Q.P Code
CS102

Hall Ticket No: _____

CSSR & SRRM DEGREE & PG COLLEGE

(AUTONOMOUS)

UG (CBCS) REGULAR EXAMINATIONS, DECEMBER-2024

BSc (Computer Science) Honours, SEMESTER-I

Course-2: Advances in Mathematical, Physical and Chemical Sciences

(w.e.f. 2024-25 Admitted Batch)

Time: 2 hours Max Marks: 70

(No additional sheet will be supplied)

A

Section-A

Answer all the multiple choice questions. Each question carries 1 mark. 30x1=30M

1. The slope of the line $3x - 4y + 5 = 0$ is

A) 3 B) 3/4

C) -3/4 D) 4/3

2. $\lim_{x\to 0} \frac{\sqrt{1+x}-1}{x}$ **=**

A) 1/2 B) 0

C) 1 D) $\frac{1}{\sqrt{2}}$

3. $\frac{d}{dx}(\sin 4x)$**=**

A) Cos4x B) 0

C) 4cos4x D) –sin4x

4. $\int e^{2x} dx =$

A) 2x B) $2e^{2x}$

C) $2e^{x}$ D) x^2

5. Determinant the Identity Matrix

A) -1 B) 0

C) 1 D) None of the Above

6. Find the correct form of Straight line equation

A) 2x-3y+4=0 B) $2x^2$-4x+6=0

C)-4x+5y+2z D) ax+by-$4y^2$=2

7. What is the primary source of energy for renewable energy generation?

A) Fossil Fuels B) Nuclear Fusion

C) Solar Radiation D) None of the above

8. What is the primary focus of biophysics?

A) Studying the behaviour of living organisms B) Converting sunlight into electricity

C) Harnessing wind energy for medical purposes D) Changing color based on temperature

9. What is the primary characteristic of Shape Memory Materials?

A) Changing colour based on temperature B) Returning to a previous shape after deformation

C) Emitting colourful light D) Storing energy in biophysics research tools

10. What is a common application of smart grids?

A). Studying molecular interactions B). Improving drug delivery

C). Enhancing communication through quantum dots D). Enabling efficient energy consumption

[P.T.O]

