



ONLINE ENTRANCE EXAMINATION - 2015

MODEL QUESTIONS

Mathematics

(1) The order of matrix $B = [1 \ 2 \ 5 \ 7]$ is

- (1) 1×4 (2) 4×1 (3) 2×1 (4) 1×1

(2) Number of elements in a matrix of order 2×3 is

- (1) 5 (2) 2 (3) 3 (4) 6

(3) The type of the matrix $\begin{pmatrix} \sqrt{2} & 0 & 0 \\ 0 & \sqrt{3} & 0 \\ 0 & 0 & \sqrt{3} \end{pmatrix}$ is

- (1) a scalar matrix (2) a diagonal matrix
(3) a unit matrix (4) diagonal and scalar

4. The matrix $\begin{bmatrix} 8 & 5 & 7 \\ 0 & 6 & 4 \\ 0 & 0 & 2 \end{bmatrix}$ is

- (1) the upper triangular (2) lower triangular
(3) square matrix (4) null matrix

5. The minor of 2 in $\begin{bmatrix} 2 & -3 \\ 6 & 0 \end{bmatrix}$ is

- (1) 0 (2) 1 (3) 2 (4) -3

6. If $A = \begin{bmatrix} 2 & 1 & 4 \\ -3 & 2 & 1 \end{bmatrix}$ and $X + A = 0$ then matrix X is



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1) $\begin{bmatrix} 2 & -1 & 4 \\ -3 & 2 & 1 \end{bmatrix}$ 2) $\begin{bmatrix} -2 & -1 & -4 \\ 3 & -2 & -1 \end{bmatrix}$ 3) $\begin{bmatrix} 2 & -1 & 4 \\ -3 & -2 & -1 \end{bmatrix}$ 4) $\begin{bmatrix} -2 & 1 & 4 \\ 3 & -2 & -1 \end{bmatrix}$

7. The product of the matrices $\begin{bmatrix} 7 & 5 & 3 \\ 3 \\ 2 \end{bmatrix}$ is equal to

- (1) [70] (2) [49] (3) [15] (4) 70

8. If $\begin{bmatrix} 2 & x & -1 \\ x \\ 3 \end{bmatrix}$ then the value of x is

- 1) 5 2) 2 3) 3 4) ± 4

9. The true statements of the following are

- 1) Every unit matrix is a scalar matrix but a scalar matrix need not be a unit matrix.
- 2) Every scalar matrix is a diagonal matrix but a diagonal matrix need not be a scalar matrix.
- 3) Every diagonal matrix is a square matrix but a square matrix need not be a diagonal matrix.

- (1) (i), (ii), (iii) (2) (i) and (ii) (3) (ii) and (iii) (4) (iii) and (i)

10. The cofactor of -7 in $\begin{bmatrix} 2 & -3 & 5 \\ 6 & 0 & 4 \\ 1 & 5 & -7 \end{bmatrix}$ is

- (1) -18 (2) 18 (3) -7 (4) 7

11. The rank of the matrix $\begin{bmatrix} 1 & -1 & 2 \\ 2 & -2 & 4 \\ 4 & -4 & 8 \end{bmatrix}$

- (1) 1 (2) 2 (3) 3 (4) 4



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12. The rank of the diagonal matrix $\begin{bmatrix} -1 & 0 & 0 & 0 & 0 \\ 0 & 2 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -4 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$ is

(1) 0 (2) 2 (3) 3 (4) 5

13. If the rank of the matrix $\begin{bmatrix} \lambda & -1 & 0 \\ 0 & \lambda & -1 \\ -1 & 0 & \lambda \end{bmatrix}$ is 2, then λ is

(1) 1 (2) 2 (3) $\frac{3}{3}$ (4) any real number

14. If the matrix $\begin{bmatrix} 1 & 3 & 2 \\ 1 & k & -3 \\ 1 & 4 & 5 \end{bmatrix}$ has an inverse, then the values of k are

(1) k is any real number (2) $k = -4$ (3) $k \neq -4$ (4) $k \neq 4$

15. If $A = \begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix}$ then $(\text{adj } A) \cdot A =$

(1) $\begin{bmatrix} \frac{1}{5} & 0 \\ 0 & \frac{1}{5} \end{bmatrix}$ (2) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ (3) $\begin{bmatrix} 5 & 0 \\ 0 & -5 \end{bmatrix}$ (4) $\begin{bmatrix} 5 & 0 \\ 0 & 5 \end{bmatrix}$



