Dhaka Board 2016

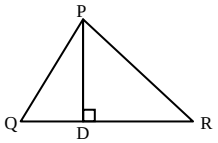
Time — 35 minutes Marks — 35 **Higher Mathematics: MCQs** Subject Code | 1 | 2 | 6 |

*[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. Which one of the following is symmetric?
a $a^2 + b + c$ b $2a^2 - 5bc - c^2$
c $x^2 - y^2 + z^2$ d $xy + yz + zx$

2. What is the co-efficient of x^2 in expanding of $(1 + 3x)^5$?
a 80 b 90 c 170 d 270

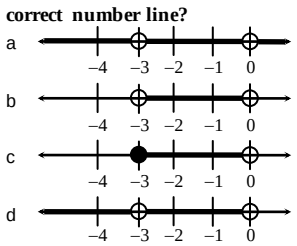
Answer the questions from 3 and 4 no. in the following figure:



3. sinB + cosC = ?
a $\frac{2b}{a}$ b $\frac{2a}{b}$ c $\frac{a^2+b^2}{ab}$ d $\frac{ab}{a^2+b^2}$

4. Which is the value of tanB?
a $\frac{a}{a^2-b^2}$ b $\frac{b}{a^2-b^2}$
c $\frac{a}{\sqrt{a^2-b^2}}$ d $\frac{b}{\sqrt{a^2-b^2}}$

5. Given that, $-3 \le x < 0$, which one of the correct number line?

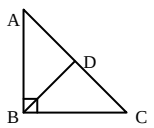


Answer the questions from 6 and 7 No based on following information:
A box cortains 12 red balls, 16 white balls and 24 black balls. A ball is taken rendomly.

6. What is the probability that the ball is white?
a $\frac{1}{52}$ b $\frac{4}{13}$ c $\frac{1}{13}$ d $\frac{13}{52}$

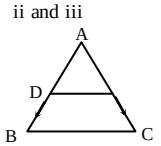
7. What is the probability that the ball is red or white?
a $\frac{12}{13}$ b $\frac{10}{13}$ c $\frac{9}{13}$ d $\frac{7}{13}$

8. In the following figure D is middle point of AC, then—



i. $AB^2 + BC^2 = 2(AD^2 + BD^2)$
ii. $AB^2 = AC^2 - BC^2$
iii. Perpendicular projection of AB is AD
Which one of the following is correct?
a i and ii b i and iii
c ii and iii d i, ii and iii

9.



If D and E are the middle point of AB and AC, then, which is correct?
a $\vec{BC} = 2(\vec{AE} - \vec{AD})$ b $\vec{BC} = 2(\vec{AD} - \vec{AE})$
c $\vec{BC} = 2(\vec{AE} + \vec{AD})$ d $\vec{BC} = 2(\vec{AB} + \vec{AC})$

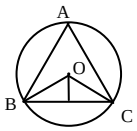
10. If AB internally divided in point C in the ratio of m : n, then [$\underline{a}$, $\underline{b}$ and $\underline{c}$ are respectively the position vectors of the points A, B and C.].
a $\underline{c} = \frac{\underline{na} + \underline{mb}}{m + n}$ b $\underline{c} = \frac{\underline{na} - \underline{mb}}{m + n}$
c $\underline{c} = \frac{\underline{na} + \underline{mb}}{m - n}$ d $\underline{c} = \frac{\underline{ma} + \underline{nb}}{m + n}$

11. If $A \subset B$ which is the correct of the following?
a $A \cap B = B$ b $A \cup B = B$
c $A \cup B = A$ d $A \cup B = A \cap B$

12. The length of sides of a triangle are 3, 4, and 5 cm. What is the square sum of the medians?
a 6.12 sq. cm. b 12.5 sq.cm.
c 37.5 sq. cm. d 150 sq.cm.

13. If $\angle B = 90°$ of ΔABC, which is the correct?
a $AB^2 = BC^2 + AC^2$ b $AC^2 = BC^2 + AB^2$
c $AB^2 + BC^2 + AC^2 = 0$ d $BC^2 = AB^2 + AC^2$

14.



In figure BC = 4cm and length of the perpendicular OP is 1cm.
i. Radius of the circle is $\sqrt{5}$ cm.
ii. Area of ΔOCP is 1 square cm.
iii. Consider OP as a radius, circumference of the circle is 2π cm.
Which one of the following is correct?
a i and ii b i and iii
c ii and iii d i, ii and iii

15. If A = {a, b, c, d, e} find the elements of P(A) = ?
a 5 b 10 c 25 d 32

16. Find the value of cosec $\left(-\frac{\pi}{3}\right)$.
a $-\frac{2}{\sqrt{3}}$ b $-\frac{1}{2}$ c $\frac{1}{2}$ d $\frac{2}{\sqrt{3}}$

17. If $p^x = y$, which one of the following is correct?
a $p = \log_x y$ b $x = \log_p y$
c $x = \log_y p$ d $y = \log_p x$

