ENTRANCE EXAM

QUESTIONS

MATHEMATICS

1. 1. The gradient of the curve $y = -2x^3+3x+5$ at $x = 2$ is

(1) −20 (2) 27 (3) −16 (4) −21

1. 2. The rate of change of area A of a circle of radius r is

(1) $2\pi r$ (2) $2\pi r$ (3) πr^2 (4) π

1. 3. is =

(1) 2 (2) 0 (3) ∞ (4) 1

1. 4.

(1) ∞ 2) 0 (3) log (4) log ()

1. 5. If $u = x^y$ then is equal to

(1) yx^{y-1} (2) u log x (3) u log y (4) xy^{x-1}

1. 6. If $u = \sin^{-1}$ and f = sin u then f is a homogeneous function of degree

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

1. 7. The value of dx is

(1) (2) 0 (3) (4) π

1. 8. The value of dx is

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

1. 9. The differential equation of all non-vertical lines in a plane is

(1) = 0 (2) = 0 (3) = m (4) = m

1. 10. The differential equation of all circles with centre at the origin is

(1) x dy + y dx = 0 (2) x dy − y dx = 0 (3) x dx + y dy = 0 (4) x dx − y dy = 0

1. 11. The number of rows in the truth table of ~ [p ∧ (~ q)] is

(1) 2 (2) 4 (3) 6 (4) 8

1. 12. The conditional statement p → q is equivalent to

(1) p ∨ q (2) p ∨~ q (3)~ p ∨ q(4) p ∧ q

1. 13. Given $E(X + c) = 8$ and $E(X - c) = 12$ then the value of c is

(1)−2 (2) 4 (3)−4 (4)2

1. 14. X is a random variable taking the values 3, 4 and 12 with probabilities 1/3 , 1/4 and 5/12 .

Then E(X) is

(1) 5 (2) 7 (3) 6 (4) 3

1. 15. of a complete rotation clockwise is

(1) -1^0 (2) -360^0 (3) -90^0 (4)1^0

1. 16. Area of the triangle ABC is

(1) ab cos C (2) ab sin C (3) ab cos B (4) bc sin B

1. 17. In the set of integers with operation * defined by $a * b = a + b - ab$, the value of

$3 * (4 * 5)$ is

(1) 25 (2) 15 (3) 10 (4) 5

1. 18. The order of [7] in $(Z_9 , +_9)$ is

(1)9 (2) 6 (3) 3 (4) 1

1. 19. If A and B are symmetric matrices, then ABA is

(1) Symmetric (2) skew-symmetric (3) diagonal (4) triangular

1. 20. If A is an orthogonal matrix, then A^{-1} is

(1) A (2) A^T (3) A^2
(4) None of these.

ENTRANCE EXAMINATION QUESTIONS
PHYSICS

1. 1. If L is the inductance and C is the capacitance, then the dimensional representation of expression will be
    a. a. $[M^0L^1T^{-1}]$
    b. b. $[M^0L^0T^{-1}]$
    c. c. $[M^0L^0T^1]$

1. 2. Which of the following is conserved when the torque acting on a system is zero?
    a. a. K.E
    b. b. Angular momentum
    c. c. Angular K.E
    d. d. Linear momentum

1. 3. A 500 kg horse pulls a cart of mass 1500 kg along a horizontal rough road with an acceleration of 1 m/s^2 , μ_s= 0.2. The forward force on the horse is (Take g = 10 m / s^2)
    a. a. Zero
    b. b. 2000 N
    c. c. 4000 N
    d. d. 6000 N

1. 4. Two identical particles move towards each other with velocity 2v and v respectively. The velocity of center of mass is
    a. a. v
    b. b. v/3
    c. c. v/2
    d. d. zero
1. 5. For the same value of kinetic energy, the momentum shall be maximum for
    a. a. A proton
    b. b. An electron
    c. c. A deuteron
    d. d. An α – particle

1. 6. For which of the following substances, the magnetic susceptibility is independent of temperature?
    a. a. Diamagnetic only
    b. b. Paramagnetic only
    c. c. Ferromagnetic only
    d. d. Both diamagnetic and paramagnetic
1. 7. A generator produces a voltage that is given by V = 240 sin t volt, where time t is in second. The frequency and rms voltage are
    a. a. 19 Hz and 120 volt
    b. b. 19 Hz and 170 volt

c. c. 60 Hz and 240 volt
d. d. 754 Hz and 170 volt

1. 8. What is the angle of incidence for an equilateral prism of refractive indexso that the ray is parallel to the base inside the prism?

a. a. 30°

b. b. 45°

c. c. 60°

d. d. Either 30° or 60°

1. 9. If 13.6 eV energy is required to ionize the hydrogen atom, then the required to remove an electron from n =2 is

a. a. 10.2 eV

b. b. 0 eV

c. c. 3.4 eV

d. d. 6.8 eV

1. 10. A transistor is used in common-emitter mode in an amplifier circuit. When a signal of 20 mV is added to the base-emitter voltage, the base current changes by 20 μA and the collector current changes by 2 mA. The load resistance is 5KΩ. What is the value of β?

a. a. 10

b. b. 100

c. c. 1000

d. d. 10^6

1. 11. The deBroglie wavelength λ of a particle with mass m and kinetic energy E is given by

a. a.

b. b.

c. c.

d. d.

