                                                                        |
| (B)  | (023)                                                                                                                                        |
| (C)  | (203)                                                                                                                                        |
| (D)  | (320)                                                                                                                                        |

| Q.22           | <p>Match the locations in Group I with the corresponding economic deposits in Group II.</p> <table> <tr> <th>Group I</th><th>Group II</th></tr> <tr> <td>P. Wajrakarur</td><td>1. Chromite</td></tr> <tr> <td>Q. Sukinda</td><td>2. Diamond</td></tr> <tr> <td>R. Malanjkhand</td><td>3. Barite</td></tr> <tr> <td>S. Mangampeta</td><td>4. Copper</td></tr> </table> | Group I | Group II | P. Wajrakarur | 1. Chromite | Q. Sukinda | 2. Diamond | R. Malanjkhand | 3. Barite | S. Mangampeta | 4. Copper |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------|---------------|-------------|------------|------------|----------------|-----------|---------------|-----------|
| Group I        | Group II                                                                                                                                                                                                                                                                                                                                                              |         |          |               |             |            |            |                |           |               |           |
| P. Wajrakarur  | 1. Chromite                                                                                                                                                                                                                                                                                                                                                           |         |          |               |             |            |            |                |           |               |           |
| Q. Sukinda     | 2. Diamond                                                                                                                                                                                                                                                                                                                                                            |         |          |               |             |            |            |                |           |               |           |
| R. Malanjkhand | 3. Barite                                                                                                                                                                                                                                                                                                                                                             |         |          |               |             |            |            |                |           |               |           |
| S. Mangampeta  | 4. Copper                                                                                                                                                                                                                                                                                                                                                             |         |          |               |             |            |            |                |           |               |           |
| (A)            | P-3; Q-4; R-1; S-2                                                                                                                                                                                                                                                                                                                                                    |         |          |               |             |            |            |                |           |               |           |
| (B)            | P-3; Q-1; R-4; S-2                                                                                                                                                                                                                                                                                                                                                    |         |          |               |             |            |            |                |           |               |           |
| (C)            | P-2; Q-1; R-4; S-3                                                                                                                                                                                                                                                                                                                                                    |         |          |               |             |            |            |                |           |               |           |
| (D)            | P-2; Q-4; R-1; S-3                                                                                                                                                                                                                                                                                                                                                    |         |          |               |             |            |            |                |           |               |           |
|                |                                                                                                                                                                                                                                                                                                                                                                       |         |          |               |             |            |            |                |           |               |           |
| Q.23           | Choose the CORRECT statement(s) on seismic wave propagation in an elastic isotropic medium.                                                                                                                                                                                                                                                                           |         |          |               |             |            |            |                |           |               |           |
| (A)            | P-waves are polarized in the direction of propagation.                                                                                                                                                                                                                                                                                                                |         |          |               |             |            |            |                |           |               |           |
| (B)            | S-waves are polarized in the direction of propagation.                                                                                                                                                                                                                                                                                                                |         |          |               |             |            |            |                |           |               |           |
| (C)            | Rayleigh waves are elliptically polarized.                                                                                                                                                                                                                                                                                                                            |         |          |               |             |            |            |                |           |               |           |
| (D)            | Love waves are elliptically polarized.                                                                                                                                                                                                                                                                                                                                |         |          |               |             |            |            |                |           |               |           |
|                |                                                                                                                                                                                                                                                                                                                                                                       |         |          |               |             |            |            |                |           |               |           |

|      |                                                                                                                                                                                                                                                                                                                                                                                   |
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| Q.24 | The difference in arrival times of P- and S-waves generated by an earthquake and recorded at a seismological station is one second. Assuming a homogeneous and isotropic Earth, a P-wave velocity ( $V_P$ ) of 3 km/s, the ratio of P- to S-wave velocities ( $V_P/V_S$ ) of 2.0, the distance between the station and the hypocenter is _____ km. [round off to 1 decimal place] |
|      |                                                                                                                                                                                                                                                                                                                                                                                   |
| Q.25 | Assuming the rate of rotation of the Earth is $7.27 \times 10^{-5}$ radians/s and the radius of Earth is 6371 km, the centrifugal acceleration at $60^\circ$ latitude for a spherically rotating Earth is _____ $\times 10^{-3}$ m/s <sup>2</sup> . [round off to 1 decimal place]                                                                                                |
|      |                                                                                                                                                                                                                                                                                                                                                                                   |
| Q.26 | The angle of inclination of the remanent magnetization of a volcanic rock measured at a location is $45^\circ$ . The magnetic latitude of the location of the volcanic rock at the time of its magnetization is _____ $^\circ$ N. [round off to 1 decimal place]                                                                                                                  |
|      |                                                                                                                                                                                                                                                                                                                                                                                   |



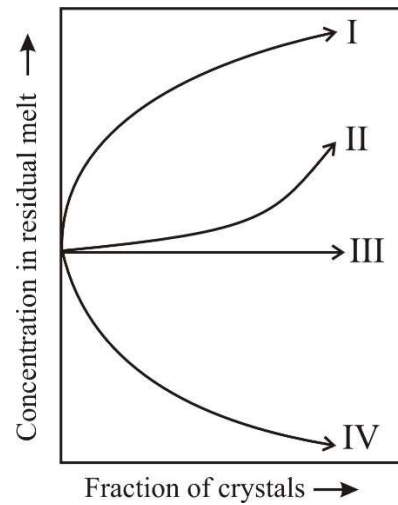
**PART B (SECTION 1): FOR GEOLOGY CANDIDATES ONLY**

