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5 SEM TDC DSE GEO (CBCS) 1 (A/B) (H)

2024

(November)

GEOLOGY

(Discipline Specific Elective)

(For Honours)

Paper : DSE-1

Full Marks : 53

Pass Marks : 21

Time : 3 hours

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

Paper : DSE-1 (A)

(Exploration Geology)

UNIT—I

(Marks : 11)

1. Write short notes on the following
(any three) : 2×3=6

(a) Mineral occurrence

- (b) Mineral deposit
- (c) Gangue minerals
- (d) Non-strategic minerals
- (e) Ore mineralisation

2. (a) Define mineral exploration. Write briefly on the geological prospecting methods of ore search.

5

Or

- (b) Write briefly about the nature of ore deposits associated with the following rock suites :

- (i) Ultrabasic rocks
- (ii) Metamorphic rocks
- (iii) Igneous rocks

UNIT—II

(Marks : 15)

3. Mention about the different types of sampling used in exploration.

3

(3)

4. (a) Describe about the principles of exploration. 6

Or

- (b) Write short notes on any *two* of the following : $3 \times 2 = 6$

(i) Pitting

(ii) Bulk sampling

(iii) Core samples

5. Write in brief about any one of the methods of geochemical exploration. 6

UNIT—III

(Marks : 5)

6. Define the following : $1 \times 3 = 3$

(a) Arithmetic mean

(b) Population

(c) Geometric mean

7. How would you determine the average grade of the ores? 2

(4)

UNIT—IV

(Marks : 10)

8. What is the difference between core and non-core drilling? Mention the importance of core logging. 4
9. Write briefly on the salient features of Rotary drilling or Auger drilling. 6

Or

Describe the different rig components of percussion drilling.

UNIT—V

(Marks : 12)

10. Describe any *two* of the following reserve estimation methods : 3×2=6
- (a) Average factors and area method
 - (b) Geological cross-section method
 - (c) Isopach method
 - (d) Rectangular method
11. Define bulk density. How would you determine the bulk density of ore minerals? 6

Or

Write briefly on the mineral reserve classification system.

(5)

Paper : DSE-1 (B)

(Fuel Geology)

UNIT—I

(Coal)

(Marks : 11)

1. What is proximate analysis of coal? Do you consider that coal characterization is a group test conducted in connection with coal utilization? If so, how? 1+2+2=5

Or

What are the theories proposed for the mode of accumulation of plant debris and conversion into coal? Explain.

2. (a) Mention the components of coal petrology.
- (b) What is anthracite? 2+2=4
3. Write True or False (any two) : 1×2=2
- (a) Not all coals are coking coals.
- (b) Vitrain is a dull, black, brittle coal normally occurring in very thin bands.
- (c) Fusain is a charcoal-like substance that dirties the hand when coal is touched.

(6)

UNIT—II
(Coal as a Fuel)
(Marks : 8)

4. Answer any *two* of the following : 3×2=6

- (a) Define coal bed methane (CBM). Is it true that marsh gas is the other name of CBM? What is the standard composition of CBM?
- (b) Write on the CBM resources in India.
- (c) What is coal liquefaction process? Mention the advantage of coal liquefaction.

5. Give a brief outline of underground coal gasification or liquefaction process. 2

UNIT—III
(Petroleum)
(Marks : 10)

6. Discuss the chemical composition and physical properties of crude oil. 5

Or

How did petroleum originate in nature? Explain the theories.

7. Explain the three stages of evolution of kerogen in nature. 5

UNIT—IV

(Petroleum Reservoir and Traps)

(Marks : 18)

8. Answer any *three* of the following : $4 \times 3 = 12$

(a) Discuss the various petrophysical properties of reservoir rocks.

(b) Write short notes on any *two* of the following :

(i) Clastic reservoir

(ii) Stratigraphic traps

(iii) Entrapment period

(c) Explain the general properties of cap rocks. Why is cap rock essential in trapping hydrocarbon in the sub-surface?

(d) Discuss the role of plate tectonics in the distribution of hydrocarbon reserves.

9. Write explanatory notes on the following : $3 + 3 = 6$

(a) Source rock quality

(b) Migration and accumulation of hydrocarbon

(8)

UNIT—V

(Other Fuels)

(Marks : 6)

- 10.** Define gas hydrate. Where are gas hydrates found?

6

Or

Define nuclear fuel. What is nuclear fuel made of?

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