Rajshahi Board 2016

Time — 35 minutes Marks — 35 **Higher Mathematics: MCQs** Subject Code | 1 | 2 | 6 |

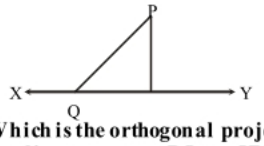
*[N.B. —Answer **all** the questions. Each question corries **one** mark. Block fully, with a ball-point pen, the circle of the letter that stands for the correct/best answer in the "Answer Sheet" for Multiple Choice Questions Examination. **Candidates are asked not to leave any mark or spot on the question paper.**]*

1. A rectangular parallolepiped has its length 4 cm, brcadth 3 cm and height 2 cm, then find the diagonal.
a $\sqrt{29}$cm b $\sqrt{21}$cm
c $\sqrt{20}$cm d 29cm

2. If $P \subset Q$ then—
i. $P \cup Q = Q$
ii. $Q \backslash P = \phi$
iii. $P \cap Q = P$
Which one of the following is correct?
a i and ii b ii and iii
c i and iii d i, ii and iii

3. If m, n, p > 0 and m ≠ 1, n ≠ 1 then—
i. $\log_m P = \log_n P \times \log_m n$
ii. $\log_m P^r = r \log_m P$
iii. $\log_m \left(\frac{P}{Q}\right) = \log_m P + \log_m Q$
Which one of the following is correct?
a i and ii b ii and iii
c i and iii d i, ii and iii

4. The following subject are—
i. $x(y - z) + y(z - x) + z(x - y) = 0$
ii. $(x - 1)$ is the factor of $x^4 + x^3 + x - 3$
iii. $x^3 + y^3 + z^3 - 3xyz = 0$, then $x = y = z$
Which one of the following is correct?
a i and ii b i and iii
c ii and iii d i, ii and iii

5.


Which is the orthogonal projection of the line segment PQ on XY?
a PQ b QR
c PR d XY

6. Which one is the domain of the relation {(0, 0), (1, 1), (–1, 1), (2, 4)}?
a {0, 1, –1, 2} b {0, 1, 4}
c {0, 1, –1, 4} d {0, 1, 2, 4}

7. Find the area of the triangle with the vertices A(2, 3), B(5, 6) and C(–1, 4) is—
a 6 sq. unit b 5 sq. unit
c 12 sq. unit d 7 sq. unit

8. Find the infinity sum of the given series:
$\frac{1}{2} + \left(-\frac{1}{4}\right) + \frac{1}{8} + \left(-\frac{1}{16}\right) + \ldots\ldots\ldots\ldots$
a 1 b $\frac{1}{2}$ c $\frac{1}{3}$ d $\frac{1}{4}$

9. A spherical ball of diameter 4 cm, then which one is its volume?
a 4π cm^3 b $\frac{4}{3}\pi$ cm^3
c $\frac{2}{3}\pi$ cm^3 d $\frac{32}{3}\pi$ cm^3

10. What is the slope of the equation 3x = 2y + 4?
a $\frac{3}{2}$ b $\frac{1}{5}$ c $\frac{2}{5}$ d $\frac{2}{3}$

11. $\log_{\sqrt{a}} \log_{\sqrt{b}} c \times \log_{\sqrt{c}} a = ?$
a 8 b 4 c 2 d $\frac{1}{8}$

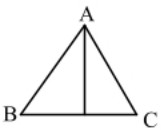
12. If $Q(y) = 2y^3 + 3y^2 - 7y + 8$, what is the value of $Q(-1)$?
a 8 b 13
c 16 d 20

Answer to the questions 13 and 14 to the information given bellow:
A ball is drawn at random from a bag containing 16 blue, 12 red and 20 white balls.

13. What is the probability that the ball is blue?
a $\frac{1}{16}$ b $\frac{1}{12}$ c $\frac{1}{4}$ d $\frac{1}{3}$

14. What is the probability that the ball is white?
a $\frac{1}{48}$ b $\frac{1}{4}$ c $\frac{1}{12}$ d $\frac{5}{12}$

15. The position vector of A, B, C are $\hat{a}, \hat{b}, \hat{c}$ and the point C divides the vector $\overrightarrow{AB}$ internally in the ratio 1 : 2, then which one is correct?
a $\hat{c} + \frac{a+b}{3}$ b $\hat{c} = \frac{2\hat{a} + \hat{b}}{3}$
c $\hat{c} = \frac{\hat{a} + 2\hat{b}}{3}$ d $\hat{c} = \frac{2\hat{a} + 2\hat{b}}{3}$

Answer to the questions 16 and 17 Considering information below:


In the figure ΔABC, AB = AC = 6 cm, ∠ADC = 90° and BC = 4cm.