**Q.27 – Q.44 Carry ONE mark Each**

|      |                                                                                                                                        |
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| Q.27 | A coarse-grained igneous rock consists of 55% olivine, 25% augite and 20% enstatite. According to the IUGS classification, the rock is |
| (A)  | websterite                                                                                                                             |
| (B)  | lherzolite                                                                                                                             |
| (C)  | wehrlite                                                                                                                               |
| (D)  | harzburgite                                                                                                                            |
|      |                                                                                                                                        |
| Q.28 | The rock-type used to build the walls of the Red Fort in Delhi is                                                                      |
| (A)  | sandstone                                                                                                                              |
| (B)  | marble                                                                                                                                 |
| (C)  | granite                                                                                                                                |
| (D)  | basalt                                                                                                                                 |
|      |                                                                                                                                        |
|      |                                                                                                                                        |
|      |                                                                                                                                        |
|      |                                                                                                                                        |

Q.29

During crystallization of a magma, which one of the following schematic paths (I, II, III and IV) describes the behavior of compatible elements in the residual melt?



(A)

II

(B)

IV

(C)

I

(D)

III

Q.30

In the geological map of India, which one of the following geological units has the largest area?

(A)

Vindhyan Supergroup

(B)

Deccan Volcanic Province

(C)

Singhbhum Granite

(D)

Mesozoic rocks of Kutch

|      |                                                                                                                                                                             |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Q.31 | Which one of the following cross-stratifications provides the paleocurrent direction on the truncated bedding surface of an undeformed cross-stratified sedimentary strata? |
| (A)  | Tabular                                                                                                                                                                     |
| (B)  | Hummocky                                                                                                                                                                    |
| (C)  | Trough                                                                                                                                                                      |
| (D)  | Herringbone                                                                                                                                                                 |
|      |                                                                                                                                                                             |
| Q.32 | Which one of the following is a dinosaur?                                                                                                                                   |
| (A)  | <i>Stegodon</i>                                                                                                                                                             |
| (B)  | <i>Stegosaurus</i>                                                                                                                                                          |
| (C)  | <i>Equus</i>                                                                                                                                                                |
| (D)  | <i>Otoceras</i>                                                                                                                                                             |
|      |                                                                                                                                                                             |
| Q.33 | The Hoek-Brown failure envelope is typically the segment of which one of the following?                                                                                     |
| (A)  | Straight line                                                                                                                                                               |
| (B)  | Ellipse                                                                                                                                                                     |
| (C)  | Parabola                                                                                                                                                                    |
| (D)  | Hyperbola                                                                                                                                                                   |

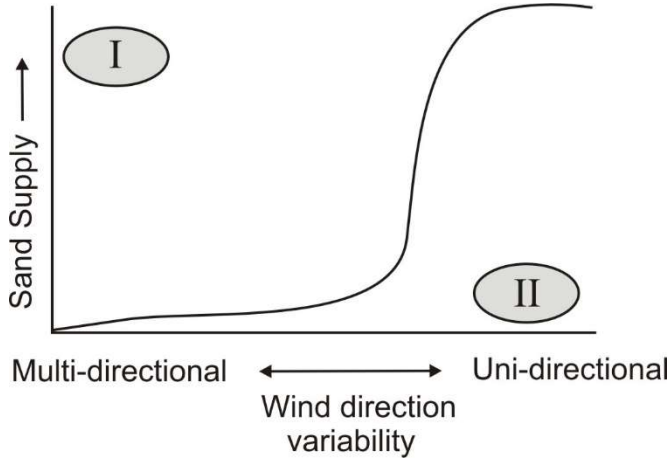
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|      |                                                                                                                                                              |
| Q.34 | Which one of the following is the optical spectral window suitable for remote sensing?                                                                       |
| (A)  | 0.02 – 0.2 $\mu\text{m}$                                                                                                                                     |
| (B)  | 0.4 – 14 $\mu\text{m}$                                                                                                                                       |
| (C)  | 0.8 – 2.0 $\mu\text{m}$                                                                                                                                      |
| (D)  | 0.01 – 1 m                                                                                                                                                   |
|      |                                                                                                                                                              |
| Q.35 | A radioactive nucleus ${}^{290}_{92}\text{X}$ decays to ${}^{278}_{87}\text{Y}$ . The number of $\alpha$ and $\beta$ particles emitted during this decay are |
| (A)  | $12\alpha$ and $1\beta^{+}$                                                                                                                                  |
| (B)  | $6\alpha$ and $1\beta^{-}$                                                                                                                                   |
| (C)  | $3\alpha$ and $1\beta^{+}$                                                                                                                                   |
| (D)  | $3\alpha$ and $1\beta^{-}$                                                                                                                                   |
|      |                                                                                                                                                              |
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| Q.36 | The silicate mineral(s) that commonly occur(s) in regionally metamorphosed siliceous dolomitic limestone is/are |
| (A)  | diopside                                                                                                        |
| (B)  | cordierite                                                                                                      |
| (C)  | tremolite                                                                                                       |
| (D)  | wollastonite                                                                                                    |
|      |                                                                                                                 |
| Q.37 | Which of the natural hazard(s) listed below can be caused by Earthquakes?                                       |
| (A)  | Tsunamis                                                                                                        |
| (B)  | Landslides                                                                                                      |
| (C)  | Cyclones                                                                                                        |
| (D)  | Lightning                                                                                                       |
|      |                                                                                                                 |
| Q.38 | Which of the following is/are the driving force(s) behind plate motion?                                         |
| (A)  | Slab-Pull                                                                                                       |
| (B)  | Ridge-Push                                                                                                      |
| (C)  | Mantle Convection                                                                                               |
| (D)  | Advection                                                                                                       |

