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NATIONAL UNIVERSITY OF COMPUTER & EMERGING SCIENCES (FAST)

Engineering Sample Admission Test 02

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.

- $\sqrt{35}$  is -----  
A) A prime number  
B) An integer  
C) A whole number  
D) An irrational number
- $\forall a, b, \in R a \cdot b = b \cdot a$  is called  
A) Closure law of addition  
B) Associative law of addition  
C) Commutative law of multiplication  
D) Associative law of multiplication
- In R, the multiplicative identity is  
A) 0  
B) 1  
C) -1  
D) None

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- The additive inverse of  $\frac{2}{3}$  is  
A)  $\frac{3}{2}$   
B)  $-\frac{2}{3}$   
C)  $-\frac{3}{2}$   
D) 0
- The multiplication inverse of 0 is  
A) 1  
B) -1  
C) 0  
D) Does not exist
- The value of  $i^7$  is

- A) 1  
C) i

- B) -1  
D) -i

7. If  $z = 2 + 3i$  then  $z^{-1}$  is

- A)  $\frac{1}{2} + \frac{1}{3}i$   
C)  $\frac{2}{13} + \frac{3}{13}i$

- B)  $2 + \frac{1}{3}i$   
D)  $\frac{2}{13} - \frac{3}{13}i$

8. The modulus of 3 is

- A) 0  
C) -3

- B) 9  
D) 3

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9. The multiplicative inverse of  $1 - 2i$  is

- A)  $\frac{1}{5} + \frac{2}{5}i$   
C)  $\frac{1}{5} - \frac{2}{5}i$

- B)  $-\frac{1}{5} + \frac{2}{5}i$   
D)  $-\frac{1}{5} - \frac{2}{5}i$

10. The set of integers is a subset of

- A) The set of natural numbers  
C) The set of prime numbers

- B) The set of whole numbers  
D) The set of rational numbers

11.  $\{1,2,3\}$  is -----

- A) An infinite set  
C) A singleton set

- B) A finite set  
D) Universal set

12. The sets  $\{1,2,4\}$  and  $\{4,6,8,10\}$  are

- A) Equal sets  
C) Disjoint sets

- B) Equivalent sets  
D) Overlapping sets

13. Write down the power set of  $\{9,11\}$

- A)  $\{\{9\},\{11\}\}$   
C)  $\{\{9\},\{11\},\{9,11\}\}$

- B)  $\{\Phi,\{9\},\{11\}\}$   
D)  $\{\Phi,\{9\},\{11\},\{9,11\}\}$

14.  $\Phi =$  -----



- C) Square matrix
- D) Null matrix
23. If A is any matrix then its additive inverse is
- A) A
- B)  $A^{-1}$
- C)  $A^t$
- D)  $-A$
24.  $\begin{bmatrix} 300 \\ 030 \\ 003 \end{bmatrix}$  is a -----
- A) Diagonal matrix
- B) Scalar matrix
- C) Triangular matrix
- D) Identity matrix
25. If A is singular then  $|A| =$  -----
- A) 1
- B) 2
- C) 0
- D) None of these
26. If A and B are non singular matrices then  $(AB)^{-1} =$  -----
- A)  $A^{-1}$
- B)  $B^{-1}$
- C)  $A^{-1}B^{-1}$
- D)  $B^{-1}A^{-1}$
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27. The transpose of a column matrix is a -----
- A) Zero matrix
- B) Diagonal matrix
- C) Column matrix
- D) Row matrix
28. The transpose of a zero matrix is a -----
- A) Column matrix
- B) Zero matrix
- C) Row matrix
- D) Scalar matrix
29. Roots of the equation  $x^2 - 7x + 10 = 0$  are
- A)  $\{2, -5\}$
- B)  $\{-2, 5\}$
- C)  $\{2, 5\}$
- D)  $\{-2, -5\}$
30.  $4^{1+x} + 4^{1-x} = 10$  is called -----
- A) Reciprocal equation
- B) Exponential equation
- C) Radical equation
- D) None of these