16. Length of AD = ?
a $4\sqrt{2}$ cm b $3\sqrt{2}$ cm
c $2\sqrt{2}$ cm d $\sqrt{2}$ cm

17. Area of ΔABC = ?
a $4\sqrt{2}$ cm^2 b $6\sqrt{2}$ cm^2
c $8\sqrt{2}$ cm^2 d $10\sqrt{2}$ cm^2

18. If θ = 60° then—
i. $\sin 2\theta = 2 \sin\theta.\cos\theta$
ii. $\sin 3\theta = 3 \sin\theta - 4 \sin^2\theta$
iii. $\sec^2\theta - \tan^2\theta = 1$
Which one of the following is correct?
a i and ii b i and iii
c ii and iii d i, ii and iii

19. If A = {5, 6, 7}, B = {2, 3} then $A \cap B$ = ?
a {ϕ} b ϕ
c {2, 3, 5, 6} d {0}

20. If B = {x ∈ N : 6 < 2x < 17} then, which of the following is an element of P(B)?
a 2^3 b 2^4
c 2^5 d $2^4 + 1$

21. Which of the following is the value of $^nC_0$?
a 0 b 1 c n d $\lfloor n$

22. If $\sqrt[3]{y^5} = 2.\sqrt[3]{y^2}$, what is the value of y?
a 1 b 2 c $\frac{7}{3}$ d $\frac{10}{3}$

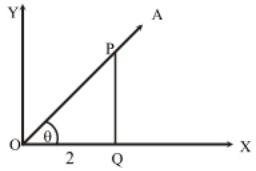
23. Which one is the solution of $2^{x+7} = 4^{x+2}$?
a 5 b 4
c 3 d 2

24. Which one is the discriminant of equation $x^2 - 2x - 2 = 0$?
a 4 b 8
c 12 d $1 + \sqrt{3}$

25. Which one is the solution set of the inequality $y \le \frac{y}{4} + 3$?
a $S = \{y \in R : y > 4\}$ b $S = \{y \in R : y < 4\}$
c $S = \{y \in R : y \le 4\}$ d $S = \{y \in R : y \ge 4\}$

26. What is the 15th term of the sequence 3, 5, 7, 9?
a 23 b 31 c 33 d 35

27. The angle 520° lies on which quadrant?
a First b Second
c Third d Fourth

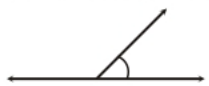
28.


In the above figure which is the value of cosθ?
a $\frac{1}{2}$ b $\frac{1}{\sqrt{5}}$ c $\frac{2}{\sqrt{5}}$ d $\frac{\sqrt{5}}{2}$

29. Which of the following is the value of $\sin\left(2\pi - \frac{\pi}{3}\right)$?
a $\frac{\sqrt{3}}{2}$ b $\frac{1}{2}$ c $-\frac{\sqrt{3}}{2}$ d $-\frac{1}{2}$

30. In the expansion of $(1 + 3x)^5$, which is the co-efficient of x^2?
a 10 b 80 c 90 d 270

31. What is the distance between the points P(2, 3) and Q(4, 6)?
a $\sqrt{13}$ b $\sqrt{117}$ c $\sqrt{15}$ d $\sqrt{81}$

32.

If y = 50°, what is the measurement of the half of the supplementary angle of ∠y?
a 130° b 120° c 25° d 65°

Answer to the question nos. 33 and 34 from the following information:
The difference of the squares of two positive whole numbers is 19 and the product of the number is 90.

33. What is the sum of the squares of the numbers?
a 90 b 181 c 361 d $\sqrt{181}$

34. What are the numbers?
a 10 and 9 b 30 and 3
c 18 and 5 d 18 and –5

35. The product of the two slopes of the two lines $x - 3y - 15 = 0$ and $3x + y - 3 = 0$ is—
a –2 b –3 c 3 d –1

Ans.																																														
	1	a	2	c	3	a	4	d	5	b	6	a	7	a	8	c	9	d	10	a	11	a	12	c	13	d	14	d	15	b	16	a	17	c	18	d	19	b	20	c							
	21	b	22	b	23	c	24	c	25	c	26	b	27	b	28	c	29	c	30	c	31	a	32	d	33	b	34	a	35	d																	