Physics

- The unit of magnetic induction is
 - Henry / m
 - Tesla
 - Ampere / m
 - weber
- A current I flows along infinitely long straight thin conductor , then magnetic induction
 - zero
 - $\frac{\mu_0}{2\pi a}$
 - $\frac{\mu_0 I}{2\pi a}$
 - $\frac{2I}{r}$
- The direction of magnetic field due to a solenoid is given by
 - Right hand palm rule
 - Left hand palm rule
 - Ampere's swimming rule
 - Ampere's circuital law
- Electromagnetic waves are
 - Transverse
 - Longitudinal
 - May be longitudinal or transverse
 - Neither longitudinal nor transverse
- An atomic spectrum should be
 - Pure line spectrum
 - Emission band spectrum
 - Absorption line spectrum
 - Absorption band spectrum
- The unit of permittivity is
 - $C^2 N^{-1} M^{-2}$
 - $C^{-2} N M^{-2}$
 - $N M^{-1}$
 - $N C^{-2} M^{-2}$
- An electric dipole placed at an angle in a non uniform electric field experience
 - Neither a force nor a torque
 - torque only
 - both force and torque
 - force only
- The electric field at a point inside a hollow metallic sphere
 - Depends on the radius of the sphere
 - is zero
 - Depends on the charge and radius of the sphere
 - Depends on the square of the radius of the sphere
- Number of electric lines of force per unit area is proportional to the magnitude of
 - Electric potential
 - electric field intensity
 - electric flux
 - volume of charge density
- The repulsive force between two like charges of 1 Coulomb separated by a distance of 1 m in vacuum is equal to
 - 9×10^9 N
 - 9×10^{-9} N
 - 10^9 N
 - 9 N



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11. The tangent to the line of force at any point gives theof the electric field
a) Force b) magnitude c) direction d) flux
12. The electric field due to two parallel charged sheets at a point in between the sheets is
a) $\frac{\sigma}{2\epsilon_0}$ b) σ/ϵ_0 c) $2\sigma/\epsilon_0$ d) zero
13. When air is replaced by dielectric medium of dielectric constant k, the maximum force of attraction between two charges separated by a distance
a) Becomes k-1 times b) increases k times
c) remains unchanged d) decreases k2 times
14. Electric field due to an electric dipole at a point on its equatorial line is
a) $\frac{1}{4\pi\epsilon_0} \frac{p}{r^2}$ b) $\frac{1}{4\pi\epsilon_0} \frac{p}{r^3}$ c) $\frac{1}{4\pi\epsilon_0} \frac{1}{r^2}$ d) $\frac{1}{4\pi\epsilon_0} \frac{2p}{r^3}$
15. When three capacitors c1, c2, c3 are connected in parallel the equivalent capacitance is given by
a) C1C2 C3 b) $\frac{C_1 C_2 C_3}{C_1 + C_2 + C_3}$ c) $\frac{C_1 C_2 + C_2 C_3 + C_3 C_1}{C_1 C_2 C_3}$ d) C1+C2+C3



Chemistry

1. The missing particle is [$3\text{Li}^{16} + \{?\} \rightarrow 2\text{He}^4 + 1\text{H}^3$].
 - a) Electron
 - b) Proton
 - c) Neutron
 - d) Deuteron
2. Neutrino has.
 - a) Charge +1, mass 1
 - b) Charge - 1, mass 1
 - c) Charge 0, mass 0
 - d) Charge 0 , mass 1
3. In the following nuclear reaction, the other product is $52\text{Te}^{130} + 1\text{H}^2 \rightarrow 53\text{I}^{131} + ?$.
 - a) Positron
 - b) One neutron
 - c) Alpha particle
 - d) Proton
4. 6C^{14} is formed from 7N^{14} in the upper atmosphere by the action of the fundamental particle
 - a) Positron
 - b) Electron
 - c) Neutron
 - d) Proton
5. On comparing chemical reactivity of [C^{12}] and C^{14} , it is revealed that
 - a) C^{12} is more reactive
 - b) C^{14} is more reactive
 - c) Both are inactive
 - d) Both are equally active
6. How many neutrons are present in the nucleus of .
 - a) 88
 - b) 140
 - c) 226
 - d) 138
7. The composition of tritium (1H^3) is .
 - a) 1 electron, 1 proton, 1 neutron



- b) 1 electron, 1 proton, 2 neutron
c) 1 electron, 2 proton, 1 neutron
d) 1 electron, 1 proton, 3 neutron
8. The introduction of a neutron into the nuclear composition of an atom would lead to a change in.
a) The number of the electrons also
b) Its atomic number
c) The chemical nature of the atom
d) Its atomic weight
9. In terms of energy 1 a. m.u. is equal to
a) 100 J
b) 931.478 MeV
c) 931.1 kcal
d) 10^7 erg
10. Nucleons are
a) Protons and electrons
b) Electrons and neutrons
c) Protons and neutrons
d) Electrons, protons and neutrons
11. An electrically charged atom or a group of atoms is known as .
a) A meson
b) A cyclotron
c) An ion
d) A proton
12. When aniline is treated with sodium nitrite and hydrochloric acid at 0°C , it gives.
a) Phenol and N^2
b) Hydrazo compound
c) Diazonium salt
d) No reaction takes place
13. Which of the following would be most reactive towards nitration.
a) Benzene
b) Toluene
c) Nitro benzene
d) Chloro benzene
14. Azo-dyes are prepared from
a) Aniline
b) Benzaldehyde
c) Salicylic acid
d) Chlorobenzene



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15. For the preparation of p-nitroiodobenzene from p-nitroaniline, the best method is
- a) NaNO_2 HCL followed by KI
 - b) LiAlH_4 followed by I_2
 - c) NaNO_2 HCL followed by CuCN
 - d) NaBH_4 followed by I_2



