Apeejay Stya University
Engineering (Sample Paper)

Note:
(i) The test is of 60 minutes duration.
(ii) The test consists of 60 questions. The maximum marks are 60.
(iii) There are three parts in the question paper. The distribution of marks subject-wise in each part is as under for each correct response.

Part A – Physics (20 marks) - Each question will carry 1 mark for each correct answer.
(Page 1-3)

Part B – Chemistry (20 marks) - Each question will carry 1 mark for each correct answer.
(Page 4-6)

Part C – Mathematics (20 marks) - Each question will carry 1 mark for each correct answer.
(Page7-10)

PART A – PHYSICS

1. A boy of mass 50 kg runs with a force of 100 N, his acceleration would be

a 5000 ms^{-2}

b 50 ms^{-2}

c 150 ms^{-2}

d 2 ms^{-2}

Answer- D

2. A mass suspended on a frictional less horizontal surface. It is attached to a string and rotates about a fixed centre at an angular velocity ω_0. If length of the string and angular velocity are doubled the tension in the string which was initially T_0 is now

a. T_0 b. $\dfrac{T_0}{2}$ c. $4 T_0$ d. $8 T_0$

Answer- D

3. Speed of wave 'v' is give by

a wavelength of wave / frequency of wave

b wavelength of wave $\times$ frequency of wave

c frequency of wave / wavelength of wave

d None of above

Answer- B

4. Waves that travel in a direction perpendicular to direction of vibration are known as

a. Transverse waves

b Longitudinal waves

c Sound waves

d   None of above

Answer- A

5. Rest mass energy of electron is

    a   1.02MeV

    b   0.511KeV

    c   0.511MeV

    d   2.02MeV

Answer- C

6. Speed of a microwave of wavelength 5×10^{-3} m in a vacuum is 5×10^8 m/s, its frequency is equal to

    1   2.0×10^5 Hz

    2   1.0×10^9 Hz

    3   1.0×10^{11} Hz

    4   6×10^{15} Hz

Answer- D

7. Electromagnetic waves carry

    a   positive charge

    b   negative charge

    c   no charge

    d   both positive and negative charge

Answer- C

8. Negative acceleration is also known as

    a   Retardation

    b   Relaxation

    c   Escalation

    d   All of above

Answer- A

9. A car covers a distance of 5 kilometers in 5 minutes, its average speed is equal to

    a   1 km/h

    b   25 km/h

    c   60 km/h

    d   None of above

Answer- C

10. Sound is produced due to

a friction

b circulation

c vibration

d refraction

Answer- C

11. A body at high temperature T °K radiates heat at rate proportional to

a. T^4
b. T^{-4}
c. T
d. T^2

Answer- A

12. Sound waves have

a Amplitude only
b Frequency and wavelength only
c Amplitude, frequency and wavelength
d Amplitude and wavelength only

Answer- C

13. One that is based on forward biased PN junction is

a photo diode

b LED

c photo voltaic cell

d both a and b

Answer- B

14. Diode characteristic curve is a plot between

a current and time
b voltage and time
c voltage and current
d both a and b

Answer- C

15. In pendulum, heavy metal ball is called

a String
b Gong
c Hook
d Bob

Answer- D

16. Range of a micrometer screw gauge is

a more than 1 cm
b 2 cm
c less than meter
d less than cm

Answer- D

17. A car uses total energy of 2500 J and output is 750 J. efficiency of car is

a 50%

b   30%

c   25%

d   80%

Answer- B

18. A car travels a distance of 15 km with a constant force of 500 N, its work done is

a   7500000 J

b   30 J

c   15500 J

d   14500 J

Answer- A

19. The speed of sound in air is 350 m/s. the fundamental frequency of the open pipe of length 50 cm is

a. 100 Hz   b. 250 Hz   c. 350 Hz   d. 400 Hz

Answer- C

20. A small body is to be moved inside a vertical circular tube of radius l. What minimum velocity should be imparted to it, as its lowest point so that it can just complete the vertical circle?