18. Find the value of $\cos^2\frac{\pi}{3} - \sin^2\frac{\pi}{4}$.
a $-\frac{1}{4}$ b $-\frac{1}{2}$ c $\frac{1}{2}$ d 1

19. What is the value of sin 120°?
a $\frac{\sqrt{3}}{2}$ b $\frac{1}{2}$ c $\frac{1}{\sqrt{2}}$ d $-\frac{1}{2}$

20. 1 Radian = ?
a 60° b 59°17′44.81″
c 58°17′44.81″ d 57°17′44.81″

21. Radius of a circle is 5 cm. What is measure of central angle based on 13 cm are?
a 0.38° b 0.38^c c 2.60^c d 2.60°

22. What is the Remainder when $p(x) = 36x^2 - 8x + 5$ is divided by $(x - 1)$?
a 49 b 41 c 33 d 23

Answer question 23 and 24 No. based of the following information $x^y = y^x$, then—

23. What is the value of $\left(\frac{x}{y}\right)^{\frac{x}{y}}$?
a $x^{\frac{x}{y}-1}$ b $x^{\frac{y}{x}-1}$ c $x^{1-\frac{x}{y}}$ d $x^{1-\frac{y}{x}}$

24. If x = 2y, then y = ?
a 2 b 3 c 4 d 5

25. The roots of the equation $2x^2 - 7x - 1 = 0$ is—
i. real ii. unequal
iii. irrational
Which one of the following is correct?
a i and ii b i and iii
c ii and iii d i, ii and iii

26. If $F(x) = \sqrt{x - 1}$, which one is the domain of F(x)?
a $\{x \in \nabla : x \le 1\}$ b $\{x \in \nabla : x \ge -1\}$
c $\{x \in \nabla : x \le -1\}$ d $\{x \in \nabla : x \ge 1\}$

27. The squaring difference of two positive integer is 13 and product is 42. What are the two numbers?
a 1, 42 b 2, 21 c 3, 14 d 7, 6

28. Which is the simplify value of $\sqrt[15]{x^{10}\sqrt{x^8}\sqrt{x^4}}$?
a x^{15} b x c $x^{\frac{1}{15}}$ d 1

29. The value of $x^3 + y^3 + z^3 - 3xyz$.
i. $(x + y + z)(x^2 + y^2 + z^2 - xy - yz - zx)$
ii. $(x + y + z)(x^2 + y^2 + z^2 + xy + yz + zx)$
iii. $\frac{1}{2}(x + y + z)\{(x - y)^2 + (y - z)^2 + (z - x)^2\}$
Which one of the following is correct?
a i and ii b i and iii
c ii and iii d i, ii and iii

30. If $3^{mx-1} = 3a^{mx-2}$, [a > 0, a ≠ 3, m ≠] then, what is the value of x?
a $\frac{m}{2}$ b $\frac{2}{m}$ c 2m d 2^m

Answer 31 and 32 No. in the following cases A(0, –3) B(4, –2) and C(16, a) are three points:

31. What is the slope of AB?
a $\frac{5}{4}$ b $-\frac{5}{4}$ c $\frac{1}{4}$ d $-\frac{1}{4}$

32. If the given points are coliner, what is the value of a?
a 0 b 1 c 2 d 3

33. i. $\binom{5}{0} = 1$ ii. $\binom{5}{1} = 5$
iii. $\binom{5}{2} = 10$
Which one of the following is correct?
a i and ii b i and iii
c ii and iii d i, ii and iii

34. Given that 1 + 0.1 + 0.01 + ... ∝, which is the summation of infinite series?
a $\frac{10}{9}$ b $\frac{9}{10}$ c $\frac{-10}{9}$ d $\frac{-9}{10}$

35. Given that, 2 + 4 + 6 + 8 + ...
i. n-th term is 2n
ii. The sum of n terms is n(n + 1)
iii. There is no summation
Which one of the following is correct?
a i and ii b i and iii
c ii and iii d i, ii and iii

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

Rajshahi Board 2016

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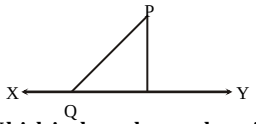
1. A rectangular parallolepiped has its length 4 cm, brcadth 3 cm and height 2 cm, then find the diagonal.
a $\sqrt{29}$cm b $\sqrt{21}$cm
c $\sqrt{20}$cm d 29cm

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 $\frac{1}{8}$

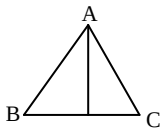
12. If $Q(y) = 2y^3 + 3y^2 - 7y + 8$, what is the value of Q(–1)?
a 8 b 13
c 16 d 20

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 $\hat{c} + \frac{\hat{a} + \hat{b}}{3}$ 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 $\frac{10}{3}$

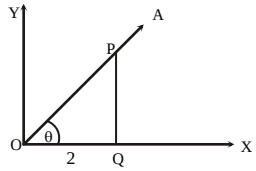
23. Which one is the solution of $2^{x+7} = 4^{x+2}$?
a 5 b 4
c 3 d 2

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

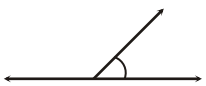
28.


