C

2008-GG

Test Paper Code: GG

Time: 3 Hours Maximum Marks: 300

INSTRUCTIONS

1. The question-cum-answer booklet has **24** pages and has **44** questions. Please ensure that the copy of the question-cum-answer booklet you have received contains all the questions.
2. Write your **Roll Number, Name and the name of the Test Centre** in the appropriate space provided on the right side.
3. Write the answers to the objective questions against each Question No. in the **Answer Table for Objective Questions**, provided on Page No. **GG-5/24**. Do not write anything else on this page.
4. Each objective question has **4 choices** for its answer: (A), (B), (C) and (D). Only **ONE** of them is the correct answer. There will be **negative marking** for wrong answers to objective questions. The following marking scheme for objective questions shall be used:
   (a) For each correct answer, you will be awarded **3 (Three)** marks.
   (b) For each wrong answer, you will be awarded **-1 (Negative one)** mark.
   (c) Multiple answers to a question will be treated as a wrong answer.
   (d) For each un-attempted question, you will be awarded **0 (Zero)** mark.
   (e) Negative marks for the objective part will be carried over to total marks.
5. Answer the subjective question only in the space provided after each question.
6. Do not write more than one answer for the same question. In case you attempt a subjective question more than once, please cancel the answer(s) you consider wrong. Otherwise, the answer appearing last only will be evaluated.
7. All answers must be written in blue/black/blue-black ink only. Sketch pen, pencil or ink of any other colour should not be used.
8. All rough work should be done in the space provided and scored out finally.
9. No supplementary sheets will be provided to the candidates.
10. **Clip board, log tables, slide rule, calculator, cellular phone, pager and electronic gadgets in any form are NOT allowed.**
11. The question-cum-answer booklet must be returned in its entirety to the Invigilator before leaving the examination hall. Do not remove any page from this booklet.

C

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READ INSTRUCTIONS ON THE LEFT SIDE OF THIS PAGE CAREFULLY

ROLL NUMBER						

Name:

Test Centre:

Do not write your Roll Number or Name anywhere else in this question-cum-answer booklet.

I have read all the instructions and shall abide by them.

.....

Signature of the Candidate

I have verified the information filled by the Candidate above.

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Signature of the Invigilator

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DO NOT WRITE ON THIS PAGE

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IMPORTANT NOTE FOR CANDIDATES

- **Questions 1-30 (objective questions) carry *three* marks each and questions 31-44 (subjective questions) carry *fifteen* marks each.**
- **Write the answers to the objective questions in the *Answer Table for Objective Questions* provided on page GG-5/24 only.**

Q.1 The following paleocurrent directions were determined from asymmetrical ripple marks on a sandstone outcrop

N 10°, N 355°, N 15°, N 345°, N 5°, N 2°, N 350°, N 358°, N 340°, N 20°
The mean paleocurrent direction is

(A) N 360° (B) N 180° (C) N 10° (D) N 340°

Q.2 Select the correct stratigraphic sequence of the Vindhyan Supergroup.

(A) Semri – Kaimur – Rewa – Bhander
(B) Rewa – Bhander – Kaimur – Semri
(C) Semri – Rewa – Kaimur – Bhander
(D) Semri – Bhander – Rewa – Kaimur

Q.3 Dripstone found rising up from the floor of a limestone cave is known as

(A) stalactite (B) stalagmite (C) uvala (D) poljes

Q.4 The highest symmetry elements of any crystal system is shown by

(A) hemihedral form (B) holohedral form
(C) tetartohedral form (D) hemimorphic form

Q.5 Match the tectonic units listed in **Group I** with their geographical locations in **Group II.**

Group I	**Group II**
P. Continent – oceanic lithosphere convergence	1. Himalayas
Q. Continent – continent collision	2. Andes
R. Continental Rift system	3. Japanese islands
S. Oceanic – oceanic lithosphere convergence	4. East Africa

(A) P – 2, Q – 1, R – 4, S – 3 (B) P – 2, Q – 3, R – 4, S – 1
(C) P – 3, Q – 4, R – 1, S – 2 (D) P – 4, Q – 1, R – 2, S – 3

Q.6 The ascending ore-forming fluids within the earth's crust give rise to

(A) hypogene deposit (B) supergene deposit
(C) syngenetic deposit (D) stratiform deposit

Q.7 Ruby is a gem variety of

(A) tourmaline (B) corundum (C) garnet (D) beryl

Q.8 Gutenberg Discontinuity in the interior of the Earth occurs at the depth of

(A) 35 km (B) 800 km (C) 2900 km (D) 5200 km

Q.9 Match the coalfields listed in **Group I** with their occurrences in States listed in **Group II**.

