QUESTION BANK

OGI751 CLIMATE CHANGE AND ITS IMPACT
DEPARTMENT OF CSE
QUESTION BANK

SUBJECT : CLIMATE CHANGE AND ITS IMPACT
SEM / YEAR : VII / IV

UNIT I BASICS OF WEATHER AND CLIMATE 9

Shallow film of Air– stratified & disturbed atmosphere – law – atmosphere Engine. Observation of parameters: Temperature – Humidity – Wind - Pressure – precipitation-surface – networks. Constitution of atmosphere: well stirred atmosphere – process around turbo pause – in dry air – ozone
– carbon Dioxide – Sulphur Dioxide– Aerosol - water. Evolution of Atmosphere. State of atmosphere: Air temperature – pressure – hydrostatic – Chemistry – Distribution – circulation.

PART - A

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1.	Define weather	BT-1	Remembering
2.	List out the components of atmosphere.	BT-2	Understanding
3.	Define turbopause	BT-1	Remembering
4.	What is meant by humidity?	BT-2	Understanding
5.	Differentiate weather and climate	BT-4	Analysing
6.	Enlist the various forms of precipitation.	BT-4	Analysing
7.	What is meant by tropopause?	BT-2	Understanding
8.	Write down the constituents of atmosphere.	BT-1	Remembering
9.	What is meant by trade winds?	BT-4	Analysing
10.	What causes the temperature to increase in stratosphere? Justify your answer.	BT-3	Applying
11.	Define troposphere.	BT-1	Remembering
12.	Distinguish between easterly and westerly winds.	BT-3	Applying
13.	What is meant by front?	BT-2	Understanding
14.	How does the air pressure changes when you climb a mountain?	BT-1	Remembering
15.	Write about the constituents of stratosphere.	BT-4	Analysing
16.	How does the sun's heat drive weather patterns on earth?	BT-3	Applying
17.	What is meant by isobars?	BT-2	Understanding
18.	How the depletion of ozone layer takes place?	BT-4	Analysing
19.	Define atmosphere.	BT-1	Remembering
20.	What is meant by aerosol?	BT-2	Understanding
21.	Describe how ozone layer protects our earth.	BT-3	Applying
22.	Sketch hydrological cycle	BT-6	Creating

23.	How does sulphur dioxide affects the atmosphere?	BT-4	Analysing
24.	Define stratosphere.	BT-1	Remembering
25.	What is meant by leeward side?	BT-2	Understanding

PART – B

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1.	Write short notes on weather and climate.	BT-2	Understanding
2.	Explain briefly about troposphere and thermosphere.	BT-4	Analysing
3.	What is meant by aerosol? Classify its types and write shorts on it.	BT-2	Understanding
4.	What is meant by cloud and how they are classified according to the altitude of formation?	BT-4	Analysing
5.	With a neat sketch brief about the process involved in hydrological cycle.	BT-6	Creating
6.	Write short notes on stratosphere and mesosphere.	BT-2	Understanding
7.	What are the causes of ozone layer depletion? Write short notes on it.	BT-4	Analysing
8.	How carbon Dioxide and sulphur Dioxide influences climate change?	BT-5	Evaluating
9.	What is meant by wind? Explain briefly about the factors that control speed and direction of it.	BT-2	Understanding
10.	Describe about the process around turbopause.	BT-3	Applying
11.	Write short notes on i) Tropopause ii) Stratopause.	BT-1	Remembering
12.	Enumerate about the evolution of atmosphere.	BT-4	Analysing
13.	How temperature and pressure affects the weather?	BT-4	Analysing
14.	Write short notes on i) Front ii) Relative Humidity iii) Atmospheric Pressure iv) Hydrostatic Pressure.	BT-1	Remembering

PART-C

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1.	Explain in detail about structure of atmosphere.	BT-4	Analysing
2.	What is meant by wind? Describe about its classification in detail.	BT-6	Creating
3.	Explain in detail about the constituents of atmosphere.	BT-2	Understanding
4.	What is meant by precipitation and explain its types.	BT-3	Applying

UNIT II ATMOSPHERIC DYNAMICS 9

Atmosphere dynamics: law – isobaric heating and cooling – adiabatic lapse rates – equation of motion - solving and forecasting. Forces – Relative and absolute acceleration – Earth's rotation coriolis on sphere – full equation of motion – Geostrophy;- Thermal winds –departures – smallscale motion.

Radiation, convection and advections: sun & solar radiation – energy balance – terrestrial radiation and the atmosphere – Green house effect- Global warming - Global budget – radiative fluxes - heat

transport. Atmosphere and ocean systems convecting & advecting heat. Surface and boundary layer – smaller scale weather system – larger scale weather system.

