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UG PROGRAM (4 YEARS HONORS) WITH SINGLE MAJOR
AT THE END OF FIRST SEARCH 123 139 120 120 122 125 129 129 12° AT THE END OF FIRST SEMESTER

ADVANCES IN MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES

nmon for B.Sc. (Mathematics, Statistics, Chemical Sciences) Common for B.Sc. (Mathematics, Statistics, Chemistry, Electronics, Physics, Data Science, Computer Science, Artificial Intelligence and Robotics, Psychology, Internet of Things,

(w.e.f. Admitted Batch 2023-24) 129 129 129 Maximum: 70 marks
(w.e.f. Admitted Batch 2023-24) 129 129 129 Maximum: 70 marks Time: 3Hours 20 129 129 129 129 129 129 129 129 129 129
SECTION A (Multiple choice questions), 129 129 129 3021
1. Which of the following is the equation of a vertical line 129 129 129 129 129 129 129 129 129 129
I. Which of the following is the equation of a vertical line.
Which of the following is the equation of a vertical line (a) $y = 2x + 3$ (b) $y = 4^{12}$ (c) $x = 4$ (d) $y = x$ (2) $x = 4 + 3$ and $y = -2x + 7$
2. What is the point of intersection of the lines $y = 2x + 3$ and $y = -2x + 7$
$\sim 10^{-10}$
(a) $(1, 5)$ (b) $(-1, -1)$ (c) $(2, 7)$ (d) $(0, 3)$ 3. What is the transpose of 2x3 matrix (a) $(2, 7)$ (d) $(0, 3)$ (b) $(2, 7)$ (d) $(0, 3)$ (c) $(2, 7)$ (d) $(0, 3)$
(a)2x3 2 (b)3x2 (c) 2x2 (d) 3x3 129
4. The determinant of $A = \begin{bmatrix} 4 & 3 \\ 2 & 3 \end{bmatrix}$ 129 129 129 129 129 129 129 129 129 129
(a) 1 (b) 1 (c) 17 (d) 3
(a) 1 (b) 17 (d) 3 5. If $f(x) = x^2 \sin x$ what is $D(f(x))$
W ALC 07 TOTAL AND 120
(a) $2x Sinx$ (b) $2x Cosx$ (c) $x^2 Cosx$ (d) $2x Sin x + x^2 Cos x$
6. If $p(x) = \sqrt{x}$ and $q(x) = \frac{1}{x}$ what is $\frac{d}{dx} \left(\frac{p}{q} \right) = \frac{1}{x}$
(a) $\frac{1}{2x\sqrt{x}}$ (b) $\frac{1}{2x\sqrt{x}}$ (c) $\frac{2^{-1}z^{5}}{2\sqrt{x}}$ (d) $\frac{1}{2\sqrt{x}}$ (29 129 129 129 129 129 129 129 129 129 1
그 사이트 기업적인 전에 가는 그는 그는 그가 있었다. 유무슨 기업적인 여전이 그 그는 그
7. Which of the following is a renewable energy source (a) Coal (b) Natural Gas (c) Solar (d) Nuclear 8. What is the primary energy source for hydropower generation (e)
(a) Coal (b) Natural Gas (e) Solar (d) Nuclear
6. What is the printary charge source to any area
(a) Wind (b) Sunlight (c) Flowing or falling water (d) Geothermal Heating
9. Which type of storage technology is based on the Principle of gravitational potential
() 129 129 129 129 129 129 129 129 129 129
(a) Flywheels (b) Compressed air
29 129 129 129 129 129 129 129 129 129 1
123 129 121 129 126 126 128 129 129 129 129 129 129 129 129 129 129
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129 129 129