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| Q.39 | Which of the following is/are copper ore mineral(s)?                                                                                                                                                                             |
| (A)  | Bornite                                                                                                                                                                                                                          |
| (B)  | Pentlandite                                                                                                                                                                                                                      |
| (C)  | Gahnite                                                                                                                                                                                                                          |
| (D)  | Covellite                                                                                                                                                                                                                        |
|      |                                                                                                                                                                                                                                  |
| Q.40 | Which of the following stratigraphic unit(s) of the Vindhyan Supergroup contain(s) commercially significant limestone deposit(s)?                                                                                                |
| (A)  | Bhander Formation                                                                                                                                                                                                                |
| (B)  | Rewa Formation                                                                                                                                                                                                                   |
| (C)  | Kaimur Formation                                                                                                                                                                                                                 |
| (D)  | Rohtas Formation                                                                                                                                                                                                                 |
|      |                                                                                                                                                                                                                                  |
| Q.41 | The strike and dip of the axial plane of a reclined fold is $022^\circ$ and $28^\circ$ SE, respectively. The plunge direction (in whole circle bearing) of the axis of the reclined fold is _____ degrees. [ <i>in integer</i> ] |
|      |                                                                                                                                                                                                                                  |
| Q.42 | If the shrinkage factor of a crude oil is 0.7, its formation volume factor is _____. [ <i>round off to 1 decimal place</i> ]                                                                                                     |

|      |                                                                                                                                                                                                                                                        |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Q.43 | The cross section of a river channel is approximated by a trapezium. The river has an average channel width of 40 m and average depth of 3 m. If the average flow speed is 2 m/s, the discharge rate is _____ m <sup>3</sup> /s. [ <i>in integer</i> ] |
|      |                                                                                                                                                                                                                                                        |
| Q.44 | A mineral of uniform composition is cut into a wedge shape. The birefringence of the wedge section is 0.012. The retardation at 40 μm thickness of the wedge is _____ nm. [ <i>in integer</i> ]                                                        |
|      |                                                                                                                                                                                                                                                        |

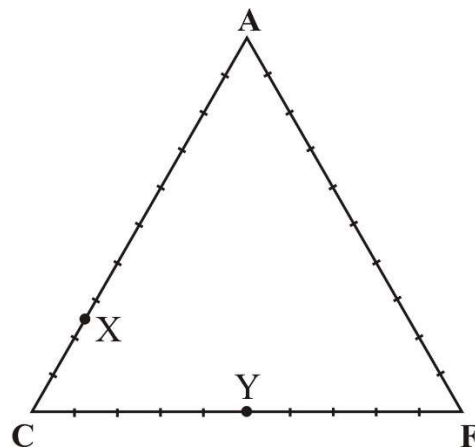
**Q.45 – Q.65 Carry TWO marks Each**

|             |                                                                                                                                                                                                                                                                             |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Q.45</p> | <p>The sand supply and the variability of wind direction results in different dune types. In the options below, choose the CORRECT pair of dune types marked I and II in the figure.</p>  |
| (A)         | I – Transverse dune; II – Barchan dune                                                                                                                                                                                                                                      |
| (B)         | I – Star dune; II – Barchan dune                                                                                                                                                                                                                                            |
| (C)         | I – Barchan dune; II – Linear dune                                                                                                                                                                                                                                          |
| (D)         | I – Barchan dune; II – Star dune                                                                                                                                                                                                                                            |
|             |                                                                                                                                                                                                                                                                             |
| Q.46        | Which one of the following statements is CORRECT?                                                                                                                                                                                                                           |
| (A)         | Salt dome traps are abundant in the Upper Assam Basin                                                                                                                                                                                                                       |
| (B)         | Fold and thrust related traps are common in the Mumbai Offshore Basin                                                                                                                                                                                                       |
| (C)         | Limestone is the predominant reservoir rock in the Cambay Basin                                                                                                                                                                                                             |
| (D)         | Sandstone is the reservoir rock in the Krishna-Godavari Basin                                                                                                                                                                                                               |
|             |                                                                                                                                                                                                                                                                             |



Q.47

Identify the common metamorphic minerals labelled X and Y in the ACF diagram.

