NAT-IE Pre Engineering Mathematics Hard Test

Sr	Questions	Answers Choice
1	The set of the first elements of the ordered pairs forming a relation is called its	A. Function on B B. Range C. Domain D. A into B
2	Question Image	A. 15 B. 15 i C. -15 i D. -15
3	If 0 < n < 1, n is a rational number, the number of terms in the expansion of $(1 + X)^n$ are	A. n + 1 B. 2n C. Infinitely many D. 2n²
4	If any two rows (or any two columns) of a square matrix are inter changed, the determinant of the resultant matrix is	A. Same as the original determinant B. Additive inverse of the original determinant C. Both A and B D. Adj of the original matrix
5	Question Image	
6	Question Image	
7	Question Image	
8	120 degrees are equal to how many radians?	
9	If in isosceles right angled triangle, one side is a then hypotenuse is	C. a D. cannot be determined by given information
10	Question Image	D. None
11	Question Image	
12	Question Image	A. A + B B. C²/AB C. A²/BC D. B²/AC
13	Complex roots of real quadratic equation occur in	A. Conjugate pair B. ordered pair C. reciprocal pair D. quadratic function
14	Question Image	A. A < G < H B. A > G > H C. A < G > H D. A > G < H
15	Question Image	D. None of these
16	If 1 + Cos x = 0, then x =	
17	The difference of two consecutive terms of an A.P. is called	A. Constant of series B. Common ratio C. Common difference D. General term
18	The set {{a,b}} is	A. Infinite set B. Singleton set C. Two points set D. None
19	Question Image	A. A polynomial B. An inequality C. An identity D. A linear function
20	A line segment whose end points lie on a circle is called	A. The secant of the circle B. The arc of the circle C. The chord of the circle

		C. The chord of the circle D. The circumference of the circle
21	Question Image	
22	Unit vector in the positive direction of x-axis is	D. All
23	The nth term of of A.P:1,5,9,15,..... is given by	A. 4n - 3 B. 4n + 1 C. 3n - 4 D. 4n + 3
24	Question Image	A. 15 B. 60 C. 90 D. 20
25	Question Image	
26	Question Image	
27	If $f_1(x)$ and $f_2(x)$ are any two anti derivatives of a function F (x), then the value of $f_1(x) - f_2(x)$ =	A. A variable B. A constant C. undefined D. infinity
28	Question Image	
29	An angle of one radian is equivalent to	A. 90° B. 60° C. 67° D. 57° 18[']
30	If the 19th term of A.P is 8 and the 4th term is 20, then the first term is	A. 20.2 B. 25.5 C. 27.5 D. 37.5
31	The set of complex numbers forms a group under the binary operation of	A. Addition B. Multiplication C. Division D. Subtraction
32	Question Image	A. 1 B. 2 C. 3 D. 4
33	Question Image	A. 1 B. 2 C. 3 D. 4
34	Question Image	
35	Question Image	
36	Question Image	A. 2 B. 1 C. 0
37	The circle $(x-2)^2 + (y+3)^2 = 4$ is not concentric with the circle	A. (x-2)²+ (y+3)²= 9 B. (x+2)²+ (y-3)²= 4 C. (x-2)²+ (y+3)²= 8 D. (x-2)²+ (y+3)²= 5
38	The gradient of the line joining (1, 4) and (-2, 5) is	A. 3/8 B. -2 2/3 C. -1/3 D. 2
39	Question Image	A. 1 B. 2

		C. 3 D. 4
40	Question Image	D. None
41	The common difference of the sequence 7,4,1, ... is	A. 1 B. -3 C. 5 D. 0
42	Question Image	A. An irrational number B. Whole number C. A positive integer D. A rational number
43	If 2 Sin x Cos 2 x = Sin x then?	
44	Question Image	
45	The radius of the circle $(x-1)^2+ (y+3)^2= 64$ is	A. 8 C. 4 D. 64
46	If a cone is cut by a plane perpendicular to the axis of the cone, then the section is a	A. Parabola B. Circle C. Hyperbola D. Ellipse
47	Which of the following integrals can be evaluated	
48	Question Image	
49	Question Image	
50	In a school, there are 150 students. Out of these 80 students enrolled for mathematics class, 50 enrolled for English class, and 60 enrolled for Physics class. The student enrolled for English cannot attend any other class, but the students of mathematics and Physics can take two courses at a time. Find the number of students who have taken both physics and mathematics	A. 40 B. 30 C. 50 D. 20
51	The direction cosines of y-axis are	A. 1,0,0 B. 0,1,0 C. 0,0,1 D. 1,1,1
52	In Binomial Expansion the coefficients of the terms equidistant from beginning and end of the expansion are	A. Zero B. Same C. Equal to preceding term D. Equal to following term
53	Question Image	
54	3/2 is	A. An irrational number B. Whole number C. A positive integer D. A rational number
55	6 is	A. A prime integer B. An irrational number C. A rational number D. An odd integer
56	Question Image	A. 10 B. 20 C. 40 D. 26
57	A fraction in which the degree of the numerator is less than the degree of the denominator is called	A. Polynomial B. Proper fraction C. Rational fraction D. Mixed fraction
58	The multiplicative inverse of -1 in the set {1-, 1} is	A. 1 B. -1 C. <u>+</u>1 D. 0
59	The conic is a parabola if	A. e < 1 B. e > 1 C. e = 1 D. e = 0
60	Question Image	A. A linear equation B. A cubic equation C. A quadratic equation D. An equation for circle
		A. p < r

