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3 (Sem-5/CBCS) GLG HE 2

2022

GEOLOGY

(Honours Elective)

Paper : GLG-HE- 5026

(Earth and Climate)

Full Marks : 60

Time : Three hours

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

1. Choose the correct option : **(any seven)**

1×7=7

- (a) About 80% of the gases that form earth's atmosphere are contained within the
- (i) troposphere
 - (ii) stratosphere
 - (iii) mesosphere
 - (iv) None of the above

Contd.

(b) The region near the equator where the northern and southern trade winds meet is called the

- (i) intertropical convergence zone
- (ii) intratropical convergence zone
- (iii) intertropical divergence zone
- (iv) None of the above

(c) Sea breeze blows during

- (i) summer
- (ii) winter
- (iii) day
- (iv) night

(d) The trade winds, westerlies and easterlies are the

- (i) permanent winds
- (ii) seasonal winds
- (iii) local winds
- (iv) All of the above

(e) A layer in the earth's atmosphere called ionosphere facilitates radio communication. Why ?

- I. The presence of ozone causes the reflection of radio waves to earth.
- II. Radio waves have a very long wavelength.

- (i) I only
- (ii) II only
- (iii) Both I and II
- (iv) Neither I nor II

(f) Which of the following statements is correct ?

- (i) The warm ocean current originates near the equator and moves towards the poles.
- (ii) The cold current carries water from polar or higher latitudes to tropical or lower latitudes.
- (iii) The labrador ocean current is cold current.
- (iv) All of the above

(g) The region in the radiation spectrum containing wavelengths between 8.5 and 11 micrometer which are not absorbed to any great extent by atmospheric gases is called

(i) atmospheric window

(ii) aurora

(iii) absolute zero

(iv) None of the above

(h) Aurora australis is visible in the

(i) northern hemisphere

(ii) southern hemisphere

(iii) Both (i) and (ii)

(iv) None of the above

(i) Which of the following is a means of indicating the differences between different types of climate plotted on a graph ?

(i) Hydrograph

(ii) Hythergraph

(iii) Thermograph

(iv) None of the above

(j) A thermally driven longitudinal cellular circulation extending across the Pacific Ocean from Indonesia to close to the Peruvian coast and forming a component of the southern oscillation is known as

(i) Walker circulation

(ii) typhoon

(iii) warm air advection

(iv) zonal circulation

(k) Which of the following is also known as mother of pearl cloud ?

(i) Nacreous clouds

(ii) Noctilucent cloud

(iii) Cumulus cloud

(iv) Cirrus cloud

(l) Psychrometer is an instrument used to measure

(i) relative humidity of air

(ii) atmospheric pressure

(iii) relative density of liquids

(iv) amount of actual evapotranspiration

2. Answer the following questions :
(any four) $2 \times 4 = 8$

- (a) What do you understand by feedback in climate system ?
- (b) What is orographic precipitation ?
- (c) What is thermohaline flow ?
- (d) What do you understand by Mediterranean overflow water ?
- (e) What causes the monsoon circulation to reverse from summer to winter ?
- (f) What are the archives of climate records ?
- (g) What is orbital monsoon hypothesis ?
- (h) What do you understand by a Nina ?

3. Write short notes on the following :
(any three) : $5 \times 3 = 15$

- (a) Hadley cell
- (b) Lapse rate cooling
- (c) Snowball earth hypothesis
- (d) Climate controlling factors

- (e) Natural effects of climate change
- (f) Atmosphere and ocean interaction and its effect on climate
- (g) Younger dryas
- (h) Marine isotope stages

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

- (a) What do you understand by climate forcing ? Add a note on climate responses. What is the relationship between the forces that drive climate change and the responses of the climate system ? $4 + 4 + 2 = 10$
- (b) Write briefly about humans and climate change. Write on future perspectives of climate change. $5 + 5 = 10$
- (c) Give an account on global oceanic conveyor belt and its control on earth's climate. Add a note on sea ice and glacial ice.

(d) Write a note about glacial-interglacial stages. Add a note on Pleistocene glacial-interglacial cycles. 5+5=10

(e) What are the different factors associated with monsoonal intensity?

(f) Write briefly about different components of the earth's climate system.

(g) Discuss briefly on earth's heat budget and interactions amongst various sources of earth's heat.

(h) Write about mechanism of monsoon. What are the different effects of monsoon? 5+5=10