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3 (Sem-6/CBCS) GLG HE 1

2023

GEOLOGY

(Honours Elective)

Paper : GLG-HE-6016

(Fuel Geology)

Full Marks : 60

Time : Three hours

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

1. Choose the correct option : $1 \times 7 = 7$

(a) In Bombay High Oil field limestone forms the

(i) source rock

(ii) reservoir rock

(iii) Both (i) and (ii)

(iv) None of the above

Contd.

- (b) Which of the following forces does not play any role in the migration of oil ?
- (i) Capillary
 - (ii) Buoyancy
 - (iii) Gravity
 - (iv) None of the above
- (c) Which of the following traps are associated with unconformities ?
- (i) Structural trap
 - (ii) Combination trap
 - (iii) Primary stratigraphic traps
 - (iv) Secondary stratigraphic traps
- (d) About half of the world's petroleum occurs in
- (i) sandstone reservoir
 - (ii) carbonate reservoir
 - (iii) shale reservoir
 - (iv) evaporite reservoir
- (e) Which of the following are fossil fuels ?
- (i) Coal
 - (ii) Natural gas
 - (iii) Petroleum
 - (iv) All of the above

- (f) How does the texture of coal change with its maturity ?
- (i) Becomes hard, less brittle and moderately tough
 - (ii) Becomes hard, less brittle and more tough
 - (iii) Becomes hard, more brittle and more tough
 - (iv) Becomes hard, more brittle and less tough
- (g) In coal bed methane (CBM), source of methane is
- (i) organic shale
 - (ii) black shale
 - (iii) coal seam
 - (iv) carbonaceous shale

2. Write brief notes on : $2 \times 4 = 8$
- (a) Bituminous coal
 - (b) 'Caprock' with example
 - (c) Rock-Eval pyrolysis
 - (d) Theories, related to 'origin of petroleum'
3. Write detailed notes on the : **(any three)**
 $5 \times 3 = 15$
- (a) Origin of coal

- (b) Classification of hydrocarbon traps
- (c) Underground coal gasification
- (d) Global distribution of hydrocarbon reserve
- (e) Lithotypes

4. Answer the following questions : **(any three)**
 $10 \times 3 = 30$

- (a) Discuss in detail about the proximate and ultimate analysis of coal.
- (b) Define 'Coal'. Write a detailed note on coal liquefaction. $2+8=10$
- (c) Define 'Reservoir rock'. Write the petrophysical properties of reservoir rock. Give the detailed classification of reservoir rock. $2+4+4=10$
- (d) Define 'CBM'. What are the intrinsic properties affecting 'CBM' gas production ? Add a note on environmental impact of 'CBM' extraction. $2+5+3=10$
- (e) What is 'Maceral' ? Write in detail about the classification of maceral. $2+8=10$
- (f) What is 'kerogen' in geological context ? Describe how 'kerogen maturation' is related to petroleum genesis. $2+8=10$