Group I	**Group II**
P. Talchir	1. Uttar Pradesh
Q. Nayveli	2. Orrissa
R. Singrauli	3. Tamil Nadu
S. Jhingurda	4. Madhya Pradesh

(A) P – 1, Q – 2, R – 3, S – 4 (B) P – 2, Q – 3, R – 4, S – 1
(C) P – 3, Q – 4, R – 1, S – 2 (D) P – 4, Q – 1, R – 2, S – 3

Q.10 Which one of the following drainage patterns is observed in a massive granitic terrain?

(A) Trellis (B) Concorted (C) Dendritic (D) Annular

Q.11 Match the mineral deposits listed in **Group I** with their occurrences listed in **Group II.**

Group I	**Group II**
P. Gold	1. Majhgawan
Q. Bauxite	2. Zawarmala
R. Lead-Zinc	3. Palamau
S. Diamond	4. Hutti

(A) P – 2, Q – 1, R – 3, S – 4 (B) P – 4, Q – 3, R – 2, S – 1
(C) P – 4, Q – 1, R – 2, S – 3 (D) P – 1, Q – 3, R – 4, S – 2

Q.12 Match the magmatic processes listed in **Group I** with the resultant products in **Group II.**

Group I	**Group II**
P. Fractional Crystallization	1. Exsolution lammelle
Q. Liquid immiscibility	2. Cumulate
R. Filter pressing	3. Anorthite – Albite solid solution
S. Gravitational Settling	4. Pegmatite

(A) P – 2, Q – 1, R – 3, S – 4 (B) P – 1, Q – 3, R – 4, S – 2
(C) P – 3, Q – 1, R – 4, S – 2 (D) P – 3, Q – 2, R – 4, S – 1

Q.13 Which part of the arch dam experiences maximum stress?

(A) Heel (B) Toe (C) Abutment (D) Spillway

Q.14 Which one of the following structures typically indicates direction of movement of fault blocks along the fault plane?

(A) Slickenside and foliation
(B) Slickenside and Riedel planes
(C) Riedel planes and foliation
(D) Foliation and joint

Q.15 On an undulating ground, a sedimentary sequence of beds X, Y and Z shows repetition as Z,Y,X,Y,X,Z,Y,X. If the bed X is the oldest and Z is the youngest, then this repetition indicates the structural sequence of

(A) syncline – anticline – fault – homocline
(B) anticline – fault – homocline – fault
(C) fault – homocline – fault – syncline
(D) homocline – fault – homocline – fault – homocline

Q.16 In hydrological context, a porous and impermeable earth mass is known as

(A) aquifer (B) aquitard (C) aquiclude (D) aquifuge

Q.17 In an underground mine, shaft and ore body are connected by

(A) bench (B) raise (C) adit (D) crosscut

Q.18 *Globotruncana* – bearing sequence indicates a shallow marine sedimentary succession deposited during

(A) Cretaceous (B) Eocene (C) Jurassic (D) Oligocene

Q.19 A heavy mineral assemblage in a rock consists of rounded grains of tourmaline, zircon, rutile, kyanite and staurolite. The provenance of such assemblage is

(A) hydrothermal deposit
(B) reworked sedimentary rock
(C) basic igneous rock
(D) acidic igneous rock

Q.20 The normal class of Triclinic system is

(A) Barite type (B) Gypsum type (C) Axinite type (D) Calcite type

Q.21 Obtuse bisectrix figure is obtained if the crystal section is oriented

(A) normal to acute bisectrix
(B) normal to obtuse bisectrix
(C) parallel to basal section
(D) parallel to obtuse bisectrix