a. $\sqrt{5gl}$ b. $\sqrt{gl}$ c. $\sqrt{3gl}$

d. $\sqrt{4gl}$

Answer- D

PART B – CHEMISTRY

1. As solid melts to form liquid:

a. Inter particle distance increases

b. Inter molecular forces of attraction decreases

c. Compressibility increases

d. All of the above

Answer- D

2. Which of the following is not characteristic of solid:

a. High Rigidity

b. High density

c. Regular Shape

d. High compressibility

Answer- D

3. The boiling point of water is:

a. 100 °C at atmospheric pressure

b. 0 °C at atmospheric pressure

c. 273K at atmospheric pressure

d. 0K at atmospheric pressure

Answer- A

4. Which of the following has highest intermolecular forces of attraction?

a. Water at room temperature

b. Ethyl alcohol

c. CO_2 gas

d. Iron metal

Answer- D

5. Which of the following substances will undergo sublimation?

a. Common salt

b. Sugar

c. Odonil

d. Sand

Answer- C

6. The process of evaporation causes:

a. Cooling

b. Dryness

c. Heating

d. None of the above

Answer- A

7. The conversion of solid to gas directly is called:

a. Evaporation

b. Distillation

c. Sublimation

d. condensation

Answer- C

8. Evaporation of a liquid can take place:

a. At its boiling point

b. At all temperatures

c. At its freezing point

d. At a fixed temperature

Answer- B

9. Which of the following describes a liquid state:

a. Definite volume and definite shape

b. Definite volume and no specific shape

c. definite shape but no definite volume

d. neither definite shape nor definite volume

Answer- B

10. Wet clothes are kept for drying. Which of the following does not help them in drying:

a. Spreading it out

b. Making the room a little warmer

c. Blowing wind over it

d. Cooling the room

Answer- D

11. Which is not represented by 1mole of Nitrogen gas?

a. 6.023×10^{23} molecules of N_2

b. 6.023×10^{23} atoms of N_2

c. 12.046×10^{23} atoms of N_2

d. 28g of N_2

Answer- B

12. 18g of water is electrolysed. The weight of oxygen obtained is:
a. 16g
b. 8g
c. 4g
d. 1g
Answer- A

13. The balancing of chemical equations is in accordance with:
a. Law of combining volumes
b. Law of conservation of mass
c. Law of constant proportions
d. Both b and c
Answer- D

14. Which of the following is a correct statement:
a. Na_2S is sodium sulphide, Na_2SO_3 is sodium sulphite, Na_2SO_4 is sodium sulphate
b. Na_2S is sodium sulphite, Na_2SO_3 is sodium sulphide, Na_2SO_4 is sodium sulphate
c. Na_2S is sodium sulphide, Na_2SO_3 is sodium sulphate, Na_2SO_4 is sodium sulphite
d. Na_2S is sodium sulphite, Na_2SO_3 is sodium sulphite, Na_2SO_4 is sodium sulphide
Answer- A

15. The formula of Calcium phosphate is:
a. $CaPO_4$
b. $Ca_3 (PO_4)_2$
c. $Ca(PO_4)_2$
d. $Ca_2 (PO_4)_3$
Answer- B

16. How many electrons, protons and neutrons are present in X^+, if atomic number of X is 19 and its mass number is 39
a. E=19, P=19, N= 20
b. E=18, P=19, N= 19
c. E=18, P=19, N= 20
d. E=19, P=20, N= 20
Answer- A

17. Which of the following does not have 8 valence electrons:
a. He
b. Ne
c. Ar
d. Cl -
Answer- A

18. Which of the following does not have one electron in its valance shell
a. Na
b. Li
c. H
d. Ca
Answer- D

19. The electronic configuration of Cl ion is:
a. 2,8,7
b. 2,8,6

c. 2,8,8
d. 2,8,8,1
Answer- C

20. Which of the following are isotopes: ^1H, ^1D, ^1T, ^1H
a. $^1H_1$, $^2D_1$, $^3T_1$
b. $^1H_1$, $^1H^+_1$
c. $^1H_1$, $^2D_1$, $^1H^+_1$
d. $^1H_1$, $^3T_1$, $^1H^+_1$
Answer- A

<div align="center">

PART C – MATHEMATICS

</div>

1. Variables of linear equation is implicitly raised to

1 first power

2 second power

3 third power

4 four power

Answer- 1

2. 18800 / 470 / 20 = ?

