CLASS

8

BVPY QUESTION PAPER – STAGE 2

Feb. 07, 2021

Part A – Mathematics (Q1 to Q30)

Part B – Science (Q1 to Q30)

Maximum Marks: 100 **Duration : 180 minutes**

Instructions for Students :

1. This paper consists two parts i.e. Part 'A' (Mathematics) Q.1 to 30, Part 'B'(Science) Q1 to 30.
2. For rough work please use last two pages.

PART 'A' (MATHEMATICS)

SECTION 1 (Maximum Marks: 15)

- This section contains Q.1 to Q. 15.
- Each question has **FOUR** options 'A', 'B', 'C' and 'D'. **ONLY ONE** of these four options is correct
- For each question, marks will be awarded in one of the following categories:

Full Marks : +1 If only the bubble corresponding to the correct option is darkened

Zero Marks : 0 If none of the bubbles is darkened

Negative Marks : –0.25 In all other cases

1. The value of $\sqrt{1\frac{1}{2}-[1\frac{1}{2}-1\frac{1}{2}+(1\frac{1}{2}-\overline{1\frac{1}{2}-1\frac{1}{4}})]}$ is :

A. $\frac{1}{2}$ B. $\frac{1}{4}$

C. $\frac{1}{16}$ D. $1\frac{1}{5}$

2. If n is a perfect square, then the next perfect square greater than n is :

A. $n^2 + 1$ B. $n^2 + n$

C. $n + 2\sqrt{n} + 1$ D. $2n + 1$

3. A number divided by 14 gives a remainder 8. What is the remainder, if this number is divided by 7 ?

A. 1 B. 2

C. 3 D. 4

4. For a non-zero integer x, x^3 is :

A. Always less than x^2

B. Always greater than x^2

C. Sometimes less and sometimes greater than x^2

D. None of these

5. What is the probability that an ordinary year has 53 Sundays ?

A. $\frac{53}{365}$ B. $\frac{1}{7}$

C. $\frac{2}{7}$ D. $\frac{48}{53}$

6. The mode of the observation $2x + 3$, $3x - 2$, $4x + 3$, $x - 1$, $3x - 1$, $5x + 2$ (x is a positive integer) can be :

A. 3 B. 5

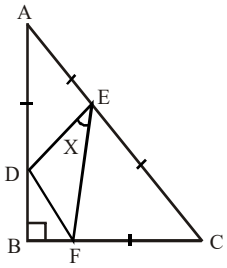
C. 7 D. 9

7. To construct rhombus uniquely it is necessary to know atleast ____of its parts.

A. 1 B. 2

C. 3 D. 5

8. In a right triangle ABC, $AD = AE$ and $CF = CE$ as show. If $\angle DEF = x$ degrees then the value of x equals



A. 30º B. 45º

C. 60º D. 75º

9 Ten years ago, average of the ages of a men and his wife was 25 years. Today, the average age of these two and their son taken together is again 25 years. What is the age (in years) of the son today ?

A. 2 B. 5

C. 8 D. 10

10. A sum of money is kept in a bank at 8 % interest compounded annually. Had the interest been at 10 % compounded semi annually the amount after 1 year would have been 225 more. What was the principal amount kept in the bank ?

A. Rs. 10,000 B. Rs. 10,500

C. Rs. 15,000 D. Rs. 18,000

11. A man loses the selling price of 4 apples on selling 36 apples. His loss per cent is

A. 12.5 B. 11.11

C. 10 D. 9

12. The side of a triangle are in the ratio $\frac{1}{2} : \frac{1}{3} : \frac{1}{4}$ and its perimeter is 104 *cm*. The length of the longest side is :

A. 52 *cm* B. 48 *cm*

C. 32 *cm* D. 26 *cm*

13. If $x + \frac{1}{x} = 5$, the value of $\frac{x^4 + 1}{x^2}$ is :

A. 21 B. 23

C. 25 D. 30

14. The number of triangles with any three of the lengths 1, 4, 6 and 8 *cm*, are :

A. 4 B. 2

C. 1 D. 0

15 Cost of two chairs and three tables is Rs.3320, while the cost of one chair and two tables is Rs. 2020. Find the cost of each chair.