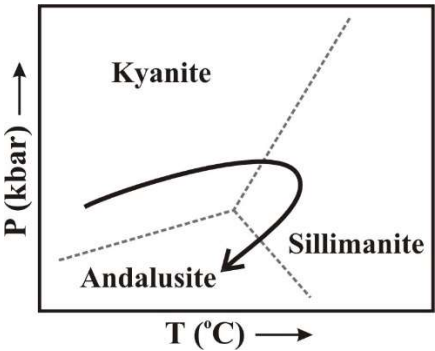
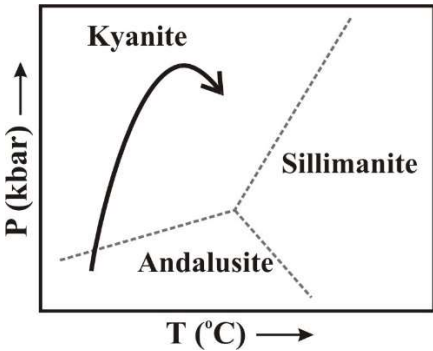
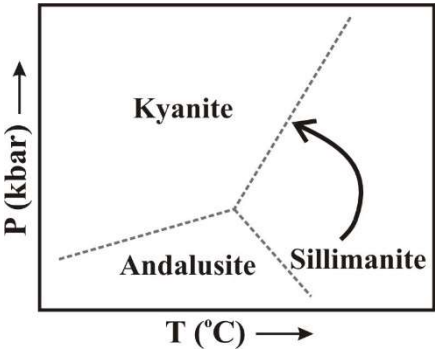
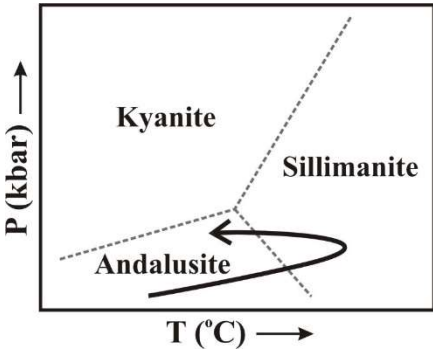


(A) X – Anorthite; Y – Actinolite

(B) X – Grossular; Y – Diopside

(C) X – Wollastonite; Y – Almandine

(D) X – Ferrosilite; Y – Andradite

|      |                                                                                                                 |     |                                                                                     |
|------|-----------------------------------------------------------------------------------------------------------------|-----|-------------------------------------------------------------------------------------|
| Q.48 | Which one of the following schematic P-T paths is characteristic for a rock metamorphosed in a subduction zone? |     |                                                                                     |
| (A)  |                                | (B) |   |
| (C)  |                               | (D) |  |
|      |                                                                                                                 |     |                                                                                     |
| Q.49 | Which one of the following is the CORRECT statement regarding the ecology of bivalves?                          |     |                                                                                     |
| (A)  | <i>Pholas</i> is a swimming form                                                                                |     |                                                                                     |
| (B)  | <i>Venus</i> is a shallow burrower                                                                              |     |                                                                                     |
| (C)  | <i>Pecten</i> is a stone borer                                                                                  |     |                                                                                     |
| (D)  | <i>Spondylus</i> is a deep burrower                                                                             |     |                                                                                     |
|      |                                                                                                                 |     |                                                                                     |
|      |                                                                                                                 |     |                                                                                     |