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																	

Dinajpur Board 2016

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1. In which case it is possible to draw a right angled triangle when length (cm) of three sides of triangle are given?
a 12, 15, 19 b 6, 7, 8
c 3, 4, 5 d 5, 6, 7

2. Which one is the domain of the function $F(x) = \sqrt{5 - x}$?
a $\{x : x \in \nabla \text{ and } x \le 5\}$
b $\{x : x \in \nabla \text{ and } x < 5\}$
c $\{x : x \in \nabla \text{ and } x \ge 5\}$
d $\{x : x \in \nabla \text{ and } x > 5\}$

3. What is the value of the half of the supplementary angle of 80°?
a 100° b 90° c 50° d 25°

4. What is the discriminant of the quation $4x^2 - 3x - 2 = 0$?
a 41 b 23 c –23 d –41

Answer the questions No. 5 and 6 based on the following information:
$p(x) = 2x^4 - 6x^3 + 5x - 2$.

5. p(2) = ?
a –92 b –8 c 8 d 92

6. What is the remainder when p(x) is divided by 2x + 1?
a –29 b $\frac{-29}{8}$ c $\frac{29}{8}$ d 29

7. In the expansion of $\left(x^2 + \frac{1}{x^2}\right)^4$, what is the value of the term independent of x?
a 4 b 6 c 8 d 10

8. What is the distance between the points (2, 2) and (0, –1)?
a 13 b 5 c $\sqrt{13}$ d $\sqrt{5}$

Answer the question no. 9 and 10 based on the following information:
By throwing 6 times of a coin we find head 36 times.

9. What is the relative frequency number of head?
a 0.753 b 0.735 c 0.573 d 0.375

10. What is the relative frequency number of tail?
a 0.375 b 0.50 c 0.75 d 0.625

11. What is the probability getting a prime number and less than 5 on the throw of an unbiased dice?
a $\frac{1}{4}$ b $\frac{1}{3}$ c $\frac{1}{2}$ d $\frac{3}{4}$

12. The radius of a semi circle is 4 cm. If the semi circle is revolved about its diameter, the obtained solid will be—
i. a cone ii. a sphere
iii. The area of the surface of the solid is 64π cm^2
Which one of the following is correct?
a i and ii b i and iii
c ii and iii d i, ii and iii

Answer the question No. 13 and 14 based on the following information:
A spherical ball of circumference 44 cm exactly fits into a cubical box.

13. What is the radius of the spherical ball in cm (approximately)?
a 7 b 8 c 9 d 14

14. What is the volume of the cube in cubic cm (Approximately)?
a 2744 b 3375 c 2197 d 2932

15. If $\underline{u}$ is an any non zero vector and $m \in \nabla$, $m > 0$, then—
i. Direction of $m\underline{u}$ and that of $\underline{u}$ are opposite
ii. Direction of $m\underline{u}$ and that of $\underline{u}$ are same
iii. $m\underline{u} \ne 0$
Which one of the following is correct?
a i and ii b i and iii
c ii and iii d i, ii and iii

16. If the position vector of P is $\underline{a}$ and position vector of Q is $\underline{b}$, then $\overrightarrow{PQ}$ = ?
a $\underline{b} - \underline{a}$ b $\underline{b} + \underline{a}$
c $\underline{a} + \underline{b}$ d $\underline{a} - \underline{b}$

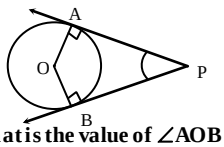
Answer question No. 17 and 18 based on the following information:
The point p(x, 3) lies on the straight line y = 4x + 2.

17. Which one of the following is the coordinate of p?
a $\left(\frac{5}{4}, 3\right)$ b $\left(\frac{1}{4}, 3\right)$
c $\left(\frac{1}{2}, 3\right)$ d (4, 3)

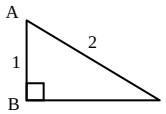
18. What is the coordinate of the point on which the straight line intersect x-axist?
a (2, 0) b (0, 2)
c $\left(0, -\frac{1}{2}\right)$ d $\left(-\frac{1}{2}, 0\right)$

19. If n = 5, then the coefficients of the expansion of $(1 + y)^n$ are—
a 1 3 3 1 b 1 4 6 4 1
c 1 5 10 10 5 1 d 1 3 5 3 1

20. What is the sum of the opposite angle of a quadrilateral inscribed in a circle in radian?
a $\frac{\pi}{2}$ b π c $\frac{3\pi}{2}$ d 2π

21.