61	Question Image	B. p > r C. p + r < 0 D. p - r < 0
62	Sin x + Cos x = 1 x =	
63	Question Image	D. None of these
64	A die is thrown. What is the probability that there is a prime number on the top?	A. 1/2 B. 1/3 C. 1/6 D. 2/3
65	Question Image	
66	Which of the vectors have opposite direction?	D. Both A and B
67	The magnitude of a vector can never be	A. Zero B. Negative C. Positive D. Absolute
68	Question Image	
69	Multiplicative inverse of "1" is	A. 0 B. <u>+</u> 1 C. 1 D. {0, 1}
70	Question Image	
71	Question Image	
72	If A and B are matrices such that AB=BA=I then	A. A and B are multiplicative inverse of each other B. A and B are additive inverses of each other C. . A and B are singular matrices D. A and B are equal
73	Question Image	B. -3/4 C. 1/16 D. 1/4
74	Question Image	
75	Question Image	D. None of these
76	Question Image	
77	The number of diagonals of a six sided figure are	A. 9 B. 6 C. 12 D. 3
78	In 30,60,90 triangle, if the smallest side is 6 then the side opposite to the angle of 60°is	A. 12 B. 3 D. 6
79	The number ways in which 5 distinct toys can be distributed among 3 children is	A. 3⁵ B. 5³ C. C₃⁵ D. P₃⁵
80	Question Image	
81	Question Image	D. None of these
82	Ifα andβ be irrational roots of a quadratic equation, then	
83	Question Image	
84	The associative angle of 280°is	A. 100° B. 10° C. 80° D. -80°
		A. 3(-2)ⁿ⁻¹

85	The nth term in G.P 3,-6,12,..... is	B. 2(-2)ⁿ⁺¹ C. 3(-2)ⁿ D. 4(-2)ⁿ⁻¹
86	Two natural numbers whose sum is 25 and difference is 5, are	A. 25, 20 B. 20, 10 C. 20, 5 D. 15, 10
87	If the angle of a triangle are in the ratio 2:3:7, the triangle is	A. Obtuse B. Acute C. Right angle D. Isosceles
88	Question Image	A. Unit matrix B. Diagonal matrix C. Nilpotent matrix D. Zero matrix
89	Question Image	A. A positive integer B. A negative integer C. A natural number D. An irrational number
90	Question Image	A. 0 B. -2 C. 1 D. 4
91	The graph of a quadratic function is	A. Circle B. Ellipse C. Parabola D. Hexagon
92	Total number of terms in the expansion of $(a + b)^5 + (a - b)^5$ after simplification are	A. 3 B. 1 C. 4 D. 7
93	If Z = (1,2), then Z^{-1} = ?	A. (0.2, 0.4) B. (-0.2, 0.4) C. (0.2 , -0.4) D. (-0.2, -0.4)
94	Which of the following is the equation of a line with slope 0 and passing through the point (4, 3)	A. X = 4 B. X = -4 C. Y = 3 D. Y = -6
95	Write the first four terms of the arithmetic sequence if a_1 = 5 and other three consecutive terms are 23,26,29	A. 23, 26, 29, 32 B. 5, 8, 11, 14 C. 8, 11, 14, 17 D. None of these
96	Question Image	
97	If A and B are two events, then P(AUB) = ? (when A and B are disjoint)	A. P(A) - P(B) B. P(A) x P(B) C. P(A)+P(B)
98	Question Image	A. An equation B. Linear equation C. Rational fraction D. Identity
99	The center of a circle of radius 10 is on the origin. Which of the following points lies with in the circle	A. (10, 0) B. (8, 8) C. (8, 4) D. (0, 10)
100	The sum of the series 1+5+9+13+17+21+25+29 is	A. 140 B. 130 C. 120 D. 110
101	Which of the following is the subset of all sets?	B. {1, 2,3} D. {0}
102	Question Image	A. 1/2 B. 3/5 C. 4/5 D. 1
103	0 (Zero) is	A. An irrational number B. A rational number C. A negative integer D. A positive number
104	Question Image	

