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Question Paper Code : 11518

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2026.

Fourth Semester

Civil Engineering

GE3451 — ENVIRONMENTAL SCIENCES AND SUSTAINABILITY

(Common to : Aeronautical Engineering/Aerospace Engineering/Automobile Engineering/Biomedical Engineering/Computer Science and Design/Computer Science and Engineering/Computer Science and Engineering (Artificial Intelligence and Machine Learning)/Computer Science and Engineering (Cyber Security)/Computer Science and Engineering (Data Science)/Computer and Communication Engineering/Electrical and Computer Engineering/Electrical and Electronics Engineering/Electronics Engineering (VLSI Design and Technology)/Electronics and Communication Engineering/Electronics and Instrumentation Engineering/Electronics and Telecommunication Engineering/Geoinformatics Engineering/Industrial Engineering/Industrial Engineering and Management/Instrumentation and Control Engineering/Manufacturing Engineering/Marine Engineering/Materials Science and Engineering/Mechanical Engineering/Mechanical Engineering (Sandwich)/Mechanical Engineering (Specialised in Automobile)/Mechanical Engineering (Specialised in Smart Manufacturing)/Mechanical and Automation Engineering/Mechatronics Engineering/Medical Electronics/Petrochemical Engineering/Production Engineering/Robotics and Automation/Safety and Fire Engineering/Agricultural Engineering/Artificial Intelligence and Data Science/Bio Technology/Biotechnology and Biochemical Engineering/Chemical Engineering/Chemical and Electrochemical Engineering/Computer Science and Business Systems/Fashion Technology/Food Technology/Handloom and Textile Technology/Information Technology/Petrochemical Technology/Petroleum Engineering/Pharmaceutical Technology/Plastic Technology/Textile Chemistry/Textile Technology)

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define environment and list any two importance.
2. Differentiate genetic and species biodiversity with an example.
3. Mention two important sources of air pollution.

4. Give any two methods to discard solid wastes.
5. Define energy conservation with an example.
6. Give the two renewable energy resources obtained from ocean waters.
7. Mention any two important sustainable development goals.
8. Give any two global environmental issues pertaining to climate change.
9. What is Circular economy?
10. Mention any two methods of carbon sequestration.

PART B — (5 × 13 = 65 marks)

11. (a) Describe ecological succession by giving the steps involved in it with an example.

Or

- (b) Give any two threats to biodiversity. Explain the strategies of biodiversity conservation with suitable examples.

12. (a) Discuss the causes, effects and preventive measures of water pollution with suitable examples.

Or

- (b) Explain the need for environmental protection and discuss the major Environmental Protection Acts in India with their significance.

13. (a) Write a note on hydrogen energy. Explain its applications and advantages as a future fuel.

Or

- (b) Discuss in detail about the origin, utilization and power plant operation of geothermal energy with a neat sketch.

14. (a) Explain the major challenges in achieving sustainability. How can societies move from unsustainability to sustainability?

Or

- (b) 'Development is necessary but not at the cost of environment'. Justify by explaining the relationship between development, GDP, and sustainability.

15. (a) Discuss the ISO 14000 series of standards. How do they help in environmental management?

Or

- (b) Discuss the role of green buildings, green materials, and energy efficiency for a sustainable habitat. How can sustainable transport contribute to sustainable urbanization?

PART C — (1 × 15 = 15 marks)

16. (a) A chemical industry is facing accidents due to poor safety practices. Apply the principles of Occupational Health and Safety Management System (OHSMS) to design a framework for worker safety and compliance with Indian Environmental Protection Acts.

Or

- (b) You are assigned to evaluate the environmental impacts of a proposed smart city project. Prepare an Environmental Impact Assessment (EIA) framework. Analyze the role of green engineering in shaping sustainable urbanization.
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12. The Government of the United States of America has the honor to inform you that it has decided to grant a loan to the Government of the Republic of the Philippines in the amount of \$100,000,000.

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