PART - A

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1.	Define atmospheric dynamics	BT-1	Remembering
2.	Differentiate between isobaric heating and cooling.	BT-3	Applying
3.	What is adiabatic lapse rate?	BT-2	Understanding
4.	Write down the equations of motion.	BT-6	Creating
5.	State Relative acceleration.	BT-1	Remembering
6.	What is meant by absolute acceleration?	BT-2	Understanding
7.	What is coriolis effect?	BT-4	Analysing
8.	Define geostrophic wind	BT-1	Remembering
9.	How does coriolis effect affect wind movement?	BT-5	Evaluating
10.	What is thermal wind?	BT-2	Understanding
11.	How thermal wind occurs?	BT-4	Analysing
12.	Distinguish between convection and advection.	BT-2	Understanding
13.	What type of radiation does the Earth emit?	BT-2	Understanding
14.	What happens when solar radiation enters earth's atmosphere?	BT-4	Analysing
15.	Write down the solar energy balance equation.	BT-5	Evaluating
16.	What is the difference between terrestrial and solar radiation?	BT-2	Understanding
17.	Which atmospheric gas absorbs most of the terrestrial radiation?	BT-3	Applying
18.	What is meant by greenhouse effect?	BT-4	Analysing
19.	List out the causes of greenhouse effect.	BT-2	Understanding
20.	What are the 5 main greenhouse gases?	BT-5	Evaluating
21	Why Coriolis effect is zero at Equator?	BT-4	Analysing
22	What is global warming?	BT-2	Understanding
23	What is meant by small scale weather system?	BT-4	Analysing
24	What are the ill effects of global warming?	BT-5	Evaluating
25	What is meant by high pressure centers in wind system?	BT-2	Understanding

PART – B

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1.	Define lapse rate. Why does the temperature fall with elevation?	BT-4	Analysing
2.	Write short notes on wet and dry adiabatic lapse rate.	BT-1	Remembering
3.	Explain briefly about Coriolis effect.	BT-5	Evaluating

4.	Discuss about the weather conditions at different adiabatic lapse rates.	BT-2	Understanding
5.	What are greenhouse gases, how does their concentration in the atmosphere affect climate and what are the major greenhouse gases?	BT-4	Analysing
6.	Illustrate about geostrophic winds.	BT-6	Creating
7.	What happens to incoming solar radiation?	BT-4	Analysing
8.	What is convection and why does it occur?	BT-5	Evaluating
9.	Write short notes on i) Earth's albedo (7) ii The tilt of the Earth's axis and the seasons (6))	BT-2	Understanding
10.	Describe briefly about trade winds and Hadley cell.	BT-2	Understanding
11.	What happens at high pressure centers and low pressure centers in the atmosphere?	BT-3	Applying
12.	Explain briefly about terrestrial radiation	BT-4	Analysing
13.	Explain why wind and ocean currents are termed as heat movers?	BT-2	Understanding
14.	Write short notes on small scale and large scale weather system?	BT-2	Understanding

PART-C

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1.	What is global warming? Explain its effects in detail.	BT-4	Analysing
2.	Why does water in the oceans store solar energy, and how does this solar energy stored in the oceans get into the atmosphere?	BT-6	Creating
3.	Define adiabatic lapse rate. Explain in detail about Gas law and adiabatic process.	BT-2	Understanding
4.	Explain in detail about Earth's energy budget.	BT-5	Evaluating

UNIT III GLOBAL CLIMATE 9

Components and phenomena in the climate system: Time and space scales – interaction and parameterization problem. Gradients of Radiative forcing and energy transports by atmosphere and ocean – atmospheric circulation – latitude structure of the circulation - latitude – longitude dependence of climate features. Ocean circulation: latitude – longitude dependence of climate features – ocean vertical structure – ocean thermohaline circulation – land surface processes – carbon cycle.

PART A

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1.	Define climate system	BT-1	Remembering
2.	What are the components of climate system?	BT-4	Analysing

3.	What is meant by radiative forcing	BT-2	Understanding
4.	Define hydrosphere.	BT-1	Remembering
5.	What is meant by ITCZ?	BT-1	Remembering
6.	Where are Hardley cells found?	BT-4	Analysing
7.	List out the climate variables.	BT-2	Understanding
8.	How do you state climate forcings?	BT-5	Evaluating
9.	Differentiate between radiative and non radiative climate forcings?	BT-2	Understanding
10.	What is meant by climate response?	BT-4	Analysing
11.	State climate feedback.	BT-1	Remembering
12.	What is meant by direct forcings?	BT-2	Understanding
13.	What do you understand by the term Evapotranspiration?	BT-1	Remembering
14.	Enlist the processes of the carbon cycle	BT-5	Evaluating
15.	Discuss at what depth is the ocean dark?	BT-6	Creating
16.	List out the 5 major factors that affect climate?	BT-4	Analysing
17.	How does longitude affect climate?	BT-5	Evaluate
18.	Identify in which humans affect the carbon cycle.	BT-3	Applying
19.	Identify the main driver of atmospheric circulation?	BT-3	Applying
20.	Define gyres.	BT-1	Remembering
21.	What are the different parts of the ocean?	BT-1	Remembering
22.	Distinguish between ocean and sea	BT-4	Analysing
23.	When the circulation is termed as thermohaline?	BT-4	Analysing
24.	Explain the four factors in primary circulation?	BT-5	Evaluating
25.	What are the 5 components of the carbon cycle?	BT-1	Remembering

