

12. World Climate and Climate Change

1. Multiple choice question

(i) Which one of the following is suitable for Koeppen's —All type of climate?

- (a) High rainfall in all the months
- (b) Mean monthly temperature of the coldest month more than freezing point
- (c) Mean monthly temperature of all the months more than 18° C
- (d) Average temperature for all the months below 10° C

Answer: (c) Mean monthly temperature of all the months more than 18° C

(ii) Koeppen's system of classification of climates can be termed as:

- (a) Applied
- (b) Systematic
- (c) Genetic
- (d) Empirical

Answer: (d) Empirical

(iii) Most of the Indian Peninsula will be grouped according to Koeppen's system under:

- (a) —Af
- (b) —BSh
- (c) —Cfb
- (d) —Am

Answer: (d) "Am"

(iv) Which one of the following years is supposed to have recorded the warmest temperature the world over?

- (a) 1990 (b) 1998 (c) 1885 (d) 1950

Answer: (a) 1990

(v) Which one of the following groups of four climates represents humid conditions?



(a) A—B—C—E (b) A—C—D—E

(c) B—C—D—E (d) A—C—D—F

Answer: (b) A—C—D—E

2. Answer the following questions in about 30 words

(i) Which two climatic variables are used by Koeppen for classification of the climate?

Answer: Mean annual and mean monthly temperature and precipitation are the two climatic variables used by V. Koeppen for an empirical classification of climate.

(ii) How is the —genetic system of classification different from the —empirical one?

Answer: Empirical classification is based on observed data, particularly on temperature and precipitation. Genetic classification attempts to organise climates according to their causes.

(iii) Which types of climates have very low range of temperature?

Answer: Tropical wet climate (Af) is found near the equator in the Amazon Basin in South America, western equatorial Africa and the islands of East Indies. The temperature is uniformly high and the annual range of temperature is negligible. The maximum temperature on any day is around 30°C while the minimum temperature is around 20°C.

(iv) What type of climatic conditions would prevail if the sun spots increase?

Answer: Cooler and wetter weather and greater storminess occur, if the sun spots increase. A decrease in sunspot numbers may be a cause of warm and drier conditions.

3. Answer the following questions in about 150 words

(i) Make a comparison of the climatic conditions between the —A and —B types of climate.

Answer: A—Tropical Humid Climates: These climates are found within the tropics between Tropic of Cancer in the north and Tropic of Capricorn in the south. The sun's rays are almost vertical throughout the year and the presence of Inter Tropical Convergence Zone (ITCZ) makes the climate hot and humid. This group of climates is further divided into three types of climates; namely Af- Tropical wet climate, Am-Tropical monsoon climate, and Aw-Tropical wet and dry climate.

B —Dry Climates: It is characterised by low rainfall that is not sufficient for the growth of plants. These climates cover vast areas extending from 15° to 60° north and south of the equator. The climates of this group are divided into steppe or semi-arid climate (BS) and desert climate (BW). They are further subdivided as subtropical steppe (BSh) and subtropical desert (BWh) at



latitudes from 15° and 35° and mid-latitude steppe (BSk) and mid-latitude desert (BWk) at latitudes between 35° and 60°.

| Group | Type | Letter Code | Characteristics |
|----------------------------------|----------------------|-------------|-------------------------------|
| A- Tropical Humid Climate | Tropical wet | Af | No dry season |
| | Tropical monsoon | Am | Monsoonal, short dry season |
| | Tropical wet and dry | Aw | Winter dry season |
| B-Dry Climate | Subtropical steppe | BSh | Low-latitude semi arid or dry |
| | Subtropical desert | BWh | Low-latitude arid or dry |
| | Mid-latitude steppe | BSk | Mid-latitude semi arid or dry |
| | Mid-latitude desert | BWk | Mid-latitude arid or dry |

(ii) What type of vegetation would you find in the —C and —A type(s) of climate?

Answer: "C" climates represent warm temperate (mid latitude) climates extending from 30° to 50° latitudes mainly on the eastern and western coasts of continents. The areas of such climates have evergreen broadleaf and deciduous forests.

"A" climate is confined to tropics. Af climate is found in the Amazon Basin and western equatorial Africa where tropical evergreen rainforests grow. „Am" is monsoon climate, which is dominated by tropical deciduous forests.

The „Aw" climate has deciduous forests and tree-shredded grasslands.

(iii) What do you understand by the term —Greenhouse Gases ? Make a list of greenhouse gases.

Answer: Greenhouse gases are those gases that cause global warming and result in rise in atmospheric temperature. This is because these gases obstruct the outgoing terrestrial radiation from-the earth's surface.



The primary GHGs of concern today are carbon dioxide (CO₂), Chlorofluorocarbons (CFCs), methane (CH₄), nitrous oxide (N₂O) and ozone (O₃). Some other gases such as nitric oxide (NO) and carbon monoxide (CO) easily react with GHGs and affect their concentration in the atmosphere.