A. Rs. 680 B. Rs. 620

C. Rs. 580 D. Rs. 720

SECTION 2 (Maximum Marks: 20)

- This section contains Q.16 to Q. 25.
- Each question has **FOUR** options 'A', 'B', 'C' and 'D'. **ONLY ONE** of these four options is correct
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Full Marks : +2 If only the bubble corresponding to the correct option is darkened

Zero Marks : 0 If none of the bubbles is darkened

Negative Marks : –0.50 In all other cases

16. The digit at the 100th place in the decimal representation of $\frac{6}{7}$, is :

A. 1 B. 2

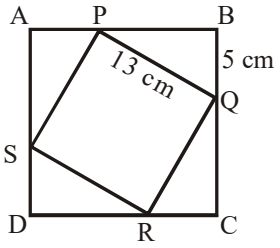
C. 4 D. 5

17. One hundred monkeys have 100 apples to divide. Each adult gets three apples while three children share one. Number of adult monkeys are :

A. 20 B. 25

C. 30 D. 33

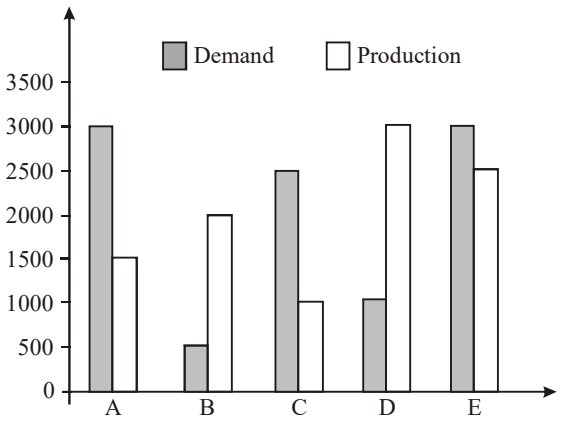
18. In the given figure *ABCD* is a square in which points *P, Q, R, S* are situated in such a way that *PQRS* is also a square of side 13 *cm*. If $BQ = 5$ *cm*., then the area of square *ABCD* is :



A. 289 cm^2 B. 324 cm^2

C. 361 cm^2 D. 400 cm^2

19. The given bar graph represents Demand and Production for five companies *A, B, C, D* and *E*. On the basis of the graph, answer the following questions.

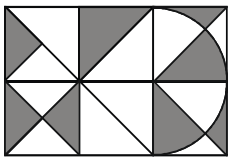


(i) If x % of demand for company *C* equals demand for company *B*, then x equals

(ii) The ratio of the number of companies having more demand than production to those having more production than demand is

	A.	B.
A.	20	4 : 1
B.	20	3 : 2
C.	60	2 : 2
D.	100	9 : 10

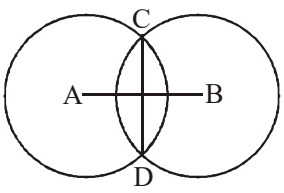
20. What percent of the given figure is shaded ?