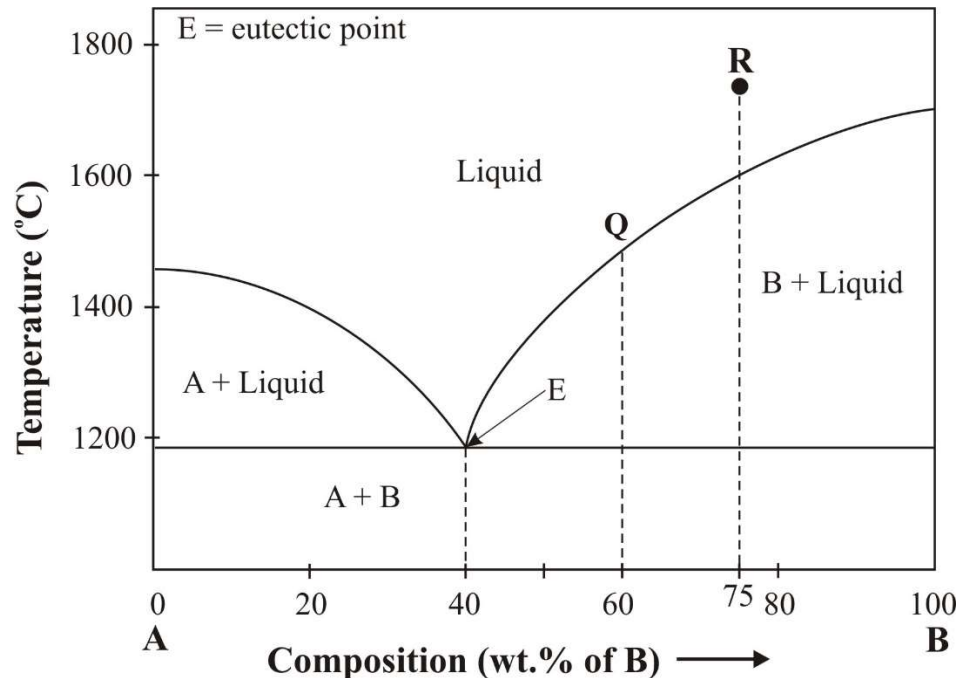
| Q.50               | On a fault surface with strike and dip $320^\circ$ and $55^\circ$ NE, respectively, four sets of slickenlines were measured by a geologist. Given that the fault surface was measured correctly, the plunge and plunge direction of the lineation on the fault surface is                                                                                                                                                                                        |         |          |              |                 |                  |                |                    |                       |             |                     |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------|--------------|-----------------|------------------|----------------|--------------------|-----------------------|-------------|---------------------|
| (A)                | $55^\circ \rightarrow 050^\circ$                                                                                                                                                                                                                                                                                                                                                                                                                                 |         |          |              |                 |                  |                |                    |                       |             |                     |
| (B)                | $20^\circ \rightarrow 320^\circ$                                                                                                                                                                                                                                                                                                                                                                                                                                 |         |          |              |                 |                  |                |                    |                       |             |                     |
| (C)                | $50^\circ \rightarrow 325^\circ$                                                                                                                                                                                                                                                                                                                                                                                                                                 |         |          |              |                 |                  |                |                    |                       |             |                     |
| (D)                | $60^\circ \rightarrow 090^\circ$                                                                                                                                                                                                                                                                                                                                                                                                                                 |         |          |              |                 |                  |                |                    |                       |             |                     |
|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |         |          |              |                 |                  |                |                    |                       |             |                     |
| Q.51               | <p>Match the following tectonic settings in Group-I with the corresponding examples in Group-II.</p> <table border="0"> <thead> <tr> <th>Group-I</th><th>Group-II</th></tr> </thead> <tbody> <tr> <td>P Rift Basin</td><td>1 Pacific Ocean</td></tr> <tr> <td>Q Passive Margin</td><td>2 Gulf of Suez</td></tr> <tr> <td>R Subducting Ocean</td><td>3 West coast of India</td></tr> <tr> <td>S Collision</td><td>4 Mediterranean Sea</td></tr> </tbody> </table> | Group-I | Group-II | P Rift Basin | 1 Pacific Ocean | Q Passive Margin | 2 Gulf of Suez | R Subducting Ocean | 3 West coast of India | S Collision | 4 Mediterranean Sea |
| Group-I            | Group-II                                                                                                                                                                                                                                                                                                                                                                                                                                                         |         |          |              |                 |                  |                |                    |                       |             |                     |
| P Rift Basin       | 1 Pacific Ocean                                                                                                                                                                                                                                                                                                                                                                                                                                                  |         |          |              |                 |                  |                |                    |                       |             |                     |
| Q Passive Margin   | 2 Gulf of Suez                                                                                                                                                                                                                                                                                                                                                                                                                                                   |         |          |              |                 |                  |                |                    |                       |             |                     |
| R Subducting Ocean | 3 West coast of India                                                                                                                                                                                                                                                                                                                                                                                                                                            |         |          |              |                 |                  |                |                    |                       |             |                     |
| S Collision        | 4 Mediterranean Sea                                                                                                                                                                                                                                                                                                                                                                                                                                              |         |          |              |                 |                  |                |                    |                       |             |                     |
| (A)                | P-2; Q-3; R-1; S-4                                                                                                                                                                                                                                                                                                                                                                                                                                               |         |          |              |                 |                  |                |                    |                       |             |                     |
| (B)                | P-3; Q-2; R-4; S-1                                                                                                                                                                                                                                                                                                                                                                                                                                               |         |          |              |                 |                  |                |                    |                       |             |                     |
| (C)                | P-2; Q-1; R-3; S-4                                                                                                                                                                                                                                                                                                                                                                                                                                               |         |          |              |                 |                  |                |                    |                       |             |                     |
| (D)                | P-4; Q-3; R-1; S-2                                                                                                                                                                                                                                                                                                                                                                                                                                               |         |          |              |                 |                  |                |                    |                       |             |                     |

| Q.52         | <p>Match the following igneous textures in Group-I with their definitions in Group-II.</p> <table> <tr> <th>Group-I</th><th>Group-II</th></tr> <tr> <td>P Vitrophyre</td><td>1 Alkali feldspar rimmed by plagioclase</td></tr> <tr> <td>Q Rapakivi</td><td>2 Aggregate of radially arrayed, needle-like crystals of plagioclase with or without clinopyroxene</td></tr> <tr> <td>R Ocelli</td><td>3 Sub-parallel skeletal, platy olivine and/or pyroxene</td></tr> <tr> <td>S Spinifex</td><td>4 Large phenocrysts within a glassy matrix</td></tr> </table> | Group-I | Group-II | P Vitrophyre | 1 Alkali feldspar rimmed by plagioclase | Q Rapakivi | 2 Aggregate of radially arrayed, needle-like crystals of plagioclase with or without clinopyroxene | R Ocelli | 3 Sub-parallel skeletal, platy olivine and/or pyroxene | S Spinifex | 4 Large phenocrysts within a glassy matrix |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------|--------------|-----------------------------------------|------------|----------------------------------------------------------------------------------------------------|----------|--------------------------------------------------------|------------|--------------------------------------------|
| Group-I      | Group-II                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |         |          |              |                                         |            |                                                                                                    |          |                                                        |            |                                            |
| P Vitrophyre | 1 Alkali feldspar rimmed by plagioclase                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |         |          |              |                                         |            |                                                                                                    |          |                                                        |            |                                            |
| Q Rapakivi   | 2 Aggregate of radially arrayed, needle-like crystals of plagioclase with or without clinopyroxene                                                                                                                                                                                                                                                                                                                                                                                                                                                           |         |          |              |                                         |            |                                                                                                    |          |                                                        |            |                                            |
| R Ocelli     | 3 Sub-parallel skeletal, platy olivine and/or pyroxene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |         |          |              |                                         |            |                                                                                                    |          |                                                        |            |                                            |
| S Spinifex   | 4 Large phenocrysts within a glassy matrix                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |         |          |              |                                         |            |                                                                                                    |          |                                                        |            |                                            |
| (A)          | P-2; Q-3; R-4; S-1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |         |          |              |                                         |            |                                                                                                    |          |                                                        |            |                                            |
| (B)          | P-3; Q-4; R-2; S-1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |         |          |              |                                         |            |                                                                                                    |          |                                                        |            |                                            |
| (C)          | P-4; Q-1; R-2; S-3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |         |          |              |                                         |            |                                                                                                    |          |                                                        |            |                                            |
| (D)          | P-4; Q-1; R-3; S-2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |         |          |              |                                         |            |                                                                                                    |          |                                                        |            |                                            |
|              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |         |          |              |                                         |            |                                                                                                    |          |                                                        |            |                                            |
|              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |         |          |              |                                         |            |                                                                                                    |          |                                                        |            |                                            |
|              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |         |          |              |                                         |            |                                                                                                    |          |                                                        |            |                                            |
|              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |         |          |              |                                         |            |                                                                                                    |          |                                                        |            |                                            |