31.  $W^{15} = \text{-----}$

- A) 0  
C) w

- B) 1  
D)  $W^2$

32. The quadratic formula is

A)  $X = \frac{b \pm \sqrt{b^2 - 4ac}}{2a}$

B)  $X = \frac{-b \pm \sqrt{b^2 - 4ac}}{a}$

C)  $X = \frac{-b \pm \sqrt{b^2 + 4ac}}{2a}$

D)  $X = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

33. The roots of the equation  $ax^2 + Bx + c = 0$  are real and equal if

- A)  $B^2 - 4ac < 0$   
C)  $B^2 - 4ac \geq 0$

- B)  $B^2 - 4ac = 0$   
D) None of these

34. Roots of the equation  $x^2 + 5x - 1 = 0$  are

- A) Rational  
C) Complex

- B) Irrational  
D) None of these

35. The sum of the four fourth roots of unity is

- A) 4  
C) 1

- B) 3  
D) 0

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36. The polynomial  $x - a$  is a factor of the polynomial  $f(x)$  if and only if

- A)  $F(a)$  is positive  
C)  $F(a) = 0$

- B)  $F(a)$  is negative  
D) None of these

37. If  $\omega$  is complex cube root of unity then  $\omega^2 = \text{-----}$

- A) 0  
C)  $\omega^3$

- B) 1  
D)  $\omega^{-1}$

38. If  $\alpha, \beta$  are roots of  $2x^2 - 4x + 5 = 0$  then  $\alpha^2 \beta + \alpha \beta^2 = \text{-----}$

- A) 1

- B) -1

- C) 5  
 D) 2
39.  $X^3 + 2x^2 - 3x + 5$  is -----  
 A) A Quadratic equation  
 B) A polynomial  
 C) Proper rational fractions  
 D) Improper rational fraction
40. A fraction in which the degree of the numerator is less than the degree of the denominator is called  
 A) Polynomial  
 B) Equation  
 C) Proper fraction  
 D) Improper fraction

### BASIC MATH

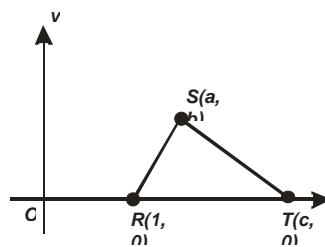
1. In a weight-lifting competition, the total weight of Joe's two lifts was 750 pounds. If twice the weight of his first lift was 300 pounds more than the weight of his second lift, what was the weight, in pounds, of his first lift?  
 A. 225                      B. 275                      C. 325                      D. 350                      E. 400
2. One hour after Yolanda started walking from X to Y, a distance of 45 miles; Bob started walking along the same road from Y to X. If Yolanda's walking rate was 3 miles per hour and Bob's was 4 miles per hour, how many miles had Bob walked when they met?  
 A. 24                      B. 23                      C. 22                      D. 21                      E. 19.5

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3. The average (arithmetic mean) of 6 numbers is 8.5. When one number is discarded, the average of the remaining numbers becomes 7.3. What is the discarded number?  
 A. 7.5                      B. 9.8                      C. 10.0                      D. 12.4                      E. 15.0

4.



In the rectangular coordinate system above, the area of  $\triangle RST$  is

A.  $\frac{bc}{2}$       B.  $\frac{b(c-1)}{2}$       C.  $\frac{c(b-1)}{2}$       D.  $\frac{a(c-1)}{2}$       E.  $\frac{c(a-1)}{2}$

5. Which of the following equations has a root in common with  $x^2 - 6x + 5 = 0$ ?

A.  $x^2 + 1 = 0$       B.  $x^2 - x - 2 = 0$       C.  $x^2 - 10x - 5 = 0$       D.  $2x^2 - 2 = 0$       E.  $x^2 - 2x - 3 = 0$

6. One inlet pipe fills an empty tank in 5 hours. A second inlet pipe fills the same tank in 3 hours. Both pipes are used together, how long will it take to fill  $\frac{2}{3}$  of the tank?

A.  $\frac{8}{15} \text{ hr}$       B.  $\frac{3}{4} \text{ hr}$       C.  $\frac{5}{4} \text{ hr}$       D.  $\frac{15}{8} \text{ hr}$       E.  $\frac{8}{3} \text{ hr}$

7. During the first week of September, a shoe retailer sold 10 pairs of a certain style of oxfords at \$35.00 a

pair; if, during the second week of September, 15 pairs were sold at the sale price of \$27.50 a pair, by what amount did the revenue from weekly sales of these oxfords increase during the second week?