A. $33\frac{1}{3}\%$ B. $39\frac{1}{4}\%$

C. $37\frac{1}{2}\%$ D. $38\frac{2}{3}\%$

21. In the figure given above, *A* and *B* are the centers of the two congruent circles with radius 17 units. If $AB = 30$ units, the length of the common chord *DC* is :



A. 25 units B. 18 units

C. 10 units D. 16 units

22. In a right angled triangle ABC, P is mid point of AC. Which one is true ?

(i) $PA = \frac{AC}{2}$ (ii) $PB = \frac{AC}{2}$

(iii) $PA = PB$

A. Only (i) B. Only (i) and (ii)

C. Only (ii) and (iii) D. All of these

23. If $x = (7 + 4\sqrt{3})$, then the value of $\sqrt{x} + \frac{1}{\sqrt{x}}$ is :

A. 8 B. 6

C. 5 D. 4

24. $\frac{1}{2} + \frac{2^1}{2^2} + \frac{2^2}{2^3} + \ldots\ldots + \frac{2^{2006}}{2^{2007}} + \frac{2^{2007}}{2^{2008}}$ is equal to :

A. 1004 B. $\frac{1}{2^{2008}}$

C. 2008 D. 502

25. Find the time taken by a train of length 200 *m* running at a speed of 84 *kmph* to cross another train of length 300 *m* running at a speed of 75 *kmph* in the same direction.

A. 150 seconds B. 200 seconds

C. 300 seconds D. 250 seconds

SECTION 3 (Maximum Marks: 15)

- This section contains Q.26 to Q. 30.
- Each question has **FOUR** options 'A', 'B', 'C' and 'D'. **ONLY ONE** of these four options is correct
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Zero Marks : 0 If none of the bubbles is darkened

Negative Marks : –1 In all other cases

26. If the sum of all angles except one of a convex polygon is 2180°, then the number of sides of the polygon is :

A. 19 B. 17

C. 15 D. 13

27. Runs scored by Rahul in a match are 38 more than the balls faced by Virat. The number of balls faced by Rahul is 8 less than the runs scored by Virat. If together they have scored 144 runs and the balls faced by Rahul are 18 more than those faced by Virat. Find the number of runs scored by Rahul.

A. 68 B. 72

C. 78 D. 66

28. The length, breadth and height of a room are in the ratio 3: 2: 1. If the breadth and height are halved while the length is doubled, then the total area of the four walls of the room will :

A. Remain the same B. Decrease by 30%

C. Decrease by 15% D. Decrease by 18.75%

29. Match the columns :

	Column – A		**Column–B**
1.	Intersection point of medians	a.	Orthocenter
2.	Intersection points of altitudes	b.	Centroid
3.	Intersection points of angle bisectors	c.	Incenter

A. 1-a, 2-b, 3-c B. 1-a, 2-c, 3-b

C. 1-b, 2-a, 3-c D. 1-c, 2-a, 3-b

30. Simplify:

(i) $\dfrac{(a+b+c)^{a+b}\times(a+b+c)^{b+c}\times(a+b+c)^{c+a}}{[(a+b+c)^{a}\,(a+b+c)^{b}\,(a+b+c)^{c}\,]^{2}}$

(ii) $(a^{p+q})^{p-q}\times(a^{q+r})^{q-r}\times(a^{r+p})^{r-p}$

(iii) $\left[\left(\dfrac{a}{b}\right)^{\sqrt{p}+\sqrt{q}}\right]^{\sqrt{p}-\sqrt{q}}\left[\left(\dfrac{a}{b}\right)^{\sqrt{q}+\sqrt{r}}\right]^{\sqrt{q}-\sqrt{r}}\left[\left(\dfrac{a}{b}\right)^{\sqrt{r}+\sqrt{p}}\right]^{\sqrt{r}-\sqrt{p}}$

A. Each has simplified to different value

B. (i) $\dfrac{1}{a+b+c}$ (ii) 1 (iii) $\left(\dfrac{a}{b}\right)^{\sqrt{p}+\sqrt{q}-\sqrt{r}}$

C. Each has simplified to single value

D. None of these

PART 'B' (SCIENCE)

SECTION 1 (Maximum Marks: 15)

- This section contains Q.1 to Q. 15.
- Each question has **FOUR** options 'A', 'B', 'C' and 'D'. **ONLY ONE** of these four options is correct
- For each question, marks will be awarded in one of the following categories:

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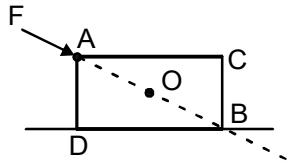
Zero Marks : 0 If none of the bubbles is darkened

Negative Marks : –0.25 In all other cases

1. A book lying on the table starts moving when force F acts on it. If force of 2F is applied on the book, force of friction acting on the book will be :

A. equal to 2F
B. equal to F
C. slightly less than F
D. slightly greater than 2F

2. 

