

Note: Collecting by previous test takers interviews

NATIONAL UNIVERSITY OF COMPUTER & EMERGING SCIENCES (FAST)

Engineering Sample Admission Test 04

MATHEMATICS

Directions: For each question below you are given four choices. SELECT ANY ONE THAT IS MOST APPROPRIATE ANSWER

ALL ANSWER MUST BE GIVEN ON THE ANSWER SHEET.

YOUR ANSWERS MUST BE INDICATED BY LETTERS (A, B, C, D) AND NOT BY THE WORDS THEMSELVES.

- The fifth term of the sequence $a_n = 2n - 3$ is _____.

A) 13	B) -13
C) 7	D) -7
- The harmonic mean between a and b is

A) $\frac{a+b}{2}$	B) $\pm\sqrt{ab}$
C) $\frac{a-b}{2}$	D) $\frac{2ab}{a+b}$
- $\frac{8!}{6!} =$ _____.

A) 8	B) $\frac{1}{56}$
C) 56	D) None of these
- ${}^{16}C_{11} + {}^{16}C_{10} =$ _____.

A) ${}^{16}C_{10}$	B) ${}^{15}C_{11}$
C) ${}^{17}C_{10}$	D) ${}^{17}C_{11}$
- In the expansion of $(a+x)^n$ the sum of exponents of a and x in each term of the expansion is

A) $N + 1$	B) $n-1$
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- C) N
D) 2n
6. The number of terms in the expansion of $\left[x^2 - \frac{4}{x^2}\right]^9$ is
A) 8
B) 9
C) 10
D) 11
7. $\cos^2 \frac{\theta}{2} + \sin^2 \frac{\theta}{2} =$ _____ .
A) 2
B) $\frac{1}{2}$
C) 1
D) None of these

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8. The area of a sector of a circular region of radius r and central angle θ radian s is
A) $r^2\theta$
B) $\frac{1}{2}r^2\theta$
C) $r\theta$
D) $\frac{1}{2}r^2\theta$
9. $\cos(2\pi + \theta) =$ _____ .
A) $\sin \theta$
B) $\cos \theta$
C) $-\sin \theta$
D) $-\cos \theta$
10. $2 \sin a \cos \beta =$ _____ .
A) $\cos(a + \beta) - \cos(a - \beta)$
B) $\cos(a + \beta) + \cos(a - \beta)$
C) $\sin(a + \beta) - \sin(a - \beta)$
D) $\sin(a + \beta) + \sin(a - \beta)$
11. Period of $\sin 3x$ is _____ .
A) $\frac{\pi}{3}$
B) $\frac{2\pi}{3}$
C) π
D) 2π

18. $F(x) = \tan x$ is
- A) Even function
B) Odd function
C) Linear function
D) None of these
19. If f is a bijective a function then $f(f^{-1}(x))$ is
- A) x
B) 0
C) 1
D) -1
20. $\lim_{x \rightarrow 0} \frac{\sin ax}{\sin bx} = \underline{\hspace{2cm}}$.
- A) 1
B) $\frac{b}{a}$
C) $\frac{a}{b}$
D) None of these
21. If $f(x) = \tan^{-1} x$ then $f(\tan x) = \underline{\hspace{2cm}}$.
- A) 0
B) -1
C) 1
D) 2
22. $\frac{d}{dx} [\tan^{-1} x] = \underline{\hspace{2cm}}$.
- A) $\frac{1}{x\sqrt{x^2-1}}$
B) $\sec^2 x$
C) $\sin^2 x$
D) $\cos^2 x$

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23. $\frac{d}{dx} (\cosh 2x) = \underline{\hspace{2cm}}$.
- A) $2 \cosh 2x$
B) $-2 \sinh 2x$
C) $2 \sinh 2x$
D) $2 \cot h 2x$

24. If $f(x) = \tan^{-1} x$ then $f(\tan x) = \underline{\hspace{2cm}}$.

A) $\frac{1}{1+x^2}$

C) $\sin^2 x$

B) $\sec^2 x$

D) $\cos^2 x$

25. The function $f(x) = 3x^2$ has extreme value at

A) $X = 1$

C) $X = 6$

B) $X = 3$

D) $X = 0$

26. $\int \frac{2x-1}{x^2-x+1} dx = \underline{\hspace{2cm}}$

A) $\frac{1}{2}(x^2-x+1)^2 + c$

C) $\frac{x^3}{3} - \frac{x^2}{2} + x + c$

B) $\ln(x^2-x+1) + c$

D) $\ln(2x-1) + c$

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27. $\int \frac{e^x - e^{-x}}{e^x + e^{-x}} dx = \underline{\hspace{2cm}}$

A) $\ln|e^x - e^{-x}| + c$

C) $E^x + e^{-x} + c$

B) $\ln|e^x + e^{-x}| + c$

D) $E^x - e^{-x} + c$

28. $\int e^x \left[\tanh^{-1} x + \frac{1}{1-x^2} \right] dx = \underline{\hspace{2cm}}$