Q.22 Fold axis of a single – folded surface is located at

(A) locus of minimum curvature of the folded surface
(B) locus of maximum curvature of the folded surface
(C) any place on the folded surface in its direction of rotation
(D) locus of the highest elevation of the folded surface

Q.23 *Terebratula* is the characteristic genera of

(A) Mesozoic (B) Cenozoic (C) Quaternary (D) Paleozoic

Q.24 Match the stratigraphic units listed in **Group I** with their respective ages mentioned in **Group II.**

Group I	**Group II**
P. Deccan Trap	1. Jurassic
Q. Panjal Trap	2. Cretaceous
R. Malani Rhyolite	3. Permian
S. Rajmahal Trap	4. Proterozoic

(A) P – 1, Q – 2, R – 3, S – 4
(B) P – 2, Q – 3, R – 4, S – 1
(C) P – 2, Q – 4, R – 3, S – 1
(D) P – 1, Q – 3, R – 4, S – 2

Q.25 Relationship between the grain size measurements in ϕ scale and d (mm) scale is

(A) $\phi = -\log_2 d$ (B) $\phi = -\log_{10} d$ (C) $\phi = \log_{10} d$ (D) $\phi = -\ln d$

Q.26 A greyish brown coloured mineral of metallic lustre gives cherry red streak. The mineral is

(A) wolframite (B) hematite (C) chromite (D) magnetite

Q.27 Rapid mass movement of water-saturated regolith is called

(A) landslide (B) creep (C) solifluction (D) earth flow

Q.28 Which one of the following minerals shows four sets of cleavage?

(A) Calcite (B) Albite (C) Barite (D) Flourite

Q.29 The glaucophane and lawsonite mineral assemblage is diagnostic of

(A) eclogite facies
(B) amphibolite facies
(C) blueschist facies
(D) greenschist facies

Q.30 Hydrothermal deposits formed at a temperature range of 50° - 200° C are known as

(A) mesothermal (B) hypothermal (C) epithermal (D) telethermal

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Answer Table for Objective Questions

Write the Code of your chosen answer only in the 'Answer' column against each Question No. Do not write anything else on this page.

Question No.	Answer	*Do not write in this column*	Question No.	Answer	*Do not write in this column*
01			16		
02			17		
03			18		
04			19		
05			20		
06			21		
07			22		
08			23		
09			24		
10			25		
11			26		
12			27		
13			28		
14			29		
15			30		

FOR EVALUATION ONLY

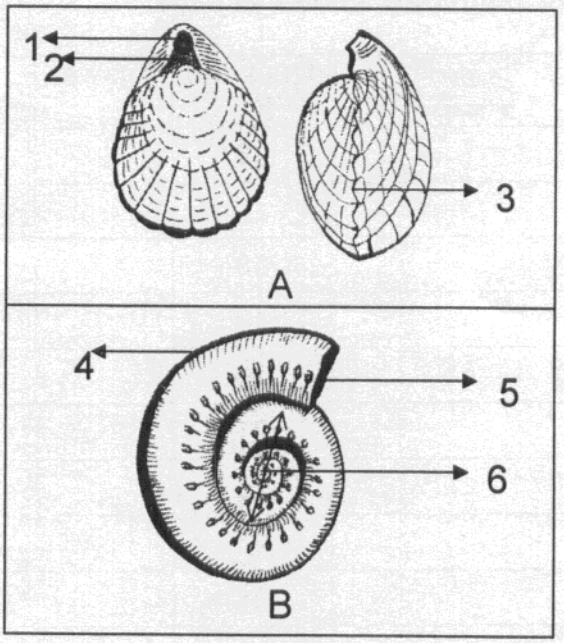
No. of Correct Answers		Marks	(+)
No. of Incorrect Answers		Marks	(–)
Total Marks in Question Nos. 1-30			( )

C

Q.31

(a) Define index fossil. Give respective ages of the index fossils *Paradoxides* and *Indoceramus.* (9)

(b) Write the names of external morphological features (indicated by numbers 1 to 6) shown in the sketches of fossils Brachiopod (A) and Ammonoid (B). (6)



C

Q.32

(a) Name a Pre-Cambrian Supergroup which is well known for its crescent shape in the Indian Subcontinent. Give a Groupwise stratigraphic classification of the Supergroup. (9)