Line of action of force is :

A. AB
B. AC
C. AD
D. BC

3. Women's high heel sandals hurt more than the men's sport shoes because :

A. women are stronger in health
B. sport shoes have small heel
C. area of contact of sandal's heel is more
D. area of contact of sandal's heel is lesser

4. Rarefractions are the regions of :

A. Maximum pressure
B. Minimum density
C. Maximum density
D. None of these

5. The force can change the :

A. State of the object
B. Directions of the object
C. Shape of the object
D. All of above

6. The structure of a fabric with, its component units X, Y linked is given below

Identify fabric from the following

A. PVC
B. Polycot
C. Polystyrene
D. Poly ethylene

7. Which of the fol1owing statement regarding non-metals is true ?

A. Non-metals are of two types only solids and gases
B. Non-metals reacts with oxygen to form basic oxides generally.
C. Non-metals are non-lustrous with dull apppearence. Graphite, an allotrope of carbon and iodine have shining surfaces.
D. Non-metals replace hydrogen from acids.

8. Complete the reaction :

$Zn + 2H_2SO_4 \rightarrow$

A. $Zn(NO_3)_2 + 2H_2O + 2NO_2$
B. $Na_2ZnO_2 + H_2$
C. $ZnSO_4 + 2H_2O + SO_2$
D. $ZnSO_4 + NO_2 + H_2O$

9. Which of the following products obtained by destructive distillation of coal is not properly matched ?

A. Coal tar – Dyes, explosives, paints
B. Coal gas – Fuel
C. Coke – Drinking purposes.
D. Ammoniacal liquor – Fertilizers

10. The composition of producer gas is

A. $CO + N_2$
B. $CO + H_2$
C. $CO + CH_4$
D. $CO + NO_2$

11. Which of the following diseases generally occurs in summers during the rainy season due to bad personal hygiene and poor sanitation ?

A. Common cold
B. Polio
C. Rabies
D. Gastro–enteritis

12. Why do young people get acne and pimples on their faces ?

A. Due to the increase in secretion of sweat gland and sebaceous glands
B. Due to the increase in secretion of salivary glands
C. Due to the stretch of skin for growth
D. All of the above

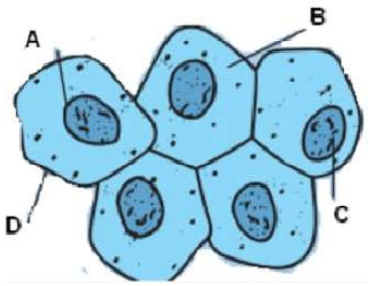
13. By which phenomenon does the larva of a silk moth change into an adult ?

A. Adultation
B. Metamorphosis
C. Larvation
D. None of these

14. Which of the following has both unicellular and multicellular forms ?

A. Amoeba
B. Euglena
C. Yeast
D. Alga

15. In human cheek cell, nucleus is separated from the cytoplasm by a membrane called the nuclear membrane. In the figure, which of the following parts represents the nuclear membrane ?



A. D
B. B
C. A
D. C

SECTION 2 (Maximum Marks: 20)

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16. A Diwali rocket is ejecting 0.05 kg of gases per second at a velocity of 400 ms^{-1}. The accelerating force on the rocket is :

A. 20 dyne
B. 20 Newton
C. 20 kg wt.
D. sufficient data not given

17. Change of seasons on the earth takes place due to the reason that

A. the axis of rotation of the earth is tilted to the orbital plane.
B. the axis of rotation of the earth is perpendicular to the plane of its orbit.
C. the temperature of the earth keeps on changing.
D. the sun sends unequal amount of light on the earth.

