

$$23 + 6 = 29$$
  

$$= (29/30)$$

Time: 2 hours

 $i\frac{1}{2}$ 

## Unit 2: Synoptic Climatology of the Tropics

- 12

6.  
5 1/2

$$6\frac{1}{2}$$

Internal assessment = 10

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West Bengal State University  
M.A/ M.Sc. Second Semester Examination, 2023  
Department of Geography  
GEOPCOR07T: SYNOPTIC AND APPLIED CLIMATOLOGY

Full marks: 50

Time: 2 hours

Answer four questions, selecting one from each unit.

**Unit 1: Atmospheric Dynamics**

1. How does atmospheric thermodynamics work? Explain Zeroth law of Thermodynamics. What makes the Carnot cycle the most efficient ideal engine? 5+2+3=10
- a) Explain atmospheric stability based on the dry and moist adiabatic lapse rates.
- b) 5.0 L of a gas weighs 30.00 g at 20° C and 92 k Pa. What is the mole weight of the gas? 6+4=10

**Unit 2: Synoptic Climatology of the Tropics**

3. Discuss the features of the heat waves and cold waves as per IMD. Explain the differences between the 'break in monsoons' and 'burst of monsoons' in India. 6+4=10
4. Discuss how the Indian Ocean Dipole influences the Walker Circulation in the tropical oceans. Highlight the characteristics of the Hadley cell. 6+4=10

**Unit 3: Climate Change**

5. Discuss the merits and demerits of the theory of climate change. Critically examine the causes of anthropogenic global warming. 5+5=10
6. Classify climate cycle. Analyse the causes and effects of climate oscillation through geologic times 4+6=10

**Unit 4: Applied Climatology**

7. Briefly describe the impact of weather on aircraft operations? Do explain headwind and tailwind. 6+4=10
8. Why are cities considered as the hotspots of global warming? How do building materials matter in creating Urban Heat Islands? 7+3=10

Internal assessment = 10



West Bengal State University  
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Department of Geography  
GEOPCOR07T: SYNOPTIC AND APPLIED CLIMATOLOGY

Time: 2 hours

Full marks: 50

Answer four questions, selecting one from each unit.**Unit 1: Atmospheric Dynamics**

1. What is the ideal gas law? How do you derive the Ideal Gas Law from the Avogadro's Law, Boyle's Law and Charles's Law? 3+7=10
2. What is the Clausius-Clapeyron relation and why is it important for the climate? How does the vapour pressure of a liquid vary with temperature? 5+5=10

**Unit 2: Synoptic Climatology of the Tropics**

3. Discuss the influence of tropical atmospheric circulations on Indian weather. Account for the airmasses over the Indian landmass. 7+3=10
4. As per the modern theories discuss the significance of monsoon trough on the onset of southwest monsoons. Mention the impact of pre monsoon thunderstorms and cyclonic storms on the Indian monsoons. 7+3=10

**Unit 3: Climate Change**

5. How does the Milankovitch cycle affect the Earth's climate? Can it predict future changes in the Earth's climate? 7+3=10
6. What are the major advantages of using different types of proxy records of paleoclimate? Examine the arguments pertaining to recent changes in global climate. 5+5=10

**Unit 4: Applied Climatology**

7. State the impact of polluted air and heat stress on human health. How does the human body adjust with abnormally hot climatic condition? 5+5=10
8. Highlight the importance of weather forecasting. Elaborate on the Long term, Medium term, Short term techniques adopted for weather forecasting. 4+6=10

Internal assessment = 10



West Bengal State University  
M.A/ M.Sc. Second Semester Examination, 2021  
Department of Geography  
GEOPCOR07T: SYNOPTIC AND APPLIED CLIMATOLOGY

Full marks: 50

Time: 2 hours

Answer four questions, selecting one from each unit.

**Unit 1: Atmospheric Dynamics**

1. How does a stable atmosphere become unstable? Describe with suitable sketches dry adiabatic lapse rate and moist adiabatic lapse rate in relation to atmospheric stability. 3+7=10
2. What is the Zeroth Law of Thermodynamics? Explain in brief how do Centrifugal and Coriolis forces affect wind movement? 2+8=10

**Unit 2: Synoptic Climatology of the Tropics**

3. Explain the role of shifting ITCZ in influencing weather and climate in the tropical countries. What drives the Walker Circulation? 7+3=10
4. Highlight the impact of monsoon variability on the weather systems and climatic hazards in India. What causes the heat and cold waves? 6+4=10

**Unit 3: Climate Change**

5. Define the Meridional Overturning Circulation of ocean water. How does it explain the global temperature variation over the multi-century time scale? 4+6=10
6. Define and classify climate cycle. Give an idea of changing thermonuclear reaction of sun that may have caused ice ages on earth. 4+6=10

**Unit 4: Applied Climatology**

7. Mention the major data sources for synoptic climatological studies. Examine the role of synoptic climatology in studying air pollution and oceanic pollution. 3+7=10
8. Discuss the factors controlling the ambient temperature in urban areas. What is the significance of urban heat island? 7+3=10

Internal assessment = 10



West Bengal State University  
M.A/ M.Sc. Second Semester Examination, 2020  
Department of Geography

GEOPCOR07T: SYNOPTIC AND APPLIED CLIMATOLOGY

Full marks: 25

Time: 2 hours

Answer any one question from the following (within 600 words)

1 × 10 = 10

1. 'The second law of thermodynamics is closely related to the concept of entropy or the disorder created during a thermodynamic process'. Explain with examples 10
2. Discuss the various stages in the life-cycle of a typical thunderstorm with a suitable diagram. 10
3. Define bioclimatology and examine the impact of polluted air on human health. 10
4. Elaborate on the techniques of weather forecasting in India with reference to short, medium and long range. 10

Answer any three questions from the following (within 300 words)

3 × 5 = 15

5. Why are there no tropical cyclones at the equator?
6. Briefly write on any three forms of precipitation
7. Describe the significance of the Nino Region 3.4.
8. Explain the Earth's eccentricity of orbit as a reason for climate change.
9. Examine the arguments pertaining to recent changes in global climate.
10. Briefly discuss the role of Synoptic climatology in pollution studies