1) 2

2) 4

3) 3

4) 1

Answer- 1

3. If 2x+3y+z=55, x-y=- 4 and y – x + z=12,then what are the values of x , y and z?

1. (x)7(y)11(z)8

2. (x)5(y)12(z)5

3. (x)6(y)10(z)9

4. (x)9(y)16(z)7

Answer- 1

4. Quadratic equation whose roots are α, β is

1 $x^2 + (α + β)x + αβ = 0$

2 $x^2 - (α + β)x - αβ = 0$

3 $x^2 + (α + β)x - αβ = 0$

4 $x^2 - (α + β)x + αβ = 0$

5. If y is expressed in terms of a variable x as Y = f(x), then y is called

    1 explicit function

    2 implicit function

    3 linear function

    4 identity function

    Answer- 2

6. if f(x)= x³ – 2x +10 then what is the value of f(- 5)?

    1. -105

    2. 145

    3. - 145

    4. 25

Answer- 1

7. Sec²θ =

    1 $1 - \cos^2\theta$

    2 $1 - \tan^2\theta$

    3 $1 + \tan^2\theta$

    4 $1 + \cot^2\theta$

Answer- 3

8. If A, G, H are arithmetic, geometric and harmonic means between a and b respectively, then A,G,H are

    1 in G.P

    2 in A.P

    3 in H.P

    4 Real numbers

Answer- 3

9. Consider velocity of the car

  What would be the acceleration for t = 2 ?

    1. 28

    2. 30

    3. 32

    4. 34

Answer- 4

10. For any subset A and B of U, $(A \cap B)^c$

1 $A \cap B$

2 $A \cup B$

3 π

4 $A^c \cap B^c$

Answer- 2

11. Function written as $y = f(x) = a^1x + a^\circ$ is general form of

1 linear function

2 variable function

3 variate function

4 constant function

Answer- 1

12. If f(x) is continous on [5,2] and F is antiderivatiove of F on [5,2] where

1. 2/3
2. 5/7

3. - 17/6

4. -13/6

Answer- 3

13. An arrangement of a finite number of objects taken some or all at a time is called their

1 A.P

2 Combination

3 Sequence

4 permutation

Answer- 4

14. For a negative integer n, factorial nι

1 is unique

2 is 0

3 does not exist

4 is 1

Answer- 3

15. X/(x+2)(x-3) =

1 2/5(x+2) -3/5(x-3)

2 2/5(x+2) +3/5(x-3)

3 2/5(x-2) +3/5(x+3)

4 None of Above

Answer- 2

16. A- B will contain elements in ?

    1. Both A and B

    2. A not B

    3. B not A

    4. Neither A nor B

Answer- 2

17. (A')' is equal to ?

1. A'

2. U-A

3. A

4. U

Answer- 3

18. Evaluate: $\lim\limits_{x \to 1} \dfrac{x^2 - 1}{x^2 + 3x - 4}$

1) 1/5

2) 2/5

3) 3/5

4) 4/5)

Answer- 2

19. Differentiate $(x^2 + 2)^{1/2}$

1. $((x^2 + 2)^{1/2}) / 2$

2. $x / (x^2 + 2)^{1/2}$

3. $(2x) / (x^2 + 2)^{1/2}$

4. $(x^2 + 2)^{3/2}$

Answer- 2

20. 40% of 2/3 of a number is 32. What is the number?

1. 240

2. 80

3. 120

4. 160

Answer- 3