A) $e^x \tan h^{-1} x + c$

C) $\frac{e^x}{1-x^2} + c$

B) $e^x \cot h^{-1} x + c$

D) $e^x \operatorname{cosec} h^{-1} x + c$

29. $\int_0^2 x^2 dx = \underline{\hspace{2cm}}$

A) $\frac{2}{3}$

B) $\frac{4}{3}$

C) $\frac{8}{3}$

D) None of these

30. The mid point of the line segment joining the points A (-B, 3) an B(2, -1) is

A) (-3, 1)

B) (-6, 2)

C) (5, 2)

D) (-5, 2)

31 The latus rectum of the parabola $x^2 = -4ay$ is

A) $X = a$

B) $Y = -a$

C) $Y = a$

D) $X = -a$

32 The vertices of the ellipse $4x^2 + 9y^2 = 36$ are

A) $(\pm 3, 0)$

B) $(\pm \sqrt{5}, 0)$

C) $(0, \pm 2)$

D) None of these

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33 The magnitude of the vector

$$\vec{r} = a_1 \hat{i} + a_2 \hat{j} + a_3 \hat{k} \text{ is}$$

A) $A_1 + a_2 + a_3$

B) $\sqrt{a_1 + a_2 + a_3}$

C) $a_1^2 + a_2^2 + a_3^2$

D) $\sqrt{a_1^2 + a_2^2 + a_3^2}$

34 If dot product of two vectors is zero then the vector are

A) Collinear

B) Perpendicular

C) Parallel

D) None of these

35 If $3\hat{i} + 9\hat{j} + 3\hat{k}$ and $-\hat{i} + 4\hat{j} - x\hat{k}$ are perpendicular then

A) $X = 2$

B) $X = 11$

C) $X = 14$

D) $X = -33$

36 $\forall, a, b, c \in R, a = b \wedge b \Rightarrow a = c$ is

- A) Reflexive property
- B) Symmetric property
- C) Transitive property
- D) Additive property

37 The value of $i^{-3} =$

- A) 1
- B) -1
- C) i
- D) -i

38 What is the number of elements of the power set of $\{ \}$?

- A) 0
- B) 1
- C) 2
- D) 3

39 A binary operation $*$ is called commutative in S if $\forall a, b, \in S.$

- A) $A * b = b * a$
- B) $A * b = -b * a$
- C) $AB = BA$
- D) None of these

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40 If $A = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$ then order of A^t is

- A) 3×1
- B) 1×3
- C) 3×3
- D) 1×1

BASIC MATH

1. Of the 3,600 employees of Company X, $\frac{1}{3}$ are clerical. If the clerical staff were to be reduced by $\frac{1}{3}$, what percent of the total number of the remaining employees would then be clerical?
- A. 25%
 - B. 22.2%
 - C. 20%
 - D. 12.5%
 - E. 11.1%

2. In which of the following pairs are the two numbers reciprocals of each other?
- I. 3 and $\frac{1}{3}$
II. $\frac{1}{17}$ and $\frac{-1}{17}$
III. $\sqrt{3}$ and $\frac{\sqrt{3}}{3}$
- A. I only B. II only C. I and II only D. I and III E. II and III
3. What is 45 percent of $\frac{7}{12}$ of 240?
- A. 63 B. 90 C. 108 D. 140 E. 311
4. If x books costs \$5 each and y books cost \$8 each, then the average (arithmetic mean) cost, in dollars per book, is equal to
- A. $\frac{5x+8y}{x+y}$ B. $\frac{5x+8y}{xy}$ C. $\frac{5x+8y}{13}$ D. $\frac{40xy}{x+y}$ E. $\frac{40xy}{13}$
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5. If $\frac{1}{2}$ of the money in a certain trust fund was invested in stocks, $\frac{1}{4}$ in bonds, $\frac{1}{5}$ in a mutual fund, and the remaining \$10,000 in a government certificate, what was the total amount of the trust fund?
- A. \$100,000 B. \$150,000 C. \$200,000 D. \$500,000 E. \$2,000,000
6. Marion rented a car for \$18.00 plus \$0.10 per mile driven. Craig rented a car for \$25.00 plus \$0.05 per mile driven. If each drove d miles and each was charged exactly the same amount for the rental, then equals
- A. 100 B. 120 C. 135 D. 140 E. 150
7. Machine A produces bolts at a uniform rate of 120 every 40 seconds, and machine B produces bolts at a uniform rate of 100 every 20 seconds. If the two machines run simultaneously, how many seconds will

it take for them to produce a total of 200 bolts?

- A. 22 B. 25 C. 28 D. 32 E. 56

8. $\frac{3.003}{2.002} =$

- A. 1.05 B. 1.50015 C. 1.501 D. 1.5015 E. 1.5

9. What is the decimal equivalent of $\left(\frac{1}{5}\right)^5$?

- A. 0.00032 B. 0.0016 C. 0.00625 D. 0.008 E. 0.03125

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10. Two hundred gallons of fuel oil are purchased at \$0.91 per gallon and are consumed at a rate of \$0.70 worth of fuel per hour. At this rate, how many hours are required to consume the 200 gallons of fuel oil?