| Q.53       | <p>Match the Volcanogenic Massive Sulfide (VMS)-type deposits in Group-I with the dominant mineralized host rocks in Group-II.</p> <table> <tr> <th data-bbox="336 353 456 389">Group-I</th><th data-bbox="762 353 895 389">Group-II</th></tr> <tr> <td data-bbox="336 434 491 470">P Besshi</td><td data-bbox="762 434 1038 470">1 Felsic volcanics</td></tr> <tr> <td data-bbox="336 515 515 551">Q Bathurst</td><td data-bbox="762 515 1230 551">2 Mafic volcanics + siliciclastics</td></tr> <tr> <td data-bbox="336 595 504 631">R Kuroko</td><td data-bbox="762 595 1038 631">3 Mafic volcanics</td></tr> <tr> <td data-bbox="336 676 499 712">S Cyprus</td><td data-bbox="762 676 1230 712">4 Felsic volcanics + siliciclastics</td></tr> </table> | Group-I | Group-II | P Besshi | 1 Felsic volcanics | Q Bathurst | 2 Mafic volcanics + siliciclastics | R Kuroko | 3 Mafic volcanics | S Cyprus | 4 Felsic volcanics + siliciclastics |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------|----------|--------------------|------------|------------------------------------|----------|-------------------|----------|-------------------------------------|
| Group-I    | Group-II                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |         |          |          |                    |            |                                    |          |                   |          |                                     |
| P Besshi   | 1 Felsic volcanics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |          |          |                    |            |                                    |          |                   |          |                                     |
| Q Bathurst | 2 Mafic volcanics + siliciclastics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |          |          |                    |            |                                    |          |                   |          |                                     |
| R Kuroko   | 3 Mafic volcanics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |         |          |          |                    |            |                                    |          |                   |          |                                     |
| S Cyprus   | 4 Felsic volcanics + siliciclastics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |         |          |          |                    |            |                                    |          |                   |          |                                     |
| (A)        | P-2; Q-1; R-3; S-4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |          |          |                    |            |                                    |          |                   |          |                                     |
| (B)        | P-2; Q-4; R-1; S-3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |          |          |                    |            |                                    |          |                   |          |                                     |
| (C)        | P-4; Q-3; R-1; S-2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |          |          |                    |            |                                    |          |                   |          |                                     |
| (D)        | P-1; Q-4; R-2; S-3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |          |          |                    |            |                                    |          |                   |          |                                     |
|            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |         |          |          |                    |            |                                    |          |                   |          |                                     |
|            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |         |          |          |                    |            |                                    |          |                   |          |                                     |
|            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |         |          |          |                    |            |                                    |          |                   |          |                                     |
|            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |         |          |          |                    |            |                                    |          |                   |          |                                     |
|            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |         |          |          |                    |            |                                    |          |                   |          |                                     |
|            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |         |          |          |                    |            |                                    |          |                   |          |                                     |
|            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |         |          |          |                    |            |                                    |          |                   |          |                                     |
|            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |         |          |          |                    |            |                                    |          |                   |          |                                     |

Q.54

The following diagram shows phase relations in a system consisting of components A and B at 1 bar pressure. If the initial composition of liquid is **R**, during cooling and crystallization of magma, which of the following statement(s) is/are CORRECT?



- (A) On complete crystallization of magma, the final composition (in wt.%) of rock consists of 25 of mineral **A** and 75 of mineral **B**.
- (B) On cooling of magma, mineral **A** is the first mineral to crystallize.
- (C) At point **Q**, the weight percentages of crystal and liquid are 37.5 and 62.5, respectively.
- (D) The composition (in wt.%) of liquid at point **E** is 40 **A** and 60 **B**.

