Program:	**F.Y.B.Sc. DS**	**Semester:**	**I**	**Program Code:**	**UGDS03**
Course:	**Green Technologies**			**Course Code:**	**NUES101**

Duration: 1 Hour **Examination Pattern:** NEP-Autonomous - External. **Max. Marks:** 30

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Draw neat diagrams wherever necessary.
4. CO (Course Outcome), KL (Knowledge Level).

Examination:
REGULAR

Q. 1		**Attempt any TWO of the following.**	[10]	CO's	KL's
	(a)	What is energy consumption in IT? Explain the major sources of energy consumption in computers, servers, and networking equipment.		CO1	L2
	(b)	Differentiate between conventional IT practices and Green IT practices with respect to energy consumption, resource utilization, and environmental impact.		CO1	L4
	(c)	What is a Green Data Center? Explain the major techniques used to improve its energy efficiency.		CO2	L2
	(d)	Suggest five practical Green IT measures that an individual can adopt to reduce energy consumption and electronic waste.		CO4	L6
Q. 2		**Attempt any TWO of the following.**	[10]	CO's	KL's
	(a)	How does virtualization in Green Data Centers help reduce energy consumption and hardware requirements?		CO2	L2
	(b)	A data center consumes 500 MWh of total energy in one month. Out of this, 350 MWh is consumed by IT equipment. i. Calculate the Power Usage Effectiveness (PUE). ii. Determine the energy consumed by non-IT infrastructure. iii. Explain whether the calculated PUE indicates an efficient data center.		CO3	L3
	(c)	A college wants to establish a Green Data Center. Propose five measures involving virtualization, server consolidation, cooling, power management, and renewable energy.		CO4	L6
	(d)	Discuss the Green IT initiatives undertaken by Google and state how significantly did it contribute to sustainability.		CO3	L5
Q. 3		**Attempt any TWO of the following.**	[10]	CO's	KL's
	(a)	Explain the importance of energy-efficient cooling systems in data centers. Write any five methods used for reducing cooling energy consumption.		CO2	L2
	(b)	What is Green Coding? How can programming practices and algorithm optimization contribute to energy-efficient software?		CO2	L2
	(c)	What is bandwidth optimization? Explain any five techniques that can reduce unnecessary network traffic and energy consumption.		CO3	L2
	(d)	A computer laboratory contains 40 computers, each consuming an average of 150 W. The computers are used for 8 hours per day for 25 days in a month. If the electricity emission factor is 0.82 kg CO_2/kWh, calculate: i. Total electricity consumed per month. ii. Carbon footprint in kg CO_2.		CO3	L3

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