

BSDS - SO102

B.Sc. DEGREE EXAMINATION, DECEMBER - 2024
(FIRST SEMESTER) (CBCS Pattern) (New Regulation)

DATA SCIENCE

Advances in Mathematical, Physical and Chemical
Sciences

(w.e.f. 2023-2024 Admitted Batch)

Time : 3 Hours

Max. Marks : 75

SECTION - A

I. Multiple choice questions:

(30 × 1 = 30)

1. The mid point of (2,3) and (4,5) is _____

a) (2,4)

b) (3,4)

c) (3,5)

d) (2,5)

2. Equation of the line passing through (x_1, y_1) with slope ' m ' is _____

a) $y - y_1 = m(x - x_1)$

b) $y - x = m(y_1 - x_1)$

c) $y_1 = mx_1$

d) None

3. $\lim_{x \rightarrow 0} \log x =$ _____

a) 0

b) 1

c) $\log x$

d) ∞

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4. $\frac{d}{dx}(4x^2) = \underline{\hspace{2cm}}$.

a) $4x$

b) $2x$

c) 8

d) $8x$

5. $\int x^4 dx = \underline{\hspace{2cm}}$.

a) $4x^2$

b) $4x^3$

c) $\frac{x^5}{5} + c$

d) $\frac{x^3}{3} + c$

6. If A is a Singular matrix then $\underline{\hspace{2cm}}$.

a) $|A| = 0$

b) $|A| \neq 0$

c) $A = A^T$

d) $A = -A^T$

7. Solar energy systems use radiation from the $\underline{\hspace{2cm}}$

a) Moon

b) Earth

c) Sun

d) None

8. The negative end of a battery is connected to an electrode called $\underline{\hspace{2cm}}$

a) Anode

b) Cathode

c) Diode

d) Electrode

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9. Pumped hydro energy storage to store _____
- a) Heat b) Air
c) Electricity d) Energy
10. The size of quantum dot should be in the range of _____
- a) $5\text{nm} < L < 25\text{ nm}$ b) $3\text{nm} < L < 15\text{ nm}$
c) $6\text{ nm} < L < 12\text{ nm}$ d) $4\text{nm} < L < 20\text{ nm}$
11. Hydro power is the electricity produced from _____.
- a) Wind b) Flowing water
c) Heat d) All of these
12. The melting point of particles in nano form _____
- a) Increases
b) Decreases
c) Remains same
d) Increases then decreases
13. Drugs are injected to _____
- a) Veins b) Muscles
c) Blood cells d) All of these

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14. one of the following is not used in QSAR?
- a) Molecular connectivity index
 - b) Molecular's similarity index
 - c) Topological polar surface area
 - d) Partition Co-efficient
15. Which of the following is a green house gas.
- a) CO_2
 - b) Hydrogen
 - c) Oxygen
 - d) Propane
16. Burning of Fossil fuels results in _____
- a) Increased oxygen level
 - b) Decreases green house gases
 - c) Increased green house gases
 - d) Increased ethane level
17. Ozone depletion causes _____
- a) Increased incidence of skin cancer
 - b) Eye damage
 - c) Harm to aquatic eco system
 - d) All of these

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18. Which of the following is/are the examples of enzyme _____ mechanisms.
- a) Acid-base catalysis b) Covalent catalysis
 - c) Metal ion Catalysis d) All of these
19. What does MRI stands for _____
- a) Magneto-Ray Idometry
 - b) Medical Radiometry Instrument
 - c) Magnetic Resonance Imaging
 - d) Maximal Radiology Imaging
20. Nano technology used in _____
- a) Medical Science
 - b) Material Science
 - c) Environment Conservations
 - d) All of these
21. Renewable energy can be used for
- a) Electricity generation
 - b) Water heating and cooling
 - c) Both (a) & (b)
 - d) None