|      |                                                                                                            |
|------|------------------------------------------------------------------------------------------------------------|
| Q.55 | Which of the following systems tract(s) indicate regression?                                               |
| (A)  | Transgressive systems tract                                                                                |
| (B)  | Falling stage systems tract                                                                                |
| (C)  | Highstand systems tract                                                                                    |
| (D)  | Lowstand systems tract                                                                                     |
|      |                                                                                                            |
| Q.56 | Which of the following sedimentary feature(s) indicate(s) sub-aerial exposure of the depositional surface? |
| (A)  | Groove cast                                                                                                |
| (B)  | Double mud drape                                                                                           |
| (C)  | Rain print                                                                                                 |
| (D)  | Adhesion ripple                                                                                            |
|      |                                                                                                            |
| Q.57 | Which of the following statement(s) is/are correct?                                                        |
| (A)  | Diatoms are algal forms.                                                                                   |
| (B)  | Dinoflagellates are unicellular algae.                                                                     |
| (C)  | Petropods are planktic gastropods.                                                                         |
| (D)  | Radiolarians are organic-walled microfossils.                                                              |

|      |                                                                                                             |
|------|-------------------------------------------------------------------------------------------------------------|
| Q.58 | Which among the following space groups is/are non-compatible with glide plane?                              |
| (A)  | Pab <sub>2</sub> <sub>1</sub>                                                                               |
| (B)  | Pnma                                                                                                        |
| (C)  | P6 <sub>3</sub> /c                                                                                          |
| (D)  | P $\bar{3}$ c1                                                                                              |
|      |                                                                                                             |
| Q.59 | Which type of porphyroclast(s) listed below is/are suitable as kinematic indicators in ductile shear zones? |
| (A)  | $\sigma$ - type                                                                                             |
| (B)  | $\Theta$ - type                                                                                             |
| (C)  | $\delta$ - type                                                                                             |
| (D)  | $\varphi$ - type                                                                                            |
|      |                                                                                                             |
| Q.60 | Which of the following parameter(s) is/are Rock Mass Rating (RMR) based on?                                 |
| (A)  | Rock Quality Designation                                                                                    |
| (B)  | Uniaxial compressive strength of intact rock                                                                |
| (C)  | Groundwater conditions                                                                                      |
| (D)  | Rock composition                                                                                            |



| Q.61         | A sample of 10 g coal yields 1 g of moisture, 2 g of ash and 5.6 g of volatile matter. The percentage of volatile matter content of the coal on dry ash-free basis is _____. [round off to 1 decimal place]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                     |                                |                               |                    |                     |           |       |        |        |       |       |           |       |        |              |       |       |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------------------------|-------------------------------|--------------------|---------------------|-----------|-------|--------|--------|-------|-------|-----------|-------|--------|--------------|-------|-------|
|              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                     |                                |                               |                    |                     |           |       |        |        |       |       |           |       |        |              |       |       |
| Q.62         | A soil sample shows an average beta count of 6.8 counts per minute (cpm) per gram of organic carbon. The <sup>14</sup> C count rate from organic carbon of present day vegetation is 15.26 cpm/g. The age of the sample is _____ years. [round off to 1 decimal place] (Half-life of <sup>14</sup> C = 5370 years)                                                                                                                                                                                                                                                                                                                                                                                                             |                     |                                |                               |                    |                     |           |       |        |        |       |       |           |       |        |              |       |       |
|              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                     |                                |                               |                    |                     |           |       |        |        |       |       |           |       |        |              |       |       |
| Q. 63        | A digital camera with a focal length of 150 mm is flown at a height of 3000 m over a flat terrain for taking aerial photographs. The scale of the aerial photograph is 1: _____. [in integer]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                     |                                |                               |                    |                     |           |       |        |        |       |       |           |       |        |              |       |       |
|              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                     |                                |                               |                    |                     |           |       |        |        |       |       |           |       |        |              |       |       |
| Q. 64        | <p>The following reaction occurs at 1 bar and 823 K.</p> <p style="text-align: center;">Grossular + Quartz = Anorthite + 2 Wollastonite</p> <table><tr><th rowspan="2">Mineral</th><th>Entropy (S<sup>1, 823</sup>)</th><th>Volume (V<sup>1, 823</sup>)</th></tr><tr><th>kJ K<sup>-1</sup></th><th>J bar<sup>-1</sup></th></tr><tr><td>Grossular</td><td>0.255</td><td>12.535</td></tr><tr><td>Quartz</td><td>0.042</td><td>2.269</td></tr><tr><td>Anorthite</td><td>0.200</td><td>10.079</td></tr><tr><td>Wollastonite</td><td>0.082</td><td>3.993</td></tr></table> <p>Using the above molar thermodynamic data, the calculated slope of the above reaction is _____ bar K<sup>-1</sup>. [round off to 2 decimal places]</p> | Mineral             | Entropy (S <sup>1, 823</sup> ) | Volume (V <sup>1, 823</sup> ) | kJ K <sup>-1</sup> | J bar <sup>-1</sup> | Grossular | 0.255 | 12.535 | Quartz | 0.042 | 2.269 | Anorthite | 0.200 | 10.079 | Wollastonite | 0.082 | 3.993 |
| Mineral      | Entropy (S <sup>1, 823</sup> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     | Volume (V <sup>1, 823</sup> )  |                               |                    |                     |           |       |        |        |       |       |           |       |        |              |       |       |
|              | kJ K <sup>-1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | J bar <sup>-1</sup> |                                |                               |                    |                     |           |       |        |        |       |       |           |       |        |              |       |       |
| Grossular    | 0.255                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 12.535              |                                |                               |                    |                     |           |       |        |        |       |       |           |       |        |              |       |       |
| Quartz       | 0.042                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2.269               |                                |                               |                    |                     |           |       |        |        |       |       |           |       |        |              |       |       |
| Anorthite    | 0.200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 10.079              |                                |                               |                    |                     |           |       |        |        |       |       |           |       |        |              |       |       |
| Wollastonite | 0.082                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 3.993               |                                |                               |                    |                     |           |       |        |        |       |       |           |       |        |              |       |       |
|              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                     |                                |                               |                    |                     |           |       |        |        |       |       |           |       |        |              |       |       |
| Q.65         | Operating costs of an open cast gold mine are Rs. 4000/tonne. The recovery at the mill is 90%. At a gold price of Rs. 4550/g, the cutoff grade of gold calculated on the basis of operating cost is _____ g/tonne. [round off to 2 decimal places]                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                     |                                |                               |                    |                     |           |       |        |        |       |       |           |       |        |              |       |       |