A. \$62.50      B. \$75.00      C. \$112.50      D. \$137.50      E. \$175.00

8. The number  $2 - 0.5$  is how many times the number  $1 - 0.5$ ?

A. 2      B. 2.5      C. 3      D. 3.5      E. 4

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9. If  $x = -1$ , then  $-(x^4 + x^3 + x^2 + x) =$

A. -10      B. -4      C. 0      D. 4      E. 10

10. Coins are dropped into a toll box so that the box is being filled at the rate of approximately 2 cubic feet per hour. If the empty rectangular box is 4 feet long, 4 feet wide, and 3 feet deep, approximately how

many hours does it take to fill the box?

- A. 4                      B. 8                      C. 16                      D. 24                      E. 48

## PHYSICS

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

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1. The first frontier in fundamental sciences is
 

A) World of extremely small bodies	B) World of extremely large bodies
C) World of middle-sized things	D) All of them
  
2. The third frontier in fundamental sciences is
 

A) World of extremely small bodies	B) World of extremely large bodies
C) World of middle-sized things	D) All of them
  
3. The branch of physics which deals with the atomic nuclei is called
 

A) Nuclear physics	B) Atomic physics
C) Particle physics	D) Modern physics
  
4. The branch of physics in which we study the structure and properties of solids is called
 

A) Nuclear physics	B) Modern physics
C) Particle physics	D) Solid state physics

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5. The quantities which cannot be defined in terms of other physical quantities are called
 

A) Scalar quantities	B) Vector quantities
C) Base quantities	D) Derived quantities
  
6. Graphically a vector is represented by an arrow head with a directed line according to a chosen scale which represents
 

A) The direction	B) Orientation
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- A) Average velocity  
B) Instantaneous velocity  
C) Uniform velocity  
D) None of them
15. The velocity-time graph of a car is a straight line which rises the same height for equal intervals, of time, if it moves with  
A) Zero velocity  
B) Constant velocity  
C) Zero acceleration  
D) Constant acceleration
16. A frame of reference stationed on Earth is approximately an example of  
A) Non- inertial frame  
B) Inertial frame  
C) Accelerating frame  
D) None of them
17. The time of flight of a projectile motion equal to  
A) Half of the time to reach maximum height  
B) Twice the time to reach maximum height  
C) One fourth of time to reach maximum height  
D) Time to reach maximum height
18. The work done, one a pail of water when a person holding the pail by the force  $F$  is moving forward, will be  
A) Positive  
B) Negative  
C) Zero  
D) None of them
19. If the angle  $\theta$  between the force and displacement is greater than  $90^\circ$ , then the work done will be  
A) Positive  
B) Negative  
C) zero  
D) Maximum
20. If work is done at the rate of 1000 joules per second, then the power of machine is  
A) One watt  
B) One kilowatt  
C) Half - watt  
D) One megawatt

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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.

- We need both ornament and implement in our society; we need the artist and the \_\_\_\_\_.
  - beautician
  - Writer
  - politician
  - Artisan
  - Model
- When such \_\_\_\_\_ remarks are circulated, we can only blame and despise those who produce them.
  - adulatory
  - Chance
  - reprehensible
  - redundant
- The stereotypical image of masculinity assumes that weeping is \_\_\_\_\_ "unmanly" behaviour, and not simply a human reaction which may be \_\_\_\_\_ by either sex.
  - Inexplicably. repented
  - Excessively...discerned
  - Essentially...defined
  - Inherently...adopted

## 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.

- FRAGILE : BREAK ::
  - vital : destroy
  - hostile : invite
  - vivid : grow
  - flexible : bend
  - fertile : smell
- SPOKE : WHEEL ::
  - square : circle
  - balance : lever
  - door : latch
  - book : shelf
  - rung : ladder
- VESSEL : FLEET ::
  - wolf : pack
  - forest : clearing
  - vehicle : truck
  - carriage : horse
  - squadron : rank
- PICADOR : BULL ::
  - heckler : speaker
  - executioner : victim
  - shepherd : sheep
  - singer : song
  - matador : cow

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**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. OMNIPOTENT:  
(A) Weak (B) Strong (C) Sour (D) Safe
9. OBLIGATORY:  
(A) Friendly (B) Optional (C) Facile (D) Divorced
10. OBSOLETE:  
(A) Desolate (B) Frightful (C) Heated (D) Renovated

**END OF TEST**

**For Answer Key:**

[www.entrytest.com/testprep/answers.aspx](http://www.entrytest.com/testprep/answers.aspx)



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