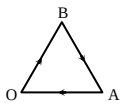
What is the value of ∠AOB in the above figure?
a $\frac{\pi}{4}$ b $\frac{\pi}{2}$ c $\frac{2\pi}{3}$ d $\frac{3\pi}{2}$

Answer question No. 22 and 23 based on the following information:


22. sec C = ?
a 2 b $\frac{2}{\sqrt{3}}$ c $\frac{\sqrt{3}}{2}$ d $\frac{1}{2}$

23. What is the value of $\frac{2 \tan A}{1 - \tan^2 A}$
a $-\sqrt{2}$ b $-\sqrt{3}$
c $\sqrt{2}$ d $\sqrt{3}$

24. If θ = 360°, then—
i. $\cos\left(\theta - \frac{\pi}{6}\right) = \frac{\sqrt{3}}{2}$ ii. $\cot\left(\theta + \frac{\pi}{6}\right) = \sqrt{3}$
iii. $\tan\left(\theta - \frac{\pi}{4}\right) = 1$
Which one of the following is correct?
a i and ii b i and iii
c ii and iii d i, ii and iii

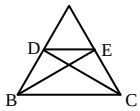
25.


In the above figure $\overrightarrow{OB} + \overrightarrow{BA} + \overrightarrow{AO}$ =?
a $-\overrightarrow{OA}$ b $\overrightarrow{OA}$
c $\overrightarrow{AO} + \overrightarrow{AO}$ d $\overrightarrow{AO} + \overrightarrow{OA}$

26. i. $\log_a p = \log_b p \times \log_a b$
ii. $\log_a\sqrt{a} \times \log_b\sqrt{b} \times \log_c\sqrt{c} = \frac{1}{8}$
iii. $\log_a b = \frac{1}{\log_b a}$
Which one of the following is correct?
a i and ii b i and iii
c ii and iii d i, ii and iii

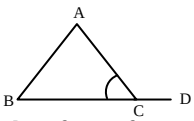
27. How many dimension of a sphere?
a 2 b 3 c 4 d 1

28. If in the triangle ABC, median AD = 5 and side BC = 6, then $AB^2 + AC^2$ = ?
a 34 b 68 c 78 d 112

29.


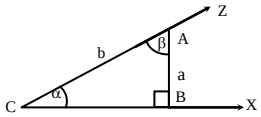
In the figure, if BC||DE, then—
i. $\frac{AB}{AD} = \frac{AC}{AE}$ ii. ∠AED = ∠ACB
iii. The hight of ΔBDC and ΔBEC are same
Which one of the following is correct?
a i and ii b i and iii
c ii and iii d i, ii and iii

30. If $ax^2 + bx + c = 0$ is a quadratic equation then,
i. $a \ne 0$
ii. Discriminant = $b^2 - 4ac$
iii. The equation has only one root
Which one of the following is correct?
a i and ii b i and iii
c ii and iii d i, ii and iii

31.


In the above figure if AB = AC; then—
a sin ∠ACD = cos 55°
b sin ∠ABC = sin 55°
c cos ∠BAC = sin 40°
d sin ∠ACD = cosec 55°

32. Which one of the following is domain of $f(x) = |x|$?
a $\{x \in \nabla : x < 0\}$ b $\nabla +$
c $\{x \in \nabla : x \ge 0\}$ d ∇

33.


If U = A ∪ B and n(u) = 120, then what is the value of 2x in the above venn-diagram?
a 15 b 17 c 20 d 30

34. $\log_4 2 + \log_6\sqrt{6}$ = ?
a $\frac{1}{2}$ b $\frac{1}{3}$ c $\frac{3}{2}$ d 1

35. If $(\sqrt{3})^{x+5} = (\sqrt[3]{3})^{2x+5}$, then what is the value of x?
a 7 b 6
c 5 d 4

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

Comilla Board 2016

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

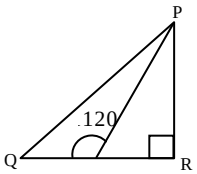
*[N. B.—Answer all the questions. Each question carries **one** mark. Block fully, with a ball-point pen, the circle of the letter that stands for the correct/best answer in the "Answer sheet" for Multiple Choice Questions Examination.]* **Candidates are asked not to leave any mark or spot on the question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

1. If U = {1, 3, 5, 6}, A = {3, 6}, what will be the number of elements of P(A′)?
a 1 b 2 c 4 d 8

2. If $x^2 + 2x + 2 = 0$ is a quadratic equation, its—
i. discriminant –4
ii. roots are real and unequal
iii. roots are imaginary
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. What is the degree of polynomials in two variables of $5x^3 + 3y^3 - 7xy + 4$?
a 2 b 3
c 4 d 5

In view of the given figure answer to the questions No. 4 – 6:



QS = 8cm, PS = 5cm, PR = 3cm.

