

DIPLOMA WALLAH

JHARKHAND UNIVERSITY OF TECHNOLOGY (JUT)

Diploma in Mining Engineering | Subject: Mining Geology - II

SAMPLE PAPER - 3

Instructions :

- **Full Marks:** 70 | **Time:** 3 Hours
- Question No. 1 is **compulsory** (7 MCQs x 2 Marks = 14 Marks).
- Answer any **FOUR** questions from the remaining (Q.2 to Q.7). Each carries 14 marks.
- Illustrate your answers with neat sketches/diagrams wherever necessary.

Q.1 Choose the correct option for the following:

[7 × 2 = 14]

i. The process by which loose, unconsolidated sediments are transformed into solid sedimentary rock is called:

- (a) Metamorphism
- (b) Lithification
- (c) Weathering
- (d) Crystallization

ii. An unconformity where the older, underlying rocks are tilted or folded, and the younger, overlying rocks are horizontal is an:

- (a) Angular Unconformity
- (b) Disconformity
- (c) Non-conformity
- (d) Paraconformity

iii. Galena is the principal ore of which of the following metals?

- (a) Zinc
- (b) Copper
- (c) Lead
- (d) Iron

iv. Mineral deposits that formed at the same time as the enclosing host rock are known as:

- (a) Epigenetic deposits
- (b) Syngenetic deposits
- (c) Supergene deposits
- (d) Hydrothermal deposits

v. The vertical displacement between the hanging wall and the footwall of a fault is called:

- (a) Heave
- (b) Throw
- (c) Hade
- (d) Slip

vi. Which of the following is NOT a type of fold?

(a) Anticline

(b) Syncline

(c) Graben

(d) Monocline

vii. The remains or traces of ancient plants and animals preserved in rocks are called:

(a) Minerals

(b) Gangue

(c) Fossils

(d) Isotopes

Q.2 (A) What are Sedimentary Rocks? Describe the various stages involved in the formation of sedimentary rocks (Weathering, Erosion, Deposition, and Lithification). [7]

[Image of Formation of Sedimentary Rocks]

Q.2 (B) Differentiate between Contact Metamorphism and Regional Metamorphism. Give one example of a rock formed by each process. [7]

Q.3 (A) Explain the term Unconformity. Describe Angular Unconformity, Disconformity, and Non-conformity with the help of neat sketches. [7]

Q.3 (B) Define a Fault. Explain the terms: Throw, Heave, and Hade in relation to a fault with a proper diagram. [7]

Q.4 (A) Write a detailed note on the Cuddapah System of Indian stratigraphy, discussing its lithology and economic importance. [7]

Q.4 (B) What are Fossils? Discuss the conditions necessary for fossilization and the importance of fossils in stratigraphy and coal exploration. [7]

Q.5 (A) Differentiate between Syngenetic and Epigenetic mineral deposits. Give one example of each. [7]

Q.5 (B) Explain the formation of mineral deposits by the process of Magmatic Concentration (Early and Late magmatic segregation). [7]

Q.6 (A) What are the main differences between Metallic and Non-metallic minerals? Give three examples of each. [7]

Q.6 (B) Discuss the occurrence, geological distribution, and uses of Gold and Copper deposits in India. [7]

Q.7 Write short notes on any FOUR of the following: [4 × 3.5 = 14]

A. Gossan (Iron cap)

B. Outcrop of a rock bed

C. Types of Coal (Peat, Lignite, Bituminous, Anthracite)

D. Hanging wall and Footwall of a fault

PAPER 3 - ANSWER KEY & MODEL HINTS

Q1 (MCQ Answers): i-(b), ii-(a), iii-(c), iv-(b), v-(b), vi-(c), vii-(c)

Model Hints for Theory:

Q2(A) Sedimentary Rocks Formation: Starts with weathering of pre-existing rocks. The broken particles are transported by water/wind (Erosion), then settle down in basins/oceans (Deposition). Over millions of years, pressure and cementing materials convert these loose sediments into solid rocks (Lithification). Example: Sandstone, Shale.

Q3(A) Unconformities: A surface of erosion or non-deposition separating younger strata from older rocks. *Angular Unconformity:* Older rocks are tilted; younger rocks are horizontal. *Disconformity:* Beds above and below are parallel, but there is an erosional gap. *Non-conformity:* Sedimentary rocks overlying eroded igneous or metamorphic rocks.

Q3(B) Fault Terminology: *Throw:* The total vertical displacement of the faulted beds. *Heave:* The total horizontal displacement of the faulted beds. *Hade:* The angle of inclination of the fault plane measured from the vertical.

Q4(B) Fossils: Remains of ancient life forms. Need rapid burial and presence of hard parts (bones/shells) to form. *Importance:* Helps in determining the age of rock beds (Index fossils), correlating strata across different regions, and finding fossil fuels like coal and petroleum.

Q5(A) Syngenetic vs Epigenetic: *Syngenetic:* The ore deposit formed at the same time as the host rock containing it (e.g., Sedimentary Iron ore). *Epigenetic:* The ore deposit formed later than the host rock, usually by mineral-rich fluids filling pre-existing cracks/veins (e.g., Hydrothermal gold veins).

Q7 Short Notes: *Gossan:* Highly oxidized, rusted, and weathered outcrop of a sulfide ore deposit, appearing as a red/brown "iron cap". It serves as a major guide for prospectors to find hidden sulfide ores (copper/lead) below. *Outcrop:* The part of a rock formation that appears at the surface of the earth, uncovered by soil.