- A. 140 B. 220 C. 260 D. 322 E. 330

PHYSICS

Directions: For each question below you are given four choices. SELECT ANY ONE THAT IS MOST APPROPRIATE ANSWER

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1. Which of the following is a scalar quantity
 (a) Density (b) Displacement (c) Torque (d) Weight
2. Which of the following is the only vector quantity
 (a) Temperature (b) Energy (c) Power (d) Momentum
3. Which of the following lists of physical quantities consists only of vectors:
 (a) Time, temperature, velocity (b) Force, volume, momentum

- (c) They are equal vectors (d) They are inclined at angle of 60°
12. If $(\vec{a} \times \vec{b})$ points along positive z-axis, then the vectors \vec{a} and \vec{b} must lie in
 (a) Ax-plane (b) Yx-plane
 (c) Xy-plane (d) None of the above
13. The position vector of a point in xz-plane is given by
 (a) $\vec{r} = x \hat{i} + y \hat{j}$ (b) $\vec{r} = y \hat{i} + z \hat{k}$ (c) $\vec{r} = x \hat{i} + y \hat{j} + z \hat{k}$ (d) $\vec{r} = x \hat{i} + z \hat{k}$
14. If $\vec{A} = A_1 \hat{i} + A_2 \hat{j}$ and $\vec{B} = B_1 \hat{i} + B_2 \hat{j}$ are non-parallel vectors, then the direction of $\vec{A} \times \vec{B}$ is
 (a) Along \vec{B} (b) Along x-axis (c) Along y-axis (d) Along z-axis

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15. If $\vec{A} \cdot \vec{B} = 0$ and also $\vec{A} \times \vec{B} = 0$, then
 (a) \vec{A} and \vec{B} are perpendicular to each other (b) \vec{A} and \vec{B} are parallel to each other
 (c) \vec{A} and \vec{B} are anti-parallel to each other (d) Either \vec{A} or \vec{B} is a null vector
16. if $\hat{i}, \hat{j}, \hat{k}$ are unit vectors along x,y, and z-axes, the $\hat{k} \times \hat{j} = \dots\dots\dots$
 (a) \hat{i} (b) \hat{j} (c) $-\hat{k}$ (d) $-\hat{i}$
17. The speed of an object at the end of 4 successive seconds is 20, 25, 30, and 35 mi/hr, respectively. The acceleration of this object is
 A) 5 ft per sec^2 B) 5 mi per hr per sec C) 5 mi per hr^2 D) 5 mi per sec^2
18. A bomb is dropped from an airplane moving horizontally with a speed of 600 km/h. If the air resistance is negligible, the bomb will reach the ground in 5 s when the altitude of the plane is approximately

- A) 50 m B) 75 m C) 125 m D) 250 m

19. If the values of instantaneous and average velocities are equal, the body is said to be moving with
- (a) Uniform acceleration (b) Uniform speed (c) Variable velocity (d) Uniform velocity
20. A stone is dropped from a cliff. The time during which it covers a distance of 490 m is
- (a) 10 sec (b) 100 sec (c) 9.8 sec (d) 4.9 sec

ENGLISH

SENTENCE COMPLETION

Directions for Q 1 - 3

Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath in sentence are five lettered words or sets of words. Choose the word or set of words that best fits the meaning of the sentence as a whole.

1. After years of talking down to his students as if they couldn't understand a word, the teacher finally acknowledged that his attitude was _____.
- A. colloquial B. condescending
C. professorial D. Justifiable
E. Logical

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2. There are too many _____ and not enough serious workers.
- A. sycophants B. Kleptomaniacs
C. novices D. dilettantes
E. Zealots
3. There was a hint of carelessness about her appearance, as though the cut of her blouse or the fit of her slacks was a matter of _____ to her.
- A. satisfaction B. Aesthetics

- C. indifference
- D. Significance
- E. Controversy

ANALOGY

Direction: Each question below consists of a related pairs of words or phrases, followed by five lettered pairs of words or phrases, Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

4. CALLOW : MATURITY ::
 - (a) incipient : fruition
 - (b) spoiled : purity
 - (c) young : old
 - (d) eager : anxiety
5. CARELESSNESS : ACCIDENT ::
 - (a) assiduity : success
 - (b) indifference : fruition
 - (c) care : avoidance
 - (d) writer : blot
6. HYPOCHONDRIAC : HEALTH ::
 - (a) addict : drugs
 - (b) miser : money
 - (c) glutton : food
 - (d) narcotic : sickness

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7. BRAKE : AUTOMOBILE ::
 - (a) choke : carburetor
 - (b) conscience : man
 - (c) detergent : society
 - (d) stop : horse

ANTONYM

Direction: In each of the following antonym questions, a word printed in capital letters precedes five lettered words or phrases. From these five lettered words or phrases, pick the one most nearly opposite in meaning to the capitalized word.

8. PERT:

(A) Polite	(B) Deliberate	(C) Moral	(D) Perishable
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9. PRAISE:

(A) Reproof	(B) Censure	(C) Thymol	(D) Trustworthy
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10. PERTINENT:
(A) Puzzling (B) Discontented (D) Irrelevant (D) Understood

END OF TEST

For Answer Key:

www.entrytest.com/testprep/answers.aspx