4. Which one is the orthogonal projection of PS?
a PR b PQ c QS d SR

5. PQ^2 = ?
a $PS^2 + QS^2 - 2QS.SR$
b $PS^2 - QS^2 + 2QS.SR$
c $PS^2 + QS^2$
d $PS^2 + QS^2 + 2QS.SR$

6. What is the value of PQ in centimetre?
a $\sqrt{55}$ b $\sqrt{73}$
c $\sqrt{135}$ d $\sqrt{153}$

7. If the discriminant of the quadratic equation $px^2 + qx + r = 0$ is zero, what are the roots of the quation??
a $\frac{q}{p}, \frac{-q}{p}$ b $\frac{2q}{p}, \frac{2q}{p}$
c $-\frac{q}{2p}, \frac{-q}{2p}$ d $\frac{q}{2p}, \frac{-q}{2p}$

8. If $P = \frac{\pi}{4}$, $Q = \frac{3\pi}{4}$, what is the value of cos (P + Q)?
a –1 b 0 c 0.5 d 1

9. In zero vector—
i. absolute value is zero
ii. no support line
iii. determine direction
Which one of the following is correct?
a i and ii b ii and iii
c i and iii d i, ii and iii

10. If the position vectors $\underline{a}$ of point P and the position vector b of point $\underline{Q}$, then $\overrightarrow{PQ}$ = ?
a $\underline{a} - \underline{b}$ b $\underline{b} - \underline{a}$ c $\underline{b} + \underline{a}$ d $\underline{ab}$

11. Tossing throw two coin together, what is the probability of not getting two heads?
a 1 b $\frac{3}{4}$ c $\frac{1}{2}$ d $\frac{1}{4}$

12. What is the sum up to infinity of the series 0.2 + 0.02 + 0.002 + ... ?
a $\frac{9}{2}$ b $\frac{2}{9}$ c $\frac{2}{11}$ d $\frac{1}{9}$

13. In an isosceles triangle equal angles are 70°. What is the another angle in radian?
a $\frac{\pi}{9}$ b $\frac{9}{2\pi}$ c $\frac{9\pi}{2}$ d $\frac{2\pi}{9}$

Answer to the questions No. 14–16 according to the information given below:
$x - 3y - 12 = 0$ is a equation of a straight line.

14. What is the gradient of the line?
a 3 b $\frac{1}{3}$ c –3 d –4

15. If the line intersects A and B in the axis of x and y respectively, then AB = ?
a 16 unit b $4\sqrt{10}$ unit
c $8\sqrt{2}$ unit d 8 unit

16. Find the area of the triangle produced by the line with the two axes in square unit?
a 36 b 24 c 18 d 12

17. How many terms in the expansion of $(a + x)^4$?
a 2 b 3 c 4 d 5

18. 1 + 0.1 + 0.01 + 0.001 + ...
i. is a geometric series
ii. common ratio of the series is 0.1
iii. infinite sum of the series is
Which one is correct?
a i and ii b ii and iii
c i and iii d i, ii and iii

19. $\log_8 2 + \log_5 \sqrt{5}$ = ?
a $\frac{5}{6}$ b $\frac{6}{5}$ c $\frac{7}{2}$ d $\text{Log}_{40}2\sqrt{5}$

20. What will be formed by joining circumcenter, the centroid and the orthocenter of a triangle?
a Straight line b Triangle
c Rectangle d Cone

21. If B is a subset of universal set U, then —.
i. $B \backslash B = \varnothing$ ii. LAB = B'
iii. $B \backslash (B \backslash B) = \varnothing$
Which one is correct?
a i and ii b ii and iii
c i and iii d i, ii and iii

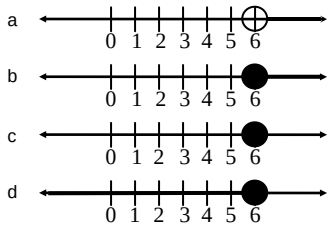
22. Which one is homogeneous expression?
a $a^3 + ab^2 + b^4$ b $a^3 + 3ab + b^2$
c $a^3 + ab^2 + b^5$ d $a^3 + a^2b + b^3$

23. If $f(x) = \sqrt{1 - 2x}$, which one of the following is the domain of the function?
a Dom F= $\{x \in R : x \le \frac{1}{2}\}$
b Dom F = $\{X \in E : x < \frac{1}{2}\}$
c Dom F = $\{x \in R : x = \frac{1}{2}\}$
d Dom F= $\{x \in R : x \ge \frac{1}{2}\}$

Answer to the questions No. 24 and 25 on the basis of the information given below :
$\frac{z}{2} - 2 \le 1$.

24. Which one is the solution set of the inequality?
a $S = \{z \in \nabla : z \le 6\}$
b $S = \{z \in \nabla : z < 6\}$
c $S = \{z \in \nabla : z \le -6\}$
d $S = \{z \in \nabla : z < -6\}$

25. Which one of the number line of the inequality?



26. Extension of any side of a equilateral triangle, which angle will produce?
a 30° b 60°
c 90° d 120°

27. Find the sum of the (2n + 2) terms of the series 2 – 2 + 2 – 2 + ...
a 2 b 1 c 0 d 2n + 2

Answer to the questions No. 28–30 according to the information given below :
A spherical ball which radius is 4 cm exactly fit into a cylinder.

