CLASS

8

BVPY QUESTION PAPER – STAGE 1
December 17, 2020

Part A – Mathematics (Q1 to Q30)

Part B – Science (Q1 to Q30)

Maximum Marks: 60   **Duration : 60 minutes**

Instructions for Students :

1. Each question carries one mark.

2. This paper consists two parts i.e. Part 'A' (Mathematics) Q.1 to 30, Part 'B'(Science) Q1 to 30.

3. There is no negative marking .

PART 'A' (MATHEMATICS)

1. $\sqrt{1+\sqrt{1+\sqrt{1+.......}}}$

    A. equals 1
    B. lies between 0 and 1
    C. lies between 1 and 2
    D. is greater than 2

2. The square root of a perfect square containing 'n' digits has _____ digits

    A. $\dfrac{n+1}{2}$
    B. $\dfrac{n}{2}$
    C. Either A. or B.
    D. None of these

3. The solution of $3^{3x-5} = \dfrac{1}{9^x}$ is -

    A. $\dfrac{5}{2}$
    B. 5
    C. 1
    D. $\dfrac{7}{3}$

4. Which one of the following is not true ?

    A. There does not exist any rational number whose square is 4
    B. There does not exist any rational number whose square is 5
    C. There does not exist any rational number whose square is 2
    D. None of these

5. The value of $\dfrac{2^{1/2} \times 3^{1/3} \times 4^{1/4}}{10^{-1/5} \times 5^{3/5}} \div \dfrac{4^{-2/3} \times 5^{-7/5} \times 4^{1/4}}{4^{-3/5} \times 6^{-1/3}}$ is equal to -

    A. $5\sqrt{2}$
    B. 1
    C. 6
    D. 18

6. What must be added to $\dfrac{x}{y}$ to make it $\dfrac{y}{x}$?

    A. $\dfrac{y-x}{y^2 x^2}$
    B. $\dfrac{y^2 - x^2}{xy}$
    C. $\dfrac{xy}{x+y}$
   D. $\dfrac{x^2 y^2}{x^2 + y^2}$

7. If $(x^2 + 1)(? - x^2 + 1) = x^6 + 1$,

   then ? will be replaced by

   A. x^4
   B. x^3
   C. $-x^4$
   D. None of these

8. If $0 < x < 1$, then the value of $x + \dfrac{1}{x}$ is

   A. Greater than 2
   B. Less than 2
   C. Cannot be determined
   D. None of these

9. If $2^{2x-y} = 32$ and $2^{x+y} = 16$ then $x^2 + y^2$ is equal to

   A. 9
   B. 10
   C. 11
   D. 13

10. $\dfrac{a^3 + b^3 + c^3 - 3abc}{a^2 + b^2 + c^2 - ab - bc - ca} = $ _____.

    A. 0
    B. $a + b + c$
    C. 1
    D. None of these

11. If $\dfrac{4}{y} - \dfrac{3}{x} = \dfrac{1}{xy}$ and $\dfrac{5}{y} - \dfrac{7}{x} = \dfrac{12}{xy}$, find $x - y$.

    A. 2
    B. $\dfrac{12}{13}$

    C. $\dfrac{14}{13}$
    D. -1

12. 16 men finish one third work in 6 days. The number of additional men required to complete the job in next 6 days are -

    A. 10
    B. 8
    C. 16
    D. 32

13. In a mixture of 60 litres, the ratio of milk and water is 2 : 1. If this ratio is to be 1 : 2, then the quantity of water to be further added is :

   A. 60 litres
    B. 30 litres
    C. 40 litres
    D. 20 litres

14. The salaries of *A, B* and *C* are in the ratio 2 : 3 : 5. If the increments of 15%, 10% and 20% are allowed respectively in their salaries, then what will be the new ratio of their salaries ?

A. 3 : 3 : 10

B. 10 : 11 : 20

C. 23 : 33 : 60

D. Cannot be determined

15. In what time Rs. 40000 amount to Rs. 57600 at 20% per annum compound interest?

A. 3 years

B. 1.5 years

C. 2.5 years

D. 2 years

16. Total area of quadrilateral *ABCD* is 20 cm^2 and offsets on *BD* are 2*cm* and 3*cm* the length of *BD* is

A. 5 *cm*

B. 6 *cm*

C. 8 *cm*

D. 10 *cm*

17. The radius of a circle is increased by 5 units. What is ratio of the new circumference and the new diameter ?

A. $\pi - 1$

B. π

C. $\pi + 5$

D. $\pi - 5$

18. The area of the greatest circle which can be inscribed in a square whose perimeter is 120 *cm*,

A. $\dfrac{22}{7} \times \left(\dfrac{7}{2}\right)^2 cm^2$

B. $\dfrac{22}{7} \times \left(\dfrac{9}{2}\right)^2 cm^2$

C. $\dfrac{22}{7} \times \left(\dfrac{15}{2}\right)^2 cm^2$

D. $\dfrac{22}{7} \times (15)^2 \ cm^2$

19. What change in percent is made in the area of a rectangle by decreasing its length and increasing its breadth by 5% ?