(b) Triassic sediments of Spiti are classified stratigraphically into three major subdivisions. Name them in stratigraphic order. (6)

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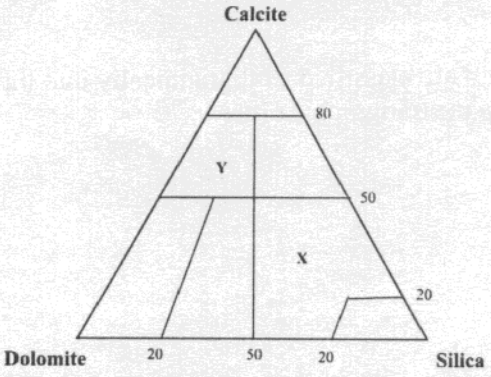
Q.33

(a) The following triangular diagram with apices as limestone, dolomite and silica provides a method to classify carbonate rocks. Identify the rock types indicated in its domains at X and Y. (6)



(b) Draw three labelled diagrams showing separately the flute cast, augen structure and amygdaloidal fillings. (9)

C

Q.34 Draw labelled diagrams showing the following textures of igneous and metamorphic rocks.

(a) Porphyritic and porphyroblastic textures (6)

(b) Cataclastic, ophitic and graphic textures (9)

C

Q.35

(a) With the help of neat diagrams, show laccolith, lopolith and ring dyke. (9)

(b) Give diagnostic optical properties to distinguish quartz from microcline; and hornblende from augite. (6)

C

Q.36

(a) Draw a well labelled figure of braided river indicating flow pattern and bars. Which type of sediment load is characteristically associated with braded river? (6)

(b) With the help of neat and labelled diagrams, differentiate between barchans and stardunes with respect to morphology, wind direction and relative quantity of sand supply. (9)

Q.37

(a) A metamorphic rock contains a well-developed foliation which strikes N 30° E and dips 40° due SE. The foliation plane contains a strongly developed mica lineation whose pitch is 90°.
Show foliation and lineation in one block diagram, and determine direction and amount of plunge for lineation. (9)

(b) Draw labelled diagrams showing axial plane foliation and reclined fold. (6)

Q.38

(a) Give the number of axes, length and orientation of axes and also the symmetry elements of 2/m 2/m 2/m group of crystal. Name a mineral belonging to pyroxene family which crystallizes in 2/m 2/m 2/m group. (9)

(b) Name twin planes and composition planes in relation to the following twinning laws – Carlsbad and Baveno. (6)

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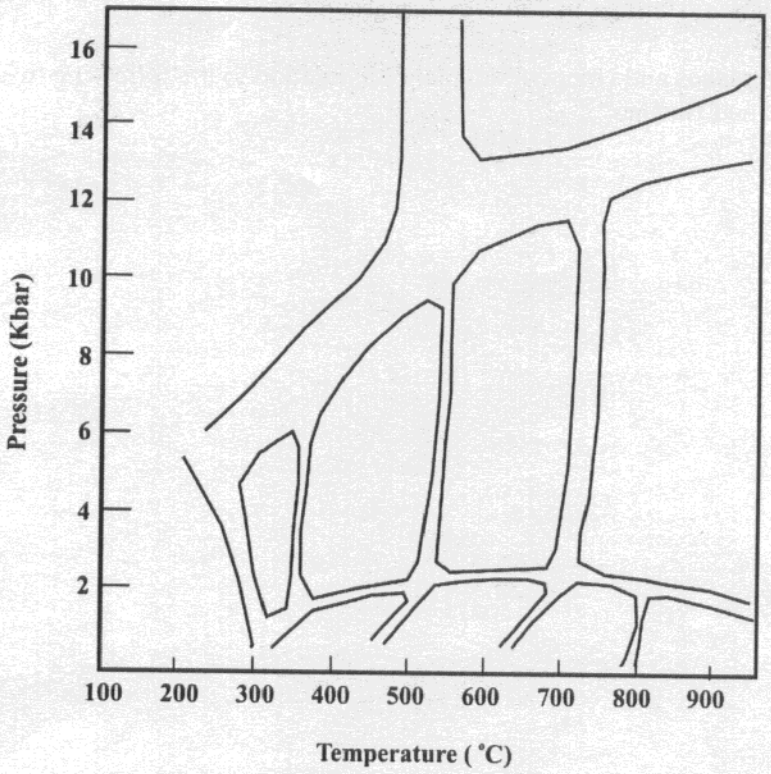
Q.39 Pressure -Temperature diagram shown below has different metamorphic facies fields.