18. When two ends of a wire are placed inside a potato, a greenish blue spot appears due to the

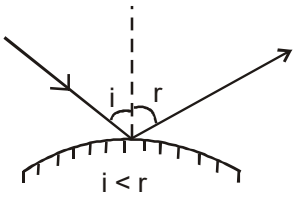
A. heating effects of electric current.

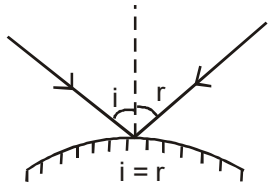
B. magnetic effects of electric current.

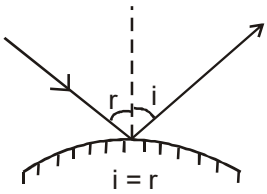
C. vibrating effects of electric current.

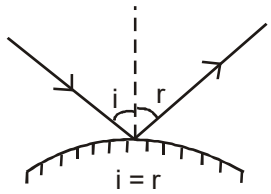
D. chemical effects of electric current.

19. Which of the following figure is correct :

A. 

B. 

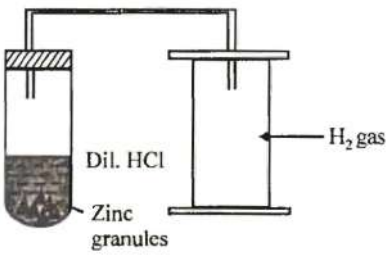
C. 

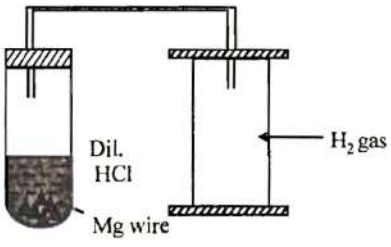
D. 

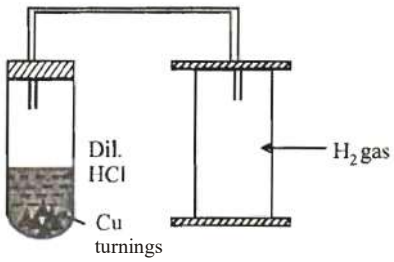
20. 'P' is processed in industries to get some useful products such as Q, R and S. S (gaseous mixture) is obtained during the processing of P to get Q, R is a mixture of about 200 substances. Identify P, Q, R and S.

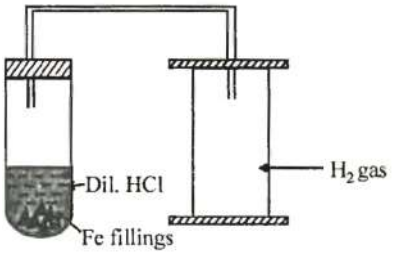
	P	**Q**	**R**	**S**
A.	Coal	Coal tar	Coke	Coal gas
B.	Coke	Coal	Coal tar	Coal gas
C.	Coal	Coke	Coal tar	Coal gas
D.	Coke	Coal	Coal gas	Coal tar

21. Four experimental set-up are shown below. A rapid evolution of H_2 gas will not be observed in which setup.

A. 

B. 

C. 

D. 

22. **Assertion (A) :** Nylon ropes are used for rock climbing.

Reason (R) : Nylon fibre is strong, elastic and light.

A. Both assertion and reason are true and reason is correct explanation of assertion.

B. Both assertion and reason are true, but reason is not the correct explanation of assertion.

C. Assertion is true, but reason is false

D. Assertion is false, but reason is true

23. Select the correct order in which a farmer produces wheat crops ?

A. Ploughing, Manuring, Sowing, Harvesting

B. Manuring, Ploughing, Sowing, Harvesting

C. Manuring, Sowing, Ploughing, Harvesting

D. Harvesting, Manuring, Sowing, Ploughing

24. Migratory birds fly to far away areas during a particular time of a year. Which of the following conditions present in their habitat during that time are responsible for this behaviour ?