A. 2.5% increase

B. 0.25% increase

C. 0.25% decrease

D. 2.5% decrease

20. In the star shape shown in figure, the sum of the angles marked at the corners A, B, C, D, E is
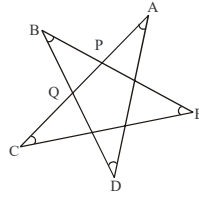
A. 90

B. 135

C. 180

D. 140

21. In the figure below (not to scale), $\overline{PQ} \parallel \overline{TS}$, reflex $\angle QRS = 300°$ and $x - y = 30°$. The measure of y will be –
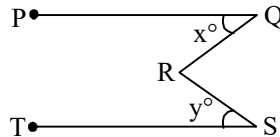
A. 25°

B. 15°

C. 20°

D. 30°

22. In the adjoining figure, it is given that D and E are the mid points of AB and AC respectively. If $\angle A = 80°$, $\angle C = 35°$ then $\angle EDB = $ _____
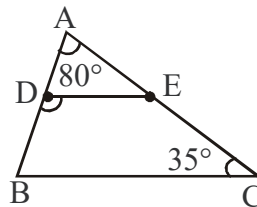
A. 120°

B. 160°

C. 70°

D. 115°

23. $ABCD$ and $MNOP$ are quadrilaterals as shown in the below given figure, then
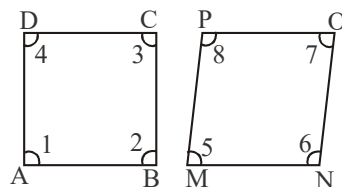
A. $1 + 2 + 3 + 4 = 5 + 6 + 7 + 8$

B. $1 + 2 + 3 + 4 < 5 + 6 + 7 + 8$

C. $1 + 2 + 3 + 4 > 5 + 6 + 7 + 8$

D. None of the foregoing

24. In the following fig. if $AB = AC$ and $BD = DC$, then $\angle ADC =$
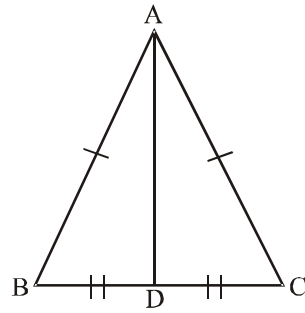
   A. 60°   B. 120°

   C. 90°   D. None of these

25. If the mean of the following data be 9.2, find the value of p.

x	4	6	7	p+4	12	12
f	5	6	4	10	8	7

   A. 2   B. 1

   C. 15   D. 6.4

26. The median of 0, 2, 2, 2, –3, 5, –1, 5, 5, –3, 6, 6, 5, 6 is :

   A. 0   B. –1.5

   C. 2   D. 3.5

27. If the mode of the observation 4, 2, 3, 3, 3, 2, 2, 4, 2, 4, x, 3, 4, 4, 2, 3, 4 is 4 then x cannot be –

   A. 2   B. 4

   C. 3   D. Both A. & C.

28. Which of the following numbers is exactly divisible by 99 ?

   A. 114345   B. 135792

   C. 3572404   D. 913464

29. In a simultaneous throw of dice, what is the probability of getting a total of 7 ?

   A. $\dfrac{1}{6}$ B. $\dfrac{1}{4}$

   C. $\dfrac{2}{3}$ D. $\dfrac{3}{4}$

30. Which of the following statements is **INCORRECT** ?

   A. All rhombuses are parallelograms.   B. All squares are not parallelograms.

   C. All rectangles are not squares.   D. All squares are trapeziums.

PART 'B' (SCIENCE)

1. Conduction is possible :
   A. when the bodies are apart from each other
   B. when the bodies have same temperature and in thermal contact
   C. when they have different temperatures maintaining distance between them
   D. bodies should be in contact and should have different temperatures

2. 1 kilowatt hour equals to :
   A. 3.6×10^6 kJ
   B. 3.6×10^6 J
   C. 3.6 MJ
   D. Both B and C

3. When water changes its state from liquid state to vapour state,
   A. heat is given out.
   B. heat is absorbed.
   C. heat is given out and then absorbed.
   D. there is no exchange of heat between the system and the surroundings.