28. If radius is π which one of the area of the surface of the sphere?
a $4\pi r$ sq. unit b $4\pi^3\pi$ sq. unit
c $4\pi r^2$ sq. unit d πr^2 sq. unit

29. What is the volume of the cylinder?
a 16π cc b 32π cc
c 64π cc d 128π cc

30. What is the unoccupied portion of the cylinder?
a $\frac{128\pi}{3}$ cc b $\frac{128\pi^3}{3}$ cc
c 128π cc d $128\pi^3$ cc

31. Which one is the co-efficient of x^3 in expansion $\left(1 - \frac{x}{4}\right)^8$?
a $-\frac{1}{64}$ b $-\frac{1}{4}$ c $-\frac{7}{8}$ d $-\frac{8}{7}$

32. An unbiased coin and an unbiased dice tossed, how many sample point we get?
a 8 b 12 c 16 d 32

33. Serially 1 to 10 numbered tickets mixed thoroughly and one ticket is drawn at random. What is the probability of multiple of 2 or 3?
a $\frac{3}{20}$ b $\frac{7}{10}$ c $\frac{4}{5}$ d $\frac{9}{10}$

34. $l^2 + m^2 + n^2$ expression is—
i. symmetric ii. homogeneous
iii. cyclic
Which one of the following is correct?
a i and ii b ii and iii
c i and iii d i, ii and iii

35. If $\cos\theta + \sin\theta = \sqrt{2}$, what is the value of θ?
a 30° b 45° c 60° d 90°

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

Chittagong Board 2016

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

*[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. What is the variations and nature of the roots of a equation $x^2 + 4x - 3 = 0$?
a Real, unequal, irrational
b Real, equal
c Real, unequal, rational
d Not real

2. If the length of diagonal of a square is $8\sqrt{2}$ cm; what is the area of the square?
a 8 cm b $8\sqrt{2}$ cm
c 64 cm d 128 cm

3. What is the co-ordinates of the intersecting pont of the graph of the equation $x^2 - 5x + 4 = 0$ and x-axis?
a (0, 1), (4, 0) b (–1, 0), (–4, 0)
c (1, 0), (4, 0) d (–1, 0), (0, –4)

4. What is the solution of the equation $3^{ax-1} = 3b^{ax-2}$?
a $\frac{a}{2}$ b $\frac{-2}{a}$ c $\frac{1}{a}$ d $\frac{2}{a}$

5. What is the solution set of the inequality $x \le \frac{x}{3} + 4$?
a $s = \{x \in R : x > 6\}$
b $s = \{x \in R : x < 6\}$
c $s = \{x \in R : x \ge 6\}$
d $s = \{x \in R : x \le 6\}$

6. What is the value of U_{15} of a sequence $U_n = \frac{1-(-1)^n}{2}$?
a –1 b 0 c 1 d 2

7. The infinite geometric series—
i. If $|r| < 1$ then $S_\infty = \frac{a}{1-r}$
ii. If $|r| > 1$ then no sum of the infinite series
iii. If r = 1 then no limiting value of S_n
Which one of the following is correct?
a i and ii b i and iii
c ii and iii d i, ii and iii

8. The angles of a triangle are in arithmetical progression and the smallest angle is half of the largest angle. What is the value of largest angle in circular system?
a $\frac{\pi}{9}$ b $\frac{\pi}{3}$ c $\frac{\pi}{2}$ d $\frac{4\pi}{9}$

9. In which quadrant does in $\left(9.\frac{\pi}{2} - \theta\right)$ lie?
a 1st b 2nd c 3rd d 4th

10. If $y^{y\sqrt{y}} = (y\sqrt{y})^y$ then what is the value of y?
a $\frac{2}{3}$ b $\frac{3}{2}$ c $\frac{9}{4}$ d $\frac{4}{9}$

11. If $x^a = y$, $y^b = z$ and $z^c = x$ then what is the value of abc = ?
a 0 b 1 c 2 d 3

12. If $a^x = n$ then x = what?
a $\log_n a$ b $\log_a n$ c $\log_n \frac{1}{a}$ d $\log_{a^n} \frac{1}{a^n}$

Answer to the question no. 13 and 14 from the above information:
In the expansion of $\left(y + \frac{1}{y^2}\right)^6$ —

13. How many terms are there?
a 5 b 6 c 7 d 8

14. What is they free term in that expansion?
a 5th term b 4th term
c 3rd term d 2nd term

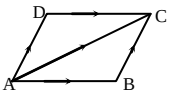
Answer to the question no. 15 and 16 from the above information:
The three points A(1, –1), B(2, 2) and C(4, r) are collinear.