(i) Unavailability of food (ii) Extreme weather conditions

(iii) Overcrowding (iv) Lack of nesting areas

A. ii and iii B. i and ii

C. i and iv D. ii and iv

25. Read the statement given below and choose the correct alternative.

Assertion (A) : Boys have a high pitched voice.

Reason (R) : In boys, Adam's apple is prominent.

A. Both A and R are true, and R is the correct explanation for A.

B. Both A and R are true, but R is not the correct explanation for A.

C. A is true, but R is false.

D. A is false, but R is true.

SECTION 3 (Maximum Marks: 15)

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26. Identify true and false statement :

(T - True ; F - False) :

(i) A real image can be seen as well as obtained on a screen

(ii) A virtual image is erect with respect to the object

(iii) If rays of light after reflection or refraction actually converge at a point then the image formed is called virtual image.

A. TTF
B. TTT
C. FTF
D. TFT

27. 2.5 waves are produced in half a second. Find the time period of the wave.

A. 0.4
B. 0.2
C. 0.6
D. 0.1

28. A brief information about three different plastics is given below:

X : Thermoplastic which can be rolled into sheets

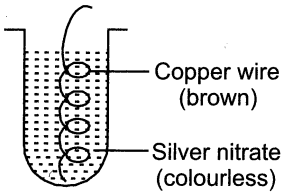
Y : Thermoplastic which is used as a covering for electric wires.

Z : Thermosetting which is used for making plugs and switches.

Identify X, Y and Z,

	X	**Y**	**Z**
A.	Melamine	Teflon	Bakelite
B.	Bakelite	Malamine	Polythene
C.	Polythene	Polyvinyl chloride	Bakelite
D.	Polyvinyl chloride	Polythene	Melamine

29. Nisha placed a copper wire in silver nitrate solution as shown in the figure.



Which of the following represents the correct observation?

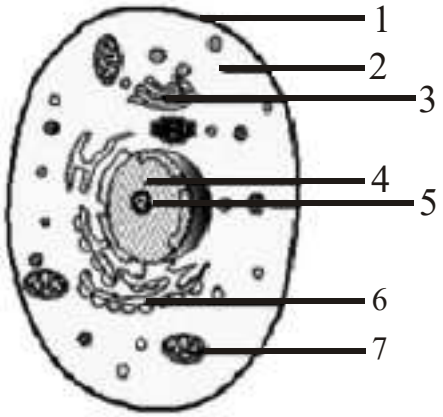
A. The colour of the solution turned blue and precipitate of solid silver was obtained

B. Colour of solution turned green and copper wire turned blue.

C. There was no change of the wire.

D. Colour of the solution became silver and there was no change in the colour of copper wire.

30. Which of the given options represents the correct labelling of the diagram shown below ?



A. (1) Cell wall, (2) Cytoplasm, (3) Endoplasmic reticulum, (4) Mitochondria, (5) Nucleolus, (6) Golgi apparatus, (7) Nucleus

B. (1) Cell wall, (2) Cytoplasm, (3) Golgi apparatus, (4) Nucleus, (5) Nucleolus, (6) Endoplasmic reticulum, (7) Mitochondria

C. (1) Plasma membrane, (2) Cytoplasm, (3) Golgi apparatus, (4) Nucleus, (5) Nucleolus, (6) Endoplasmic reticulum, (7) Mitochondria

D. (1) Plasma membrane, (2) Cytoplasm, (3) Golgi apparatus, (4) Nucleolus, (5) Nucleus, (6) Mitochondria, (7) Endoplasmic reticulum

Space for rough work

Space for rough work