

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP2023)

CLASS: IMSc
BRANCH: PHYSICS

SEMESTER : VI
SESSION : SP2023

SUBJECT: PH320 ATMOSPHERIC PHYSICS

TIME: 02 Hours

FULL MARKS: 25

INSTRUCTIONS:

1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

		CO	BL
Q.1(a)	What is lapse rate? Is it positive or negative in the troposphere?	[2] 1	1
Q.1(b)	What do you understand by El Niño, La Niña and southern oscillation	[3] 1	1
Q.2(a)	What is greenhouse effect? Name the main greenhouse gases.	[2] 1	1
Q.2(b)	What do you understand by the virtual temperature? If the ambient temperature is 303K and mixing ratio is 20 g/Kg, then what will be the value of virtual temperature	[3] 1	1
Q.3(a)	What is the significance of scale analysis?	[2] 2	1
Q.3(b)	What is the pressure gradient force? If pressure between Kanpur to Delhi falls from 998hPa to 960hPa, what will be the pressure gradient force, assuming the distance between these sites is approximately 400 Km.	[3] 2	1
Q.4(a)	What are the fundamental forces?	[2] 2	1
Q.4(b)	What is conservation of mass? Develop the expression.	[3] 2	1,3
Q.5(a)	If between wavelength λ and $\lambda+d\lambda$, e_λ and a_λ be emissive and absorptive powers of a body and E_λ be the emissive power of the perfect blackbody, then what is the relationship between e_λ , a_λ and E_λ .	[2] 3	1
Q.5(b)	Write the definition and value of the solar constant. How its value change from top of atmosphere to the earth surface.	[3] 3	1

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