105	Question Image	
106	Question Image	
107	Question Image	
108	The value of x, and y, when $(x + iy)^2 = 5 + 4i$	A. X = 2, y = -1 B. X = -2, y = 1 C. X = 2, y = -1 D. X = 2, y = 2
109	The complement of set A relative to universal set U is the set	D. A - U
110	Question Image	A. 0 B. 1 C. -1 D. 2
111	In which quadrant is the solution of the equation sin x - 1 = 0	A. II quadrants B. II and III quadrants C. III and IV quadrants D. I quadrant
112	a + x is	A. A trinomial B. A binomial C. A moomial D. An equation
113	Which is in the solution set of 4x - 3y < 2	A. (3, 0) B. (4, 1) C. (1, 3) D. None
114	Question Image	
115	If the sum of the roots of the equation $ax^2 - 2x + 2a = 0$ is equal to their product, then the value of a is	A. 1 B. 2 C. 3 D. 4
116	The constant distance of all points of the cirlce from its centre is called the	A. Radius of the circle B. Secant of the circle C. Chord of the circle D. Diameter of the circle
117	If the sum of the roots of $(a + 1)x^2 + (2a + 3)x + (3a+4) = 0$ is -1, then product of the roots is	A. 1 B. 2 C. -2 D. -1
118	Question Image	
119	In general matrices do not satisfy	A. Commutative law w.r.t multiplication B. Associative law w.r.t addition C. Distributive law w.r.t addition D. Multiplication of a scalar with the matrix
120	Question Image	A. (0, e) B. (0, 1) D. None
121	Question Image	
122	If P(E) is the probability that can event will occur, then P(E) =	A. 1 B. 0.5 C. 2 D. 0
123	Question Image	
124	A farmer possesses 100 hectometers of land and wants to grow corn and wheat. Cultivation of corn requires 3 hours per hectometer while cultivation of wheat requires 2 hours pert hectometer. Working hours cannot exceed 240. If he gets a profit of Rs. 20 per hectometer for corn and Rs. 20 per hectometer for wheat. The profit function for the farmer is	A. P(x,y) = 20x + 15y B. P(x,y) = 2x + 3y C. P(x,y) = x + y D. P(x,y) = 3x + 2y
125	Question Image	A. 0 B. -25 C. 5 D. 45
126	A standard deck of 52 cards is shuffled. What is the probability of choosing the queen of the diamonds	A. 1/5 B. 1/13 C. 5/52 D. 1/52

127	The multiplicative inverse of x such that x = 0 is	A. -x B. does not exist C. 1/x D. 0
128	A relation in which the equality is true only for some values of the unknown variable is called	A. An identity B. An equation C. A polynomial D. Inverse function
129	If K_1: K_2= 1 : 1 then the point P dividing the line is	A. Midpoint B. Extreme left point C. Extreme Right Point D. P lies out side k₁and k₂
130	The point (-5, 3) is the center of a circle and P(7, -2) lies on the circle. The radius of the circle is	A. 2 B. 13 C. 7 D. 8
131	Question Image	
132	Question Image	
133	Cos 315°=	A. 0.707 B. 0.5 C. 1 D. 0
134	The mid point of the line joining (-1, -3) to (3, -5) is	A. (1, 1) B. (1, -1) C. (2, -8) D. (1, -4)
135	Question Image	A. Tan x B. X C. - x
136	The value of the polynomial $3x^3+ 4x^2- 5x + 4$ at x = -1 is	A. 12 B. 1 C. 10 D. -10
137	If n is a positive integer, then 3+6+9+ ----------+3n =	
138	Question Image	A. n = 3 only B. n <u>></u> 5 C. n <u>></u> 3 D. n < 5
139	The perpendicular bisector of any chord of a circle	A. Passes through the centre of the cirle B. Does not pass through the centre of the circle C. May or may not pass through the centre of the cirlce D. None of these
140	Question Image	
141	The Domain of f(x) = log x is	
142	The curves $y = x^2$, y = x intersect at	A. (0,0) , (1, 1) B. (2, 4) D. (0,3), (-1, 1)
143	Two dice are rolled. The number of possible outcome in which at least one die shows 2 is?	A. 5 B. 12 C. 11 D. 7
144	The equation of the normal to the circle $x^2+ y^2= 25$ at(4, 3) is	A. 3x - 4y = 0 B. 3x - 4y = 5 C. 4x + 3y = 5 D. 4x + 3y = 25
145	Question Image	A. Both A,B have the same number of columns B. Both A and B do not have the same order C. Number of col A is same as number of rows of B D. Number of rows of A is same as number of col of B
146	Question Image	