| Q. No. | Session | Question Type | Subject Name | Key/Range       | Mark |
|--------|---------|---------------|--------------|-----------------|------|
| 1      | 4       | MCQ           | GA           | C               | 1    |
| 2      | 4       | MCQ           | GA           | D               | 1    |
| 3      | 4       | MCQ           | GA           | C               | 1    |
| 4      | 4       | MCQ           | GA           | C               | 1    |
| 5      | 4       | MCQ           | GA           | C               | 1    |
| 6      | 4       | MCQ           | GA           | B               | 2    |
| 7      | 4       | MCQ           | GA           | D               | 2    |
| 8      | 4       | MCQ           | GA           | A               | 2    |
| 9      | 4       | MCQ           | GA           | C               | 2    |
| 10     | 4       | MCQ           | GA           | C               | 2    |
| 11     | 4       | MCQ           | GG           | D               | 1    |
| 12     | 4       | MCQ           | GG           | D               | 1    |
| 13     | 4       | MCQ           | GG           | A               | 1    |
| 14     | 4       | MCQ           | GG           | D               | 1    |
| 15     | 4       | MSQ           | GG           | A, C            | 1    |
| 16     | 4       | NAT           | GG           | 2.24 to 2.30    | 1    |
| 17     | 4       | NAT           | GG           | 1.00 to 1.10    | 1    |
| 18     | 4       | MCQ           | GG           | C               | 2    |
| 19     | 4       | MCQ           | GG           | B               | 2    |
| 20     | 4       | MCQ           | GG           | D               | 2    |
| 21     | 4       | MCQ           | GG           | A               | 2    |
| 22     | 4       | MCQ           | GG           | C               | 2    |
| 23     | 4       | MSQ           | GG           | A, C            | 2    |
| 24     | 4       | NAT           | GG           | 3.0 to 3.0      | 2    |
| 25     | 4       | NAT           | GG           | 16.3 to 17.3    | 2    |
| 26     | 4       | NAT           | GG           | 26.2 to 27.0    | 2    |
| 27     | 4       | MCQ           | GG           | B               | 1    |
| 28     | 4       | MCQ           | GG           | A               | 1    |
| 29     | 4       | MCQ           | GG           | B               | 1    |
| 30     | 4       | MCQ           | GG           | B               | 1    |
| 31     | 4       | MCQ           | GG           | C               | 1    |
| 32     | 4       | MCQ           | GG           | B               | 1    |
| 33     | 4       | MCQ           | GG           | C               | 1    |
| 34     | 4       | MCQ           | GG           | B               | 1    |
| 35     | 4       | MCQ           | GG           | D               | 1    |
| 36     | 4       | MSQ           | GG           | A, C, D OR A, C | 1    |
| 37     | 4       | MSQ           | GG           | A, B            | 1    |
| 38     | 4       | MSQ           | GG           | A, B, C         | 1    |
| 39     | 4       | MSQ           | GG           | A, D            | 1    |
| 40     | 4       | MSQ           | GG           | A, D            | 1    |
| 41     | 4       | NAT           | GG           | 112 to 112      | 1    |
| 42     | 4       | NAT           | GG           | 1.4 to 1.5      | 1    |
| 43     | 4       | NAT           | GG           | 240 to 240      | 1    |
| 44     | 4       | NAT           | GG           | 480 to 480      | 1    |

|    |   |     |    |                  |   |
|----|---|-----|----|------------------|---|
| 45 | 4 | MCQ | GG | B                | 2 |
| 46 | 4 | MCQ | GG | D                | 2 |
| 47 | 4 | MCQ | GG | B                | 2 |
| 48 | 4 | MCQ | GG | B                | 2 |
| 49 | 4 | MCQ | GG | B                | 2 |
| 50 | 4 | MCQ | GG | A                | 2 |
| 51 | 4 | MCQ | GG | A                | 2 |
| 52 | 4 | MCQ | GG | C                | 2 |
| 53 | 4 | MCQ | GG | B                | 2 |
| 54 | 4 | MSQ | GG | A, C             | 2 |
| 55 | 4 | MSQ | GG | B, C, D          | 2 |
| 56 | 4 | MSQ | GG | C, D             | 2 |
| 57 | 4 | MSQ | GG | A, B, C OR A,B   | 2 |
| 58 | 4 | MSQ | GG | A, C             | 2 |
| 59 | 4 | MSQ | GG | A, C             | 2 |
| 60 | 4 | MSQ | GG | A, B, C          | 2 |
| 61 | 4 | NAT | GG | 80.0 to 80.0     | 2 |
| 62 | 4 | NAT | GG | 6261.0 to 6266.0 | 2 |
| 63 | 4 | NAT | GG | 20000 to 20000   | 2 |
| 64 | 4 | NAT | GG | 20.00 to 21.00   | 2 |
| 65 | 4 | NAT | GG | 0.96 to 1.00     | 2 |