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12" 12" 129 129 129 129 129 129 129 129 129 129
(2) 129 129 129 129 129 129 129 129 129 129
10. How are quantum dots utilized in bio-imaging
(a) To catch a broader spectrum of light (b) To emit high intensity visible light
(c) To enhance electrical conductivity (d) To enable high resolution imaging
11. What recent discovery in biophysics has implications for the development of new antibiotics
and understanding antibiotics resistance.
(a) Protein folding mechanisms (b) DNA sequencing techniques
(c) Bacterial cell division process (d) Bacterial biofilm formation
12. In which industry are shape memory materials often used for aerospace components like
aircraft wings and control surfaces? 129 129 129 129 129 129 129 129 129 129
(d) Aerospace
120 120 13. What is the primary goal of computer-aided drug design (CADD)
23 129 129 129 (a) Drug manufacturing 121 123 (b) Drug discovery
129 129 129 (c) Drug Administration 129 129 (d) Drug marketing
14. What is the primary focus of chemical biology?
(a) Organic synthesis (29 129 129 129 129 129 129 129 129 129 1
(b) Understanding chemical reaction
(c) Investigating the biological roles of small molecules
(d) Material science
15. What type of bond holds the two strands of DNA together in the double helix structure? ()
(a) Ionic bonds (b) Covalent bond (c) Hydrogen bonds (d) Van Der waals force
16. Which of the following is a primary source of chemical pollutants in aquatic ecosystems? ()
(a) Volcanic activity (b) Industrial discharge (c)Wind erosion (d) None
17. Which type of chemical pollutant is commonly associated with the greenhouse effect and
climate change? (a) Heavy metals (b) Greenhouses gases (c) pesticides (d) Radioactive substances
(a) Heavy metals (b) Greenhouses gases
(c) pesticides (d) Radioactive substances
(c) pesticides (d) Radioactive substances 18. Which of the following is a common health effect associated with exposure to air pollutant such as particulate matter (PM) and Ozone?
such as particulate matter (PM) and Ozone?
(a) Skin rashes (b) Respiratory problems
(d) Joint pain
121 1940 1441 155 155
129 129 129 129 129 129 129 129 121 120 129 129 129 129 129 129 129 129 129 129
129 120 129 129 125 128 126 126 126 127 128 120 120 120 120 120 120 120 120 120 120
600 100 100 100 100 120 120 120 120 120 1