15. What is the slope of the straight line AB?
a –1 b $\frac{1}{3}$ c 1 d 3

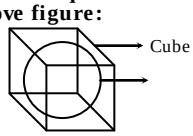
16. What is the value of r?
a 2 b 4 c 6 d 8

17. What is the equation of straight which passes through the point (2, 3) and having slope 4?
a y = 4x – 5 b y = 4x + 5
c y = 4x – 10 d y = 4x – 12

18. $\underline{V}$ is called the opposite vector of $\underline{U}$ if—
i. $|\underline{V}| = |\underline{U}|$
ii. lines of support of $\underline{U}$ and $\underline{V}$ are the same and parallel
iii. the direction of $\underline{V}$ is opposite of that of $\underline{U}$
Which one of the following is correct?
a i & ii b i & iii
c ii & iii d i, ii & iii

19.


Which one is applicable of the parallelogram ABCD?
a $\overrightarrow{AB} + \overrightarrow{AC} = \overrightarrow{BC}$ b $\overrightarrow{AB} + \overrightarrow{AD} = \overrightarrow{AC}$
c $\overrightarrow{AD} + \overrightarrow{BC} = \overrightarrow{AC}$ d $\overrightarrow{AC} + \overrightarrow{DC} = \overrightarrow{AD}$

Answer to the questions No. 20 and 21 from the above figure:


Diameter of the sphere = edge of the cube 6 cm.

20. What is the volume of the sphere?
a 12π b 36π c 72π d 288π

21. What is volume of unoccupied portion of the cube in cubic cm?
a 194.79 b 152.38
c 102.90 d 39.40

22. Which one is the limit of probability?
a $0 < p < 1$ b $0 \le p \le 1$
c $0 < p \le 1$ d $0 \le p < 1$

Answer to the questions no. 23 and 24 from the above information:
In a bag there are 4 red, 5 black and 3 yellow balls. A ball is taken at random—

23. What is the probability of the ball to be green?
a 0 b $\frac{1}{3}$ c $\frac{1}{4}$ d $\frac{5}{12}$

24. What is the percentage of probability of the ball to be Black?
a 41.7% b 33.33%
c 25% d 20%

25. U is universal and the subsets of A, B and C which one of the following De Morgan's Law?
a $(A \cup B)' = A' \cap B'$
b $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$
c $A \cup B = B \cup A$
d $A \backslash B' = B \backslash A$

26. Which one of the following image set of $F(x) = x^2 - 2x$; for the domain $X = \{-1, 0, 1\}$?
a {–1, 0} b {3, 0, –1}
c {–1, 0, 3} d {–1, 0, 1}

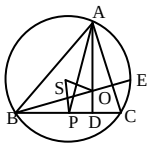
27. For the function $F(x) = \frac{x}{x-2}$
i. define $f(x)$ at x = 2
ii. its one-one function
iii. $F^{-1}(x) = \frac{2x}{x-1}$
Which one of the following is correct?
a i & ii b i & iii
c ii & iii d i, ii & iii

28. i. The largest of the degrees of the terms appearing in a polynomial is called the degree of the polynomial
ii. The terms of a polynomial of the variable x, y, z have the from $cx^py^qz^r$
iii. Multiplication of two polynomial is always polynomial
Which one of the following is correct?
a i & ii b i & iii
c ii & iii d i, ii & iii

29. Which one is improper fractions?
a $\frac{x+5}{(x-1)(x+2)}$ b $\frac{x-1}{(x-2)(x+5)}$
c $\frac{x^3}{(x-1)(x-2)(x-3)}$
d $\frac{x^3}{x^4+x^2-1}$

30. If $Q(x) = x^3 + 2x^2 + 2x + 1$ and $Q(-1) = 0$ then which one of the factors of Q(x)?
a $x - 1$ b $x + 1$
c $x^2 + x - 1$ d $x^2 - x + 1$

31. In ΔABC—
i. $\angle C > 90°$ then $AB^2 > AC^2 + BC^2$
ii. $\angle C = 90°$ then $AB^2 = AC^2 + BC^2$
iii. $\angle C < 90°$ then $AB^2 < AC^2 + BC^2$
Which one of the following is correct?
a i & ii b i & iii
c ii & iii d i, ii & iii

32.


Which two triangles are equiangular?
a ΔABP and ΔADP b ΔAOG and ΔSPG
c ΔADC and ΔAOG d ΔADP and ΔADC

33. What is the point of concurrence of the medians of a triangle?
a Centroid b Circumcentre
c Nine point d Incentre

34. What is the length tangent of a point at a distance of 5cm from the centre of radius 2 cm?
a 3 cm b 4.6 cm
c 21 cm d 29 cm

35. i. A triangle cannot be drawn with any lengths of three sides
ii. A circle can be drawn only the radius
iii. At an any point on a circle only one tangent can be drawn
Which one of the following is correct?
a i & ii b i & iii
c ii & iii d i, ii & iii

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

Sylhet Board 2016

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

*[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. How many elements of power set of the set A = {1, 2, 3, 4, 5}?
a 5 b 10 c 25 d 32

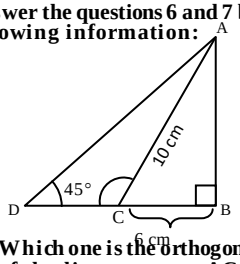
2. Among a certain group of students, 60 like cricket, 40 like football and 25 like both the game. How many students like at least one of the games?
a 25 b 75 c 100 d 125