PART – B

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1.	Describe briefly about hydrosphere and cryosphere.	BT-2	Understanding
2.	Write short notes on interactions among climate components.	BT-4	Analysing
3.	How radiative forcing and its variations influences climate change?	BT-5	Evaluating
4.	Explain briefly about the circulation of atmosphere.	BT-4	Analysing
5.	Summarize about oceanic circulation.	BT-2	Understanding
6.	Interpret about the latitude structure of the atmospheric circulation.	BT-6	Creating
7.	Illustrate briefly about Conceptual framework of climate forcing, response, and feedbacks under present-day climate conditions.	BT-6	Creating
8.	Explain briefly about the soil carbon dynamics.	BT-5	Evaluating
9.	Formulate equation for Autotrophic respiration	BT-6	Creating

10.	Explain about the properties of upper ocean vertical structure.	BT-2	Understanding
11.	What is the repose for the coupled air -sea system in the deeper ocean on a global scale?	BT-1	Remembering
12.	What role does the land surface play in modulating and controlling atmospheric CO_2?	BT-1	Remembering
13.	Identify where the major sources and sinks are and what is their likely long-term behaviour?	BT-3	Applying
14.	What is the effect of geographical location on the climate?	BT-3	Applying

PART-C

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1.	Illustrate the components of climate system, their processes and its interactions in detail.	BT-6	Creating
2.	Explain in detail, how the atmospheric circulation contributes to the climate change?	BT-4	Analysing
3.	Explain briefly about the various layers in the ocean system.	BT-2	Understanding
4.	Define relationship between latitude and general climate patterns.	BT-1	Remembering

UNIT – IV CLIMATE SYSTEM PROCESSES 9

Conservation of motion: Force – coriolis - pressure gradient- velocity equations – Application – geotropic wind – pressure co-ordinates. Equation of State – atmosphere – ocean. Application: thermal circulation – sea level rise. Temperature equation: Ocean – air – Application – decay of sea surface temperature. Continuity equation: ocean – atmosphere. Application: coastal upwelling – equatorial upwelling – conservation of warm water mass. Moisture and salinity equation: conservation of mass

– moisture. Source & sinks – latent heat. Moist processes – saturation – convection – Wave processes in atmosphere and ocean.

PART – A

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1	How is pressure related to velocity?	BT-1	Remembering
2	Explain the causes of pressure gradient?	BT-5	Evaluating
3	Justify whether higher pressure means higher velocity?	BT-5	Evaluating
4	How do we understand the Coriolis force?	BT-1	Remembering
5	Distinguish between centrifugal force and Coriolis force?	BT-4	Analysing
6	What is Coriolis force explain with example?	BT-2	Understanding
7	Justify why coriolis force is zero in Equator?	BT-4	Analysing
8	Where would you most likely find geostrophic wind?	BT-1	Remembering
9	Discuss the causes for sea level rise?	BT-6	Creating

10	What is the average sea surface temperature?	BT-1	Remembering

11	How much does the ocean temperature change from day to night?	BT-2	Understanding
12	What causes coastal upwelling?	BT-1	Remembering
13	Identify Which gives rise to equatorial upwelling?	BT-3	Applying
14	Define Synoptic Scaling of Continuity Equation.	BT-1	Remembering
15	Identify whether warm water have more salinity or not?	BT-3	Applying
16	Identify whether the temperature affect the weight of water?	BT-3	Applying
17	Enlist the three types of movement of ocean water.	BT-5	Evaluating
18	What process is ocean to atmosphere?	BT-1	Remembering
19	List the factors affecting the height of the waves?	BT-4	Analysing
20	Discuss how the atmospheric and oceanic circulation coupled?	BT-6	Creating
21	Difference between waves and currents.	BT-4	Analysing
22	List out the factors affecting the waves.	BT-4	Analysing
23	Enlist the 5 major ocean currents.	BT-2	Understanding
24	Explain how much heat can the ocean absorbs?	BT-2	Understanding
25	List out the 3 main causes of sea level rise.	BT-4	Analysing