4. If a rock is brought from the surface of the moon :
   A. its mass will change
   B. its weight will change, but not mass
   C. both mass and weight will change
   D. its mass and weight will remain the same

5. The walls of a dam are specially thickened at the base to
   A. withstand huge pressure of water
   B. withstand earthquake
   C. withstand the sound waves
   D. none of these

6. Brakes of automobiles do not work well during rainy season because :
   A. water acts as a lubricant between wheel drum and brake shoe
   B. water destroys the wheel drum
   C. we can't apply much force on brakes during rainy season
   D. all are correct

7. Audible frequency range is :
   A. Below 20 Hz
   B. 20 Hz to 20 kHz
   C. Above 20 kHz
   D. No limit

8. Identify the wrong image formation :

A.
B.
C.
D.
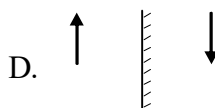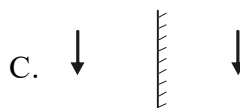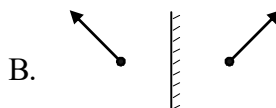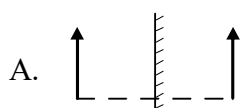
9. Which instrument is used to measure earthquake waves ?

   A. Seismogram
   B. Seismograph
   C. Seismic wave
   D. Seismology

10. A lightning conductor :

    A. conducts light
    B. stops lightning
    C. protects buildings from the damaging effects of lightning
    D. prevents clouds from coming near a building and thus protects it

11. PVC (Poly vinyl chloride) and Polythene are –

    A. Thermosetting plastics
    B. Thermoplastics
    C. Natural fibres
    D. Synthetic fibres

12. See the figure given below and select the correct statement regarding polymer.
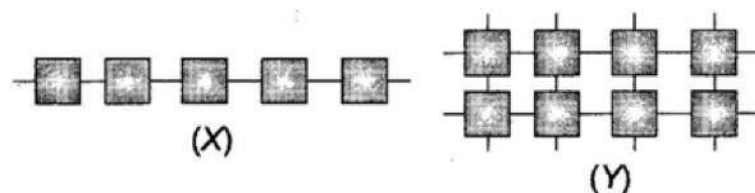
1. Figure (X) shows structure of a monomer while figure (Y) shows structure of a polymer.

2. Small boxes in the structure represent monomers which are joined to give a polymer.

3. Figure (X) shows structure of a linear polymer while (Y) shows structure of a cross - linked polymer.

    A. 1 and 2 only
    B. 1 and 3 only
    C. 2 and 3 only
    D. All are correct

13. Properties of substances W, X, Y and Z are listed below:

    W : A liquid metal

    X : A liquid non - metal

    Y : Non-metal essential for respiration

    Z : Non-metal which can conduct electricity

    W, X, Y and Z are respectively

A. Iron, iodine, hydrogen and oxygen

B. Gold, sulphur, chlorine and hydrogen

C. Copper, phosphorus, nitrogen and carbon

D. Mercury, bromine, oxygen and graphite.

14. Fill in the blanks with the most appropriate option.

'W' is very reactive metal, reacts vigorously with oxygen and water therefore, stored in __(1)__.

'X' is non - metal, soft and dull and forms __(2)__ oxides with oxygen.

'Y' is very reactive __(3)__, catches fire if exposed to air, therefore, stored in water.

A. 1 - Water, 2 - basic, 3 - metal

B. 1 - Kerosene, 2 - acidic, 3 - metalloid

C. 1 - Kerosene, 2 - acidic, 3 - non - metal

D. 1 - Water, 2 - basic, 3 - non - metal

15. Select the incorrect statements among the following:

(i) Bitumen is used for metalling the roads

(ii) Some inexhaustible natural resources like coal, petroleum and natural gas formed from the dead remains of living organisms are known as fossil fuels.

(iii) Many useful substances are obtained from coal (commercial importance), so it is also called as 'Black gold'.

(iv) Natural gas is used as a starting material for the manufacture of a number of chemicals and fertilisers.

A. (i) and (ii) only

B. (ii) and (iii) only

C. (ii) and (iv) only

D. (i), (ii) and (iv) only

16.

List - I	List-II
(P) Water gas	(i) Fuel for vehicles
(Q) Producer gas	(ii) $CO + H_2$
(R) Compressed natural gas	(iii) $CO + N_2$
(S) Liquefied petroleum gas	(iv) Household fuel

A. P → (ii); Q → (iii); R → (i); S → (iv)

B. P → (iii); Q → (iv); R → (ii); S → (i)

C. P → (iv); Q → (iii); R → (i); S → (ii)

D. P → (ii); Q → (i); R → (iv); S → (iii)

17. Calorific values of some fuels are given;

| Fuel	Calorific value (kJ / kg)
Coal	25000 - 33000
Diesel	45,000
LPG	55,000
CNG	50,000

On the basis of this data, find out the correct order of efficiency of fuels.