12. 12. The capacity of a condenser is 4×10^{-6} farad and its potential is 100 volt. The energy released on discharging it fully will be

a. a. 0.02 joule
b. b. 0.04 joule
c. c. 0.025 joule
d. d. 0.05 joule

13. 13. In order to increase the kinetic energy of ejected photoelectrons, there should be an increase in the

a. a. frequency of radiation

b. b. intensity of radiation

c. c. wavelength of radiation

d. d. both wavelength and intensity of radiation.

a. 14. Which of the following is true for cathode rays
a. they cannot be accelerated
b. they contain positively charged particles
c. they are deflected by magnetic and electric fields
d. they are electromagnetic radiation.

15. The heat capacity of a body depends on
a. the mass of the body
b. the colour of the body
c. the heat given out
d. the temperature rise.

16. A train moves towards a stationary observer with speed 34 m/s. The train sounds a wistle and its frequency registered by the observer is f1. If the train's speed is reduced is 340m/s then the ratio f2,f2 is

a. 18/19
b. 1/2
c. 2
d. 19/18

17. A constant volume air thermometer works on the principle of

a. Boltzmann's law
b. Boyles law
c.Charle's law
d. Kelvin's law.

18. Radio isotopes

a. have same atomic weights but different atomic number
b. have same atomic number but different atomic weights
c. but have same atomic weights and same atomic number
d. have same density but different atomic number.

19.A concave lens of focal length 20 cm produces an image half in size of the real object. The distance of the real object is

a. a. 20 cm
b. b. 30 cm
c. c. 10 cm
d. d. 60 cm

20.A charge moves in a circle perpendicular to a magnetic field. The time period of revolution is independent of

a. a. Magnetic field
b. b. Charge
c. c. Mass of the particle
d. d. Velocity of the particle

ENTRANCE EXAMINATION QUESTIONS
CHEMISTRY

1. En= $-313.6/n^2$, If the value of En = -34.84 to which value 'n' corresponds
a) 4 b) 3
c) 2 d) 1

2. Dual character of an electron was explained by
a) Bohr b) Heisenberg c) de-broglie
d) pauli

3. de-broglie equation is
a) $\lambda = mv/h$ b) $\lambda = hmv$ c) $\lambda = hv/m$ d) $\lambda = h/ mv$

4. The value of the Bohr radius for hydrogen atom is
a) 0.528×10^{-8} cm b) 0.529×10^{-10} cm
c) 0.529×10^{-9} cm

d) 0.529×10^{-12} cm

5. Which of the following particles having same kinetic energy, would have the maximum de-broglie wave length

a) α – particle b) proton

c) β – particle d) neutron

6. If the energy of an electron in the second Bohr orbit of H –atom is – E, what is the energy of the electron in the Bohr's first orbit?

a) 2E b) – 4E c) -2E

d) 4E

7. Which explain the wave nature of an electron?

a) definite position in space b) black body radiation

c) Interference d) photoelectric effect

8.The bond order of oxygen molecule is

a) 2.5 b)1 c)3

d)2

9. The hybridisation is SF_6 molecule is

a) sp^3 b)sp^3d^2 c) sp^3d

d) sp^3d^3

10. The intramolecular hydrogen boding is present in

a) o-nitrophenol b) m-nitro phenol

c) p-nitrophenol d) p-hydroxy benzaldehyde

11.The value of C –C distance found experimentally in a saturated hydrocarbon is

a) 1.34 A° b) 1.36 A° c) 1.54 A°

d) 1.56 A°

12. On moving down the group, the radius of an ion

a) Decreases b) Increases c) No change d) None of the above

13. Effective nuclear charge (Z*) can be calculated by using the formula

a) Z* = Z-S b) Z* = Z+S c) Z* = S-Z d) Z = Z*-S

14. Pick out the correct statement

a) Carbon having more nuclear charge than boron

b) The size of carbon atom is larger than boron

c) Carbon forms electron deficient compounds
d) Carbon forms ionic compounds

15. Comparing the ionization energy of fluorine with carbon, fluorine has
    a) higher ionization energy b) lower ionization energy
    c) same ionization energy d) none of these

16. Among the following which has the maximum ionization energy
    a) alkali elements b) alkaline earth elements
    c) halogens d) noble gases

17. The electron affinity of an atom is
    a) directly proportional to its size
    b) inversely proportional to its size
    c) independent of its size
    d) none of these

18. Among the following which has higher electron affinity value?
    a) Fluorine b) Chlorine c) Bromine d) iodine

19. The scale which is based on the empirical relation between the energy of a bond and the electro negativities of bonded atoms is
    a) Pauling scale b) Mulliken's scale
    c) Sanderson's scale d) Alfred and Rochow's scale

20. Electron affinity is expressed in
    a) kJ b) J c) kJ mol d) $kJmol^{-1}$

KEY

Physics Maths Chemistry

Q. No.	Answers
1	b
2	b
3	d
4	c
5	d
6	a
7	b
8	c
9	c
10	b
11	a
12	a
13	a
14	c
15	a
16	d
17	c
18	b
19	c
20	d
Q. NO	**Answer**
1	b
2	c
3	d
4	a
5	c
6	b
7	c
8	d
9	b
10	a
11	c
12	b
13	a
14	a
15	a
16	d
17	b
18	b
19	a
20	d

1. 4

2. 2

3. 2

4. 4

5. 1

6. 3

7. 2

8. 2

9. 2

10. 3

11. 2

12. 3

13. 1

14. 2

15. 1

16. 2

17. 1

18. 1

19. 1

20. 2