PART B

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1	Derive the equation for the density of sea.	BT-1	Remembering
2	Explain briefly about the upwelling and down welling effect happen in the ocean.	BT-2	Understanding
3	Apply and Derive the equation on conservation of salt in the ocean.	BT-3	Applying
4	Derive the equation on conservation of heat	BT-1	Remembering
5	With a neat sketch explain briefly about the vertical structure of ocean.	BT-5	Evaluating
6	What are the sea water standards given by TEOS-10?	BT-1	Remembering
7	Write the difference between the external and internal gravity waves.	BT-4	Analysing
8	Compare the pressure coordinate in vertical and horizontal direction.	BT-4	Analysing
9	Explain briefly about Coriolis force.	BT-2	Understanding
10	Explain and derive the continuity equation for pressure coordinate.	BT-2	Understanding
11	What are the various causes for sea level rise?	BT-1	Remembering
12	Derive and scale the thermodynamic equation for pressure coordinate.	BT-1	Remembering
13	Explain briefly about the governing equation for atmospheric turbulent force.	BT-2	Understanding

14	Formulate the angular momentum using Coriolis force with an example.	BT-6	Creating

PART – C

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1	Define Coriolis force and Distribution of pressure with altitude in the sea breeze.	BT-1	Remembering
2	How Salinity is measured from space techniques?	BT-2	Understanding
3	Define equation of state and explain the equation of state for ocean.	BT-4	Analysing
4	Explain about the ideal law of gas and Derive ideal law and thermodynamic for moist air	BT-6	Creating

UNIT – V CLIMATE CHANGE MODELS 9

Constructing a climate model – climate system modeling – climate simulation and drift – Evaluation of climate model simulation – regional (RCM) – global (GCM) – Global average response to warming
– climate change observed to date.

PART – A

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1	What is the importance of climate models?	BT-1	Remembering
2	What is essential in constructing a global climate model?	BT-1	Remembering
3	How do you measure climate sensitivity?	BT-1	Remembering
4	Enlist the various steps involved in constructing the climate model.	BT-2	Understanding
5	How do scientists create current climate models?	BT-6	Creating
6	How do we Estimate the past climate?	BT-5	Evaluating
7	How many years of climate data do we have?	BT-1	Remembering
8	Identify how scientists collect data about the atmosphere?	BT-3	Applying
9	Conclude what climate models tell us?	BT-5	Evaluating
10	List out the various components of climate change.	BT-4	Analysing
11	Discuss how global warming affects the seasons.	BT-6	Creating
12	Identify the importance of climate system.	BT-3	Applying
13	List out the instruments used to measure weather and climate?	BT-4	Analysing
14	How do we classify climate?	BT-1	Remembering
15	Identify the methods used to test and evaluate the climate models.	BT-3	Applying
16	Discuss the factors which increase uncertainty in climate models.	BT-6	Creating
17	What is a regional model?	BT-1	Remembering
18	How will you downscale climate model?	BT-2	Understanding
19	How you can estimate resolution after downscaling.	BT-2	Understanding
20	Write down the use of global climate model GCM.	BT-2	Understanding
21	Define ENSO.	BT-1	Remembering
22	Conclude the drawbacks of a global climate model.	BT-5	Evaluating

23	List out the 5 elements for climate analysis.	BT-4	Analysing
24	Estimate the current rate of global warming.	BT-5	Evaluating

25	List out different types of drifts.	BT-4	Analysing

PART-B

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1	Explain briefly about creating a climatic model.	BT-2	Understanding
2	What are the different types of climatic models?	BT-1	Remembering
3	Estimate the climate change using the energy balance method.	BT-6	Creating
4	Explain briefly about the Intermediate complexity models	BT-2	Understanding
5	Explain briefly about the General circulation models.	BT-4	Analysing
6	Elaborate how we can evaluate the climate change models.	BT-6	Creating
7	Classify the types of drifts in a climate change model.	BT-4	Analysing
8	Discuss about the experiments to be done to run a climate change model.	BT-3	Applying
9	Enumerate in detail about the various Criteria for validating the climate change model	BT-5	Evaluating
10	Describe briefly about the various parameters analysed using the regional climate change model.	BT-3	Applying
11	What are the methods available to downscale the regional climate change model?	BT-1	Remembering
12	Discuss the main limitation of using climate change model.	BT-6	Creating
13	What changes have been observed so far in climate? (6) What is causing the present-day changes in climate? (7)	BT-1	Remembering
14	What is the average response of global warming on the earth?	BT-1	Remembering

PART – C

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1.	What are the new techniques available for the evaluating the climate change models	BT-1	Remembering
2.	Explain briefly how we can tuned the climate change model parameter.	BT-2	Understanding
3.	How do scientists produce climate model information for specific regions?	BT-4	Analysing
4.	Construct a climate model for simulation using a flow chart and also explain the various steps to be carried out to construct the model.	BT-6	Creating