128 128 128 128 128 128 128 128 128 128
200 S20 S20 S20 S20 S20 S20 S20 S20 S20
129 129 120 120 120 120 120 120 120 120 120 120
170 170 170 170 190 170 170 170 170 170 170 170 170 170 17
19 Which of the following number system is not used in computers?
19 Which of the following number system is not used in computers? (a) Decimal (b) Binary (c) Hexadecimal (d) Octal 20. In the Hexadecimal number system, what digit comes after 9?
(a) A (b) B (c) 10 1(d) 216 (25)
(a) Decimal (b) Binary (c) Hexadecimal (d) Octal 20. In the Hexadecimal number system, what digit comes after 9729 (a) A (b) B (c) 10 (d) 16
(a) Decimal (b) Binary (c) Hexadecimal (d) Octal 20. In the Hexadecimal number system, what digit comes after 9? 29 (a) A (b) B (c) 10 (d) 16 21. I zettabyte =? (a) 1024 TB (b) 1024 EB (c) 1024 ZB (d) 1024 PB (b) 1024 ZB (d) 1024 PB (c) 1024 ZB (d) 1024 PB (d) 1024 PB (e) 1024 ZB (d) 1024 PB (f) 129 129 129 129 129 129 129 129 129 129
79 70 70 70 70 70 70 70 70 70 70 70 70 70
21. I zettabyte =? 29 128 129 129 129 129 129 129 129 129 129 129
23. What is the beyodecimal equivalent of the decimal number 215?
120 129 129 129 129 129 129 129 129
22. Which of the following is not an example of hexadecimal number (a) IC2 (b) 2A1 (c) IABCD (d) 67GA (29 129
23. What is the hexadecimal equivalent of the decimal number 215? (a) D7 (b) 7D (c) B7 (d) 7C 24. Which of the following is not used for web graphics? (a) JPEG (b) PNG (c) GIF (d) .exe
(a) D7 (b) 7D (c) B7 (d) 7C 24. Which of the following is not used for web graphics? (a) JPEG (b) PNG (c) GIF (d) exe (b) 7D (c) B7 (d) 7C (e) B7
70 129 125 125 125 125 125 125 125 125 125 125
5 T L 2/0 DM 144 T
(a) Router (b) Switch (c) Repeater (d), Dringe 29
(a) Router (b) Switch (c) Repeater (d) Bridge 29 27. $\int e^x [Tanx + Sec^2x] dx = ?$ (a) $e^x + c$ (b) $e^x Tanx + c$ (c) $e^x Sec^2x + c$ (d) None 28. If $\begin{bmatrix} x & 4 \\ 2 & 8 \end{bmatrix}$ is a singular matrix then $x = ?$
(a) $e^{-} + c^{-}$ (b) $e^{-}1 anx + c^{-}$ (c) $e^{-}Sec^{-}x + c^{-}$ (d) None
(a)1 (b)0 29 (c) 8 (d) None
(a) 1 (b) 0 (c) 8 (d) None 29. What neuro physics technique is used for studying brain function and structure? (2) (a) X-ray (b) EEG (c) PET scan (d) NMR spectroscopy
30. Which of the following is a benefit of recycling in solid waste management?
(a) Increased land fill space (b) Energy consumption (c) Resource conservation (d) Air pollution (d) Air pollution (29 129 129 129 129 129 129 129 129 129 1
(c) Resource conservation. (d) Air pollution (e) Resource conservation. (d) Air pollution (e) Resource conservation. (f) Energy consumption (g) En
25 125 125 125 125 125 125 126 127 126 127 126 126 129 129 129 129 129 129 129 129 129 129
SECTION -B (Fill in the blanks)
120 129 120 129 120 129 129 129 129 129 129 129 129 129 129
SECTION -B (Fill in the blanks) 31. The point slope form of a straight line is 32. The lines are perpendicular, if the product of their slopes is 33. Wind turbines convert the kinetic energy of into electrical energy of the energy of the electrical energy of
32. The lines are perpendicular, if the product of their slopes is
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33.W and turbines convert the kinetic energy of into electrical energy 129 129 129 129 129 129 129 129 129 129
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120 120 120 at a tentral situs by high regions the energy of flowing
Hydropower generates electricity by harnessing the energy of flowing
Catalysis method is commonly and degradation of organic dyes in
waste water treatment 20 120 120 120 120 120 120 120 120 120
36. Computational method used to predict the three-dimensional structure of a protein is
waste water treatment. 36. Computational method used to predict the three-dimensional structure of a protein is
to hinary addition 141 equals to
and attend only
39. $\frac{129}{129}$ connects two networks $\frac{129}{129}$ $$
SECTION =C (Very short answer questions)
9 120 179 129 129 129 129 129 129 129 129 129 12
40. $\int Sinx dx = \frac{1}{2}$ SECTION—C (Very short answer questions) 10X1=10 41. Calculate the inverse of the matrix $A = \begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix}$.
42. Find the equation of a line passing through (0,0) and (1,1).
Find the derivative of $\sqrt{2x+3}$.
What is the most common type of electrochemical energy storage?
45. How do quantum dots emit light?
What is the main environmental advantage of hydropower?
42. What is a digital signal?
48. What is the range of infrared waves?
23 129 100 and
49. Name the common disinfection method used in water treatment. 50. Name some sources of chemical pollutions.
30. Name some some some some some some some so
SECTION -D (Matching) 129 129 129 129 129 129 129 129 129 129
129 129 129 129 129 129 129 129 129 129
126 (29 129] 129 129 129 129 129 129 129 129 129 129
52. Decimal equivalent to (1111) ₂ is (2) b. 10010
53. Base of hexadecimal system is (29) 22 c. Infinite
54. The value of the binary number 18. (129) 2 d. 1
55_9 129 14 $\dot{\text{lim}}e^{1/\hat{x}^2}$ 129 129 120 120 120 120 120 120 120 120 120 120
54. The value of the binary number 18 (129) 124 d. 1 29 122 129 129 129 129 129 129 129 129 1
20 129 129 129 129 129 129 129 129 129 129
129 126 129 120 129 129 129 129 129 129 120 129 120 129 129 129 129 129 129 129 129 129 129
128 129 129 129 129 129 129 129 129 125 129
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	TI. 129 129 129 129 129 129 129 129 129 129
	(A) _{26 129 126 129 129 129 129 129 129 129 129 129 129}
	56. Chlorination 72 22 12 () a Foreign water through a semi-
	permeable membrane to remove
	57. Reverse Osmosis
	. Conversion of organic waste into
	57. Reverse Osmosis 79 (12) 26. conversion of organic waste into? 8. Nativated carbon Filtration 129 129 129 129 129 129 129 129 129 129
	-20 120 129 129 129 129 129 129 129 129 129 129
	58. Activated carbon Filtration () c. Thermal treatment of waste to generate energy. 129 129 129 129 129 129 129 129 129 129
	129 129 129 129 129 129 129 129
	59. Composting 29 () and Adsorption of organic impurities
	29 129 129 129 129 129 121 129 129 129 1
	100 100 120 120 120 120 120 120 120 120
	60. Incineration 29 129 () Disinfection by Killing micro organisms.
	60. Incineration 129 129 (129 Disinfection by Killing micro organisms. 129 129 129 129 129 129 129 129 129 129
	120 120 120 120 120 120 120 120 120 120
	f. Controlled disposal of waste in
	20 120 129 129 129 129 129 129 129 129 129 129
_	SECTION – E (True or False) 10X1 = 10
-	10 129 129 129 129 129 129 129 129 129 129
	(a) (2)
	(a) (2)
	61. The derivative of a constant function is always zero 62. $D\left(\frac{1}{x}\right) = Logx$
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