



GS-304

VI Semester B.Sc. Examination, May/June - 2019

PHYSICS - VIII

Atmospheric Physics, Electronics and Computational Physics

NS-(Repeaters-Prior to 2018-19) (2013-14 & Onwards)

(CBCS 2016-17 & Onwards)

Time : 3 Hours

Max. Marks : 70

Instructions to Candidates : Answer **any five** questions from each part.

PART - A

Answer **any five** of the following questions. Each question carries **eight** marks. 5x8=40

1. (a) Define absolute humidity and relative humidity. 2+6
 (b) Obtain an expression for the variation of pressure with height. Give its graphical representation. 4+4
2. (a) Explain the terms reflectivity and transmittivity. 2+6
 (b) Derive Beer's law for the absorption of solar radiation by earth's atmosphere. 3+5
3. (a) Mention any two forces that affect atmospheric motion. 2+6
 (b) Explain the formation of trade winds and the erosion of river banks. 2+6
4. (a) What is feedback ? State Barkhausen's conditions for sustained oscillations. 2+6
 (b) Describe the working of Wien bridge oscillator with a diagram using OP-AMP and write its frequency of oscillation. 4+4
5. (a) Mention any two techniques of fabrication of ICs. 4+4
 (b) With the necessary circuit diagram arrive at an expression for the voltage gain of an inverting amplifier with feedback using OP-AMP. 8
6. (a) Write the logic symbol and the truth table of NAND gate and XOR gate. 8
 (b) With the necessary truth table and circuit diagram explain the full-adder logic circuit used for binary addition. 8
7. Write a C programme to find the roots of a Quadratic equation $ax^2 + bx + c = 0$. 8
8. Write the algorithm for free fall of a body with air resistance proportional to velocity by Euler's Method. 8

P.T.O.



PART - B

Solve **any five** of the following problems. Each problem carries **four** marks. 5x4=20

9. Calculate the equivalent black body temperature T_E of the outer visible surface of the sun assuming that the flux density of the solar radiation reaching the earth surface is 1365 W/m^2 . Radius of the sun $= 7 \times 10^8 \text{ m}$ and the distance from sun to Earth $= 1.5 \times 10^{11} \text{ M}$ given $\sigma = 5.67 \times 10^{-8} \text{ Wm}^{-2}\text{K}^{-4}$
10. The horizontal pressure gradient of the sea level pressure at Nandhi hills is $2 \text{ Pa per Kilometer}$. If the air density is 1.25 kgm^{-3} . Calculate the pressure gradient force per unit mass.
11. Find the coriolis force/mass at a station at 30° N having Zonal wind of 15 ms^{-1} . Given $F_c = 2 \times 7.29 \times 10^{-5} \sin \theta$.
12. An amplifier has gain of 800. When the feedback is applied, the gain is reduced to 150. Find the feedback ratio.
13. In RC phase shift oscillator $R = 5 \text{ k}\Omega$ and $C = 0.1 \mu\text{F}$. Calculate the frequency of Oscillations.
14. Perform the following conversions :
11011 to decimal, $[52]_{10}$ to binary.
15. Use the bisection method to solve $y = e^x - 3x$ with initial values 0.62000 and 0.60000.
16. If $f(x) = \sqrt{x}$ find $f'(2)$ using the difference method with $h = 0.2$ and $h = 0.02$.

PART - C

17. Answer **any five** of the following questions. Each question carries **two** marks. 5x2=10
 - (a) Why wind speed is slower over land than over ocean ? Explain.
 - (b) Earth atmosphere can be treated as a heat engine. Justify.
 - (c) Does temperature of troposphere change with height ? Explain.
 - (d) Name the type of ICs.
 - (e) Which type of feedback is called regenerative ? Explain.
 - (f) NAND and NOR gates are called universal logic gates. Explain.
 - (g) What are arrays ? Explain.
 - (h) Is bisection method convergent ? Explain.

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