(a) Identify the fields of prehnite-pumphelite; greenschist; and eclogite facies in the diagram. (9)



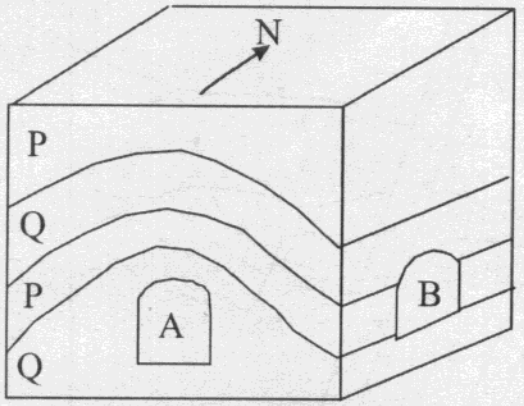
(b) Give the name of two metamorphic rock types characterized by mineral assemblages: quartz-orthopyroxene-clinopyroxene-garnet and hornblend-plagioclase-quartz. (6)

C

Q.40

(a) Draw a labelled sub-surface hydrological section showing perched water table, confined aquifer and a free flowing well. (9)

(b) In a non-plunging folded sequence, two horizontal tunnels (A and B) with alignments N-S and E-W directions respectively are proposed as shown in figure given below. Give at least two geotechnical reasons suggesting tunnel A is better located than the tunnel B. (6)



A, B – Tunnel Alignments
P – Phyllite
Q – Quartzite

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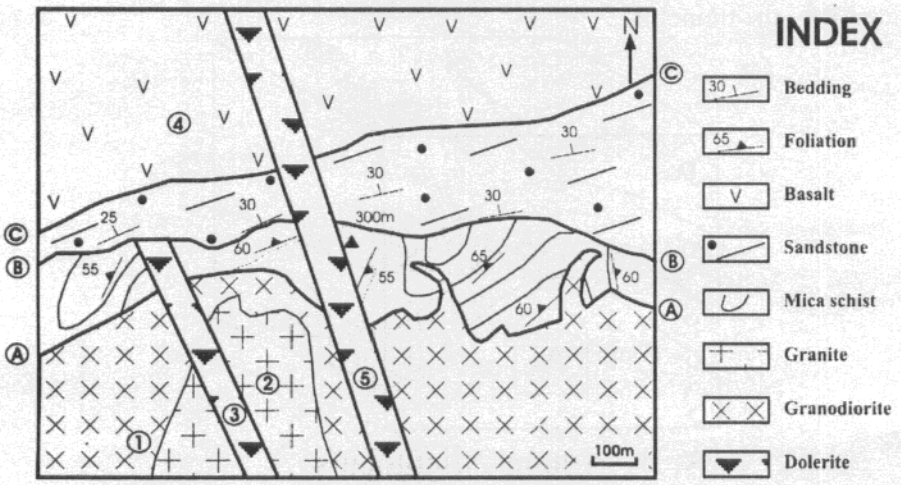
Q.41 The geological map given below shows various geological events.
Answer the following:

(a) Characters of geological surfaces A, B and C in chronological order. (9)

(b) Mutual relationship between various igneous bodies 1 to 5 with other units. (6)



Q.42

(a) When a vein composed of disseminated sulphide mineral assemblage is subjected to weathering process, different zones are developed. Name these zones. (9)

(b) What is the age of banded iron formation (BIF)? Give mineralogical composition of iron rich bands in BIF. (6)

C

Q.43

(a) What are subduction zones, oceanic ridges and transform faults. (9)

(b) Name any two regional thrusts observed successively from North to South, in the Himalayas. (6)

Q.44

(a) List silicate structures with one example of rock-forming mineral crystallizing in that group. (9)

(b) What is the chemical composition of magnesite? Give two locations where commercial grade magnesite occurs in India. (6)

Space for rough work

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