11. Photovoltaic Cells (PV) are made up of

A) Conductors B) Semiconductors

C) Insulators D) None of the above

12. Which energy storage method is commonly used in renewable energy systems to store excess electricity?

A) Compressed Air Energy Storage B) Flywheel Energy Storage

C) Chemical Batteries D) Pumped Hydro Storage

13. What is the purpose of the parity bit in parity check?

A) To correct errors in data B) To determine the total number of bits

C) To indicate the presence of errors in data D) None

14. Which layer of the OSI model does a switch operate at

A) Physical Layer B) Data Link Layer

C) Network Layer D) Transport Layer

15. Which network device is used as a bridge between different networks and protocols?

A) Core router B) Edge router

C) Distribution router D) Home router

16. Which of the following is a primary source of chemical pollution in the Environment?

A) Volcanic eruptions B) Human activities

C) Ocean currents D) Solar radiation

17. Which chemical pollutant is responsible for the depletion of Ozone layer?

A) Carbon monoxide B) Sulfur dioxide

C) CFC's D) Nitrogen oxides

18. What role does the Food and Drug Administration play in drug development?

A) conducting clinical trials B) Approving and regulating drugs for market entry

C) Designing drug formulations D) Finance drug research

19. What is the major greenhouse gas released from the burning of fossil fuels?

A) Methane B) Carbon dioxide

C) Nitrous oxide D) Ozone

20. Which software is commonly used for molecular visualization in CADD?

A) Photoshop B) ChemDraw

C) PyMOL D) AutoCAD

21. Which heavy metal is commonly associated with contaminated water from industrial discharges?

A) Iron B) Mercury

C) Calcium D) Potassium

22. The primary source of Acid Rains is:

A) Oxides of Nitrogen B) Oxides of Sulphur

C) Both A and B D) None

23. The phenomenon where pollutants are removed from the atmosphere through rainfall is known as:

A) Leaching B) Filtration

C) Precipitation scavenging D) Desorption

24. What is the primary cause of water hardness?

A) Presence of bacteria B) High mineral content

C) Industrial pollution D) Excess dissolved oxygen

25. $\frac{\mathbf{d}}{\mathbf{dx}}(\boldsymbol{x}\,\mathbf{sin\,x})=$

A) xsinx+cosx B) xcosx-sinx

C) xsinx+xcosx D) xcosx+sinx

[P.T.O]

26. A3F convert to binary number

A) 101010101111 B) 101000111111

C) 110100101100 D) None

27. A device which is used to boost the signal between two cable segments or wirless access points is

A) Booster B) Repeater

C) Switch D) Router

28. A device that is used to connect a number of LANs is

A) Router B) Repeater

C) Switch D) Bridge

29. The binary value of decimal number 9 is

A) 1010 B) 1001

C) 1101 D) 0011

30. Which field involves the study of biomechanics?

A. Nanotechnology B. Renewable energy

C. Biophysics D. Quantum communication

Section-B

Answer all fill in the blanks questions. Each question carries 1 mark. 10x1=10M

31. If $A^T = -A$ then the matrix A is called _____

32. Number of rows and columns in a square matrix are _____

33. Hydroelectric power generation harnesses energy from the flow of _____

34. Radiation Therapy is commonly used for the targeted treatment of _____

35. Photovoltaic cells convert sunlight into _____

36. The process of _____ refers to the gradual buildup of pollutants in organisms.

37. Combustion of fossil fuels releases _____, contributing to climate change.

38. In vector space i x i = _____

39. HUB is a _____

40. MODEM stands for _____

Section-C

Answer all very short answer questions. Each question carries 1 mark. 10x1=10M

41. If $2X + \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix} = \begin{pmatrix} 3 & 8 \\ 7 & 2 \end{pmatrix}$ find X

42. Find the derivative of $x^2 + \log x$

43. Define Renewable and Non-renewable Energies?

44. Define Quantum Dots?

45. Examine the environmental benefits of energy-efficient materials

46. Define catalysis method?

47. Give some examples of Chemical pollutants?

48. Find the derivative of $e^x \log x$.

49. Write any two differences between digital and analog signals?

50. What is Number system? [P.T.O]

Section-D

Answer all match the following questions. Each question carries 1 mark. 10x1=10M

Group-A	Group-B
51. $\lim_{x\to 2} \frac{x^3-2^3}{x-2} =$	A). Network device
52. $\begin{vmatrix} -1 & 3 & 4 \\ 1 & 9 & 12 \\ 9 & 9 & 12 \end{vmatrix} =$	B). Generate power from flowing air
53. Solar	C). Bhopal gas tragedy
54. Wind	D). 12
55. Biomass	E). 0
56. Repeater	F). Captures energy from sunlight.
57. 010100	G). Binary number
58. Acid rains	H). 13
59. Methyl IsoCyanate (MIC)	I). Converts organic materials into energy.
60. Decimal value of 1101	J). NO_2 and SO_2

Section-E

Answer all True or False questions. Each question carries 1 mark. 10x1=10M

61. Intercept form of a line is $\frac{x}{a}+\frac{y}{b}=1$

62. Two straight lines are always intersect

63. Wind energy is an example of a non-renewable energy source

64. Lithium-ion batteries are an example of a commonly used energy storage technology.

65. Catalysis can be used to remove both organic and inorganic dyes from waste water

66. Carbon monoxide is a greenhouse gas that contributes to global warming.

67. Null matrix having at least one zero

68. The base value of Hexadecimal value is 16

69. A bit in computer terminology means either 0 or 1

70. CRC provides built-in error correction capabilities

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