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22. X-rays were discovered in the year
- a) 1894
 - b) 1893
 - c) 1895
 - d) 1896
23. Which of the following that the studies the nervous system?
- a) Biophysics
 - b) Neurophysics
 - c) Nanophysics
 - d) None
24. Which of the following are water treatment steps?
- a) Coagulation
 - b) Chlorination
 - c) Filtration
 - d) All of these
25. A-F system is used in which number system?
- a) Binary
 - b) Octal
 - c) Hexa-Decimal
 - d) Decimal
26. MODEM stands for _____
- a) Modern electronic machine
 - b) Modulator and demodulator
 - c) Modern development machine
 - d) Modulator and convertor

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27. Multiplexing is used in _____

- a) Packet switching
- b) Circuit switching
- c) Data switching
- d) Packet and circuit switching

28. In modulo - 2 arithmetic, we use only _____

- a) 1 and 2
- b) 0 and 2
- c) 0 and 1
- d) None

29. The bridge network device is categorized into _____ types.

- a) 1
- b) 2
- c) 3
- d) 4

30. Which of the following network devices connects two networks?

- a) Bridge
- b) Hub
- c) Repeater
- d) Gateway

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II. Fill in the blanks :

(10 × 1 = 10)

1. The equation of the straight line passing through two given points $A(x_1, y_1)$ $B(x_2, y_2)$ is given by _____
2. $\lim_{x \rightarrow 3} \frac{x^3 + 3x}{x^2 - 9} = \underline{\hspace{2cm}}$.
3. Renewable energy sources are _____.
4. _____ technology directly converts light into electric current.
5. SBDD means _____.
6. Biophenol A (BPA) has been used in manufacture of _____ products.
7. Radiotherapy treatment uses beams of intense energy to kill _____ cells.
8. _____ method is better for the solid waste problem.
9. A codec means _____.
10. _____ is a device like a switch that routes data packets based on their IP address

SECTION - B

III. Very short answer questions :

(15 × 1 = 15)

1. Evaluate $\lim_{x \rightarrow 1} \frac{2x^2 + x - 3}{3x^2 - 4x + 1}$.
2. Find the value of $\frac{d}{dx} (x^3 + 9x^2 + 6)$.
3. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ then find A^{-1} .
4. What are Renewable energy sources?
5. What are hybrid solar cells?
6. Why quantum dots are so special?
7. What is CADD?
8. What is dye removal?
9. Write any two applications of nano sensors?
10. What are the sources of solid waste?
11. What is Arrhenius equation?
12. Write about smart grids?
13. Define Hub.
14. What is gateway?
15. What is called Binary systems?

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IV. Match the following :

(10 × 1 = 10)

- | | |
|--|-----------------------------|
| 1. $\lim_{x \rightarrow 0} \frac{\sin x}{x}$ | a) $(1001110)_2$ |
| 2. A is Symmetric matrix | b) Renewable energy sources |
| 3. Green house gas | c) Flow of water |
| 4. Hydraulic power | d) Brain, spinal cords |
| 5. Enzyme - mechanisms | e) 1 |
| 6. Ozone - depletion causes | f) $A = A^T$ |
| 7. Smart grid technology | g) Methane |
| 8. Neuro physics | h) Acid - base catalysis |
| 9. Hub | i) Impact on Agriculture |
| 10. $(78)_{10}$ | j) Multi-port repeater |

SECTION - C

V. True or False :

(10 × 1 = 10)

1. The derivative of any constant function is '1'

i) True

ii) False

2. Matrices of any order can be added

i) True

ii) False

3. Coal is a renewable energy source

i) True

ii) False

4. Solar panels are used to create nuclear energy

i) True

ii) False

5. All drugs are harmful

i) True

ii) False

6. The activity of the catalyst is reduced by the promoter

i) True

ii) False

7. Nuclear medicine can show how the organs or tissues are functioning

i) True

ii) False

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8. Municipal solid waste is the same as hazardous waste
 - i) True
 - ii) False
9. Modem is used to transmit a data
 - i) True
 - ii) False
10. A gateway is also called a protocol converter
 - i) True
 - ii) False