English

Choose the word which is most nearly the **SYNONYMS** in meaning as the word given

1) ARDUOUS

- (a) Pleasurable (b) Hazardous (C) Difficult (d) Different

2) FORMULATE

- (a) Frame (b) Apply (C) Contemplate (d) Regularize

(3) DEGRADING

- (a) Demeaning (b) Lowering (C) Corrupting (d) Minimizing

4) TRANSITIONAL

- (a) Changed (b) Extreme (C) Revolutionary (d) Intermediate

5) VIABLE

- (a) Impossible (b) Rudimentary (C) Negative (d) Practical

In the questions below the sentences have been given in Direct/Indirect speech. From the given alternatives, choose the one which best expresses the given sentence in Indirect/Direct speech.

1) "If you don't keep quiet I shall shoot you", he said to her in a calm voice.

- (a) He warned her to shoot if she didn't keep quiet calmly.
(b) He warned her calmly that he would shoot her if she didn't keep quiet.
(c) He said calmly that I shall shoot you if you don't be quiet.
(d) Calmly he warned her that be quiet or else he will have to shoot her

2) I told him that he was not working hard.

- (a) I said to him, "You are not working hard."
(b) I told to him, "You are not working hard."
(c) I said, "You are not working hard."
(d) I said to him, "He is not working hard."



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- 3) His father ordered him to go to his room and study.
- (a) His father said to him, "Go and study in your room."
 - (b) His father said, "Go to your room and study."
 - (c) His father shouted, "Go right now to your study room"
 - (d) His father said firmly, "Go and study in your room."
- 4) He said to his father, "Please increase my pocket-money."
- (a) He told his father, "Please increase the pocket-money"
 - (b) He asked his father to increase his pocket-money.
 - (c) He pleaded his father to please increase my pocket money.
 - (d) He requested his father to increase his pocket-money.
- 5) She said that her brother was getting married.
- (a) She said, "My brother is getting married."
 - (b) She said, "My brother was getting married."
 - (c) She told, "Her brother is getting married."
 - (d) She said, "Her brother is getting married."



Aptitude

1. Five years ago, the average of Raja and Rani's ages was 20 yrs. Now the average age of Raja, Rani and Rama is 30 yrs. What will be Rama's age 10 yrs hence?

- (a) 20 (b) 50 (c) 40 (d) 60

2. Out of three numbers, the first is twice the second and thrice the third. If their average is 88, find the numbers.

- (a) 66, 88, 99 (b) 48, 144, 72 (c) 50, 65, 75 (d) 60, 164, 88

3. The average of 8 numbers is 21. Find the average of new set of numbers when 8 multiplies every number.

- (a) 148 (b) 158 (c) 150 (d) 168

4. The average of 30 innings of a batsman is 20 and another 20 innings is 30. What is the average of all the innings?

- (a) 24 (b) 50 (c) 20 (d) 5

5. A cyclist travels to reach a post at a speed of 15 km/hr and returns at the rate of 10 km/hr. What is the average speed of the cyclist?

- (a) 16 km/hr (b) 18 km/hr (c) 12 km/hr (d) 10 km/hr

6. With an average speed of 40 km/hr, a train reaches its destination in time. If it goes with an average speed of 35 km/hr, it is late by 15 minutes. What is the total distance?

- (a) 55 km (b) 50 km (c) 40 km (d) 70 km

7. Find the 20th term of the series 5 + 9 + 13 + 17 + 21 +

- (a) 55 (b) 81 (c) 99 (d) 41

8. Find the sum up to 30 terms of the A.P.

- (a) 3504 (b) 3250 (c) 3105 (d) 3405

9. Find the 8th term of the G.P 2, 6, 18, 54

- (a) 4374 (b) 4437 (c) 4434 (d) 4482



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10. Find the sum of the first 9 terms of the G.P.

- (a) 5682 (b) 5484 (c) 8884 (d) 9841

11. What is the difference between the compound interests on Rs. 5000 for $1\frac{1}{2}$ years at 4% per annum compounded yearly and half-yearly?

- (a) 5.05 (b) Rs. 2.04 (c) Rs. 1.05 (d) Rs. 4.26

12. There is 80% increase in an amount in 8 years at simple interest. What will be the compound interest of Rs. 14,000 after 3 years at the same rate?

- (a) Rs. 1025 (b) Rs. 1254 (c) Rs. 4634 (d) Rs. 5265

13. The compound interest on Rs. 30,000 at 7% per annum is Rs. 4347. The period (in years) is:

- (a) 8 (b) 1.5 (c) 5 (d) 2

14. The difference between simple and compound interests compounded annually on a certain sum of money for 2 years at 4% per annum is Re. 1. The sum is:

- (a) Rs. 625 (b) Rs. 425 (c) Rs. 325 (d) Rs. 525

15. The difference between compound interest and simple interest on an amount of Rs. 15,000 for 2 years is Rs. 96. What is the rate of interest per annum?

- (a) 7% (b) 8% (c) 9% (d) 10%