A. LPG > CNG > Diesel > Coal

B. Coal > Diesel > LPG > CNG

C. Diesel > CNG > Coal > LPG

D. CNG > LPG > Diesel > Coal

18. The head of a safety match contains:

A. Antimony trisulphide and potassium chlorate

B. Antimony chloride and potassium sulphide

C. Antimony carbonate

D. Potassium sulphide

19. What happens when a solution of an acid is mixed with a solution of a base in a test tube?

(i) The temperature of the solution increases.

(ii) The temperature of the solution decreases.

(iii) The temperature of the solution remains the same.

(iv) Salt formation takes place.

A. (i) only
B. (i) and (iii)

C. (ii) and (iii)
D. (i) and (iv)

20. Match the column-I with column-II and select the correct option from the codes given below :

Column-I   Column-II

a. Expansion of metals on heating.   i. Neither physical nor chemical change

b. A stone kept in the sunlight   ii. Chemical change

c. Burning of a candle   iii. Combination of physical and chemical changes

d. Curdling of milk   iv. Physical change

A. a - iv, b - i, c - iii, d - ii   B. a - iv, b - iii, c - ii, d - i

C. a - i, b - ii, c - iii, d - iv   D. a - i, b - iv, c - ii, d - iii

21. See the diagram below. Identify the parts labelled as A, B and C in the diagram.
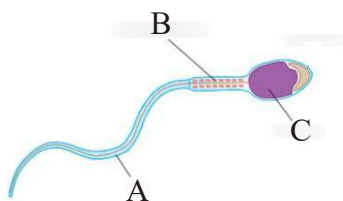
A. A is the head, B is the middle piece, and C is the tail.

B. A is the head, B is the acrosome, and C is the tail.

C. A is the middle piece, B is the head, and C is the acrosome.

D. A is the tail, B is the middle piece, and C is the head.

22. Which set is mixed with the food in small intestine?

    A. Saliva, gastric juice, bile

    B. Gastric juice, bile, pancreatic juice

    C. Bile, pancreatic juice, succus entericus

    D. Bile, pancreatic juice and saliva

23. Which of the following is a set of diseases caused by viruses in human beings ?

    A. Small pox, dysentery, malaria

    B. Influenza, mumps, polio

    C. Chicken pox, dengue, typhoid

    D. Tuberculosis, rabies, AIDS

24. Ribosome is present in both eukaryotic and prokaryotic cells, it refers that ribosome is

    A. Necessary for protein synthesis

    B. A membrane less organelle

    C. Independent of nucleus

    D. Meeting body's energy requirement in all the above conditions

25. The given figure shows positions of few endocrine glands in human body. Two patients, Ravi and Sohail recently visited an endocrinologist regarding their health issues.

    Doctor examined them and prepared a chart shown here to keep a record of their illness and monitor their health.
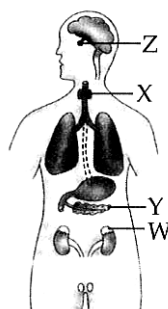
Patient's name	Disease symptoms
Ravi	Swollen neck
Sohail	Large quantities of sugar in blood and urine

Refer to the given figure and chart and select the correct option.

    A. Ravi is suffering from goitre which is caused due to hyposecretion of a hormone by gland X.

    B. Ravi is suffering from cretinism which is caused due to hypersecretion of a hormone by gland Y.

    C. Sohail is suffering from diabetes which is caused by hyposecretion of a hormone by gland W.

    D. Sohail is suffering from diabetes which is caused by hypersecretion of a hormone by gland Z.

26. Species which are restricted only to specific area and not in any other geographical area are called
   A. Extinct
   B. Endangered
   C. Endemic
   D. None of these.

27. Which of the following should come in the box 'X' in the given sequence?
   Ploughing $\rightarrow$ Levelling $\rightarrow$ Sowing seeds $\rightarrow [x] \rightarrow$ Irrigation
   A. Broadcasting
   B. Transplanting
   C. Manuring
   D. Drilling

28. Which of the following are the essential parts of a flower ?
   A. Calyx and corolla
   B. Calyx and androecium
   C. Corolla and gynoecium
   D. Androecium and gynoecium

29. In plants process 'x' obtains CO_2 and produces O_2 while process Y obrains O_2 and produces CO_2. What are the process X and Y ?
   A. X: Photosynthesis, Y: Respiration
   B. X: Respiration, Y: Transpiration
   C. X: Excretion, Y: Photosynthesis
   D. X: Transpiration, Y: Respiration

30. Vocal cords occur in –
   A. Pharynx
   B. Glottis
   C. Bronchii
   D. Larynx

Space for rough work