147	Question Image	
148	The values of n such that, in the binomial expansion of $(1 - x)^n$, co-efficient of x^2, co-efficient of $x^2$is 3, are	A. -2, -3 B. 2, -3 C. -2, 3 D. None of these
149	Question Image	A. 30° B. 45° C. 60° D. 90°
150	What is the domain of $y = Cot^{-1}x$?	A. Set of irrational number only B. Set of all real numbers C. Set of intergers only D. Set of complex numbers only
151	If 4 - x > 5, then	A. x > 1 B. x > -1 C. x < 1 D. x < -1
152	If ab > 0 and a < 0, which of the following is negative?	A. b B. -b C. -a D. (a - b)²
153	Question Image	
154	Question Image	
155	How many elements are in the sample space of two rolling dies	A. 6 B. 12 C. 18 D. 36
156	Question Image	
157	The equation of the line with gradient 1 passing through the point (h, k) is	A. Y = x + k - h B. Y = k/h x + 1 C. Y = x + h - k D. Ky = hx - 1
158	Question Image	
159	For which of the following ordered pairs (s, t) is s + t > 2 and s - t < -3?	A. (3, 2) B. (2, 3) C. (1, 8) D. (0, 3)
160	The sum of the interior angles for a 16 sided polygon is	A. 4 pie B. 14 pie C. 8 pie D. 2 pie
161	If a statement S(n) is true for n = 1 and the truth of S(n) for n + K implies the truth of S(n) for S(n) = K + 1, then S(n) true for all	A. All Real numbers B. All integers C. Positive integers D. All complex numbers
162	If c is a constant number and if f is the function defined by the equation f(x) = c for all values of x, then f is differentiable at every x and f is defined the equation f(x) = _____	A. f B. 1 C. C D. 0
163	Question Image	D. None of these
164	The range of inequality x + 2 > 4 is	A. (-1, 2) B. (-2, 2) D. None
165	Question Image	D. None
166	The length of rectangle is twice as much as its breadth. If the perimeter is 120 cm, the length of the rectangle is	A. 10 cm B. 20 cm C. 30 cm D. 40 cm

167	If -1 < x < 0, which of the following statements must be true?	A. x < x²< x³ B. x < x³< x² C. x²< x³< x D. x²< x < x³
168	Question Image	A. 1 B. 0 C. -2 D. 3
169	If A = (3, 8) and B = (5, 6), then the distance between A and B is	B. 2 C. 1 D. 6
170	Sin(a + b) + Sin (a - b) =	A. Sin a Cos b B. Sin a Sin b C. Sin a + Cos b D. Sin a - 2 Cos b
171	Question Image	
172	In the expansion of $(a + b)^n$ in every term the sum of the exponents of a and b is	A. n B. n + 1 C. 2n - 1 D. 2n + 1
173	If the diagonal of a square has coordinates (1, 2) and (5,6) the length of a side is	A. 3 B. 4 C. 1 D. 5
174	Which is not a half plane	A. ax + by < c B. ax + by > c C. Both A and B D. None
175	Every prime number is also	A. Rational number B. even number C. Irrational number D. multiple of two numbers
176	Question Image	
177	Question Image	D. -2-i
178	A point of a solution region where two of its boundary lines intersect, is called	A. Boundary B. Inequality C. Half Plane D. Vertex
179	Question Image	
180	If x < y, 2x = A, and 2y =B, then	A. A = B B. A < B C. A < x D. B < y
181	If A and B are matrices of same order than (,A + B)(A + B) =	A. A²+ B² B. A²+ B²+ 2AB C. A + B D. A²+ B²+ AB + BA
182	Question Image	A. Nilpotent matrix B. Singular matrix C. Non singular matrix D. Diagonal matrix
183	In the expansion of $(a + b)^n$ in every term the sum of the exponents of a and b is	A. n B. n + 1 C. 2n - 1 D. 2n + 1
184	If you are looking a high point from the ground, then the angle formed is	A. Angle of elevation B. Angle of depression C. Right angle D. Horizon
185	The line joining (1, 3) to (a, b) has unit gradient then	A. a-b = -2 B. a+b = 0 C. a-b + 5 D. 2a+3b=1

186	A function F(x) is called even if	A. F(x) = F(-x) B. F(x) = F(-x) C. F(x) = -F(x) D. 2F(x) = 0
187	Period of Sin 2x =	
188	What is the period of Cot x?	
189	The number of ways in which we can courier 5 packets to 10 cities is	A. 2 x 5⁰ B. 5¹⁰ C. 10⁵ D. 2¹⁰
190	Question Image	
191	Question Image	
192	Question Image	A. Free vector B. Null vector C. Unit vector D. None of these
193	A vector of magnitude zero is called	A. Position vector B. Null vector C. Free vector D. None of these
194	What is a proper rational fraction?	D. All are proper rational fractions
195	Question Image	A. 2 B. 1 C. 3 D. 4
196	Which is an explicit function	D. All