3. Algebraic expression—
i. $x^2y + yz^2 + xyz$ is a homogeneous polynomial
ii. $6x^2 + 5xy + 2y^2$ is a symmetric expression
iii. $z^2x + x^2y + yz^2$ is a cyclic expression
Which one of the following is correct?
a i b i & ii
c i & iii d i, ii & iii

4. Which one is the factor of $x^3 + 2x^2 - 5x - 6$?
a $x - 4$ b $x - 1$ c $x + 2$ d $x + 3$

5. In Nine-point circle—
i. the centroid divides the medians in the ration 2 : 1
ii. the centre of the nine-point circle is the middle point of the line segment joining the orthocenter and the circumcenter
iii. the radius of the nine-point circle is half of radius of the circumcircle
Which one of the following is correct?
a i & ii b i & iii
c ii & iii d i, ii & iii

Answer the questions 6 and 7 based on the following information:



6. Which one is the orthogonal projection of the line segment AC on BD?
a BD b CD c AB d BC

7. DC = what?
a 2 cm b 4 cm c 6 cm d 8 cm

8. The area of a piece of paper is 48 sq. cm. A rectangular piece x cm long and 6 cm wide is cut off from it. What is the possible value of x?
a $8 < x < 6$ b $-6 < x < 8$
c $6 < x < 8$ d $6 < x < -8$

9. A straight line passes through the points (2, 2) and (4, t) and its slope is 3. What is the value of t?
a 8 b $\frac{8}{3}$ c $-\frac{8}{3}$ d -8

10. If two tangents of a circle meet at a point outside the circle formed 60° angle, then what will be the measure of the angle that is formed at the centre with the points of contacts?
a 30° b 60° c 120° d 360°

Answer the questions 11 and 12 on the basis of the following information:
"$4x - 2 - x^2 = 0$ is a quadratic equation."

11. What is the descriminant of it?
a 20 b 8 c $2\sqrt{5}$ d $2\sqrt{2}$

12. What are the nature of the roots?
a Real and irrational b Real and rational
c Real and equal d Imaginary

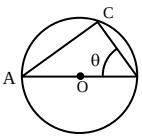
13. $16^x = 64^y$, then $\frac{y}{x}$ = what?
a $\frac{1}{4}$ b $\frac{2}{3}$ c $\frac{3}{2}$ d 4

14. 4 times of a positive number is not less than the sum of the number with 18. Which one is correct?
a $x = 6$ b $x > 6$
c $x \geq 6$ d $x < 6$

15. The *n*th term of a sequance is $U_n = \frac{1}{n}$ and $Un < \frac{1}{5^{-3}}$. Which one is correct?
a $n > \frac{1}{125}$ b $n < \frac{1}{125}$
c $n > 5^3$ d $n < 5^3$

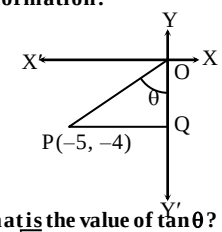
16. What is the rational fraction of 5.783?
a $\frac{5783}{1000}$ b $\frac{5783}{99}$ c $\frac{5726}{99}$ d $\frac{5726}{990}$

17.



In the figure $\sin\theta = \frac{\sqrt{3}}{2}$ and O is the centre of the circle, then—
i. circumference of the circle is 2π
ii. area of the circle is π
iii. value of θ is $\frac{\pi}{6}$
Which one of the following is correct?
a i & ii b i & iii
c ii & iii d i, ii & iii

Answer the questions 18 and 19 based on the information:



18. What is the value of $\tan\theta$?
a $-\frac{\sqrt{41}}{5}$ b $-\frac{4}{\sqrt{41}}$ c $\frac{4}{5}$ d $\frac{5}{4}$

19. If PQ is the diameter of a circle, what will be the length of circumference of that circle?
a 7.58 b 15.71
c 19.64 d 31.42

20. If a, b, x > 0 and $a \neq 1$, $b \neq 1$ then—
i. $\log_{\sqrt{a}} a + \log_{\sqrt{b}} b = 4$
ii. $\log \frac{ab}{x} = \log a + \log b - \log x$
iii. $a^x = \sqrt[3]{a^2}$ when $x = \frac{2}{3}$
Which one of the following is correct?
a i & ii b i & iii
c ii & iii d i, ii & iii

21. The lengths of the three sides of a triangle are 3cm, 4cm and 5cm. What is the sum of the areas of the squares on the three medians?
a $\frac{200}{3}$ b $\frac{75}{2}$ c $\frac{75}{4}$ d $\frac{25}{2}$

22. What is the value of ${}^{10}C_3$?
a 7 b 30 c 120 d 240

Answer the questions 23 and 24 based on the following information:
$(1 - 2x + x^2)^2$ is a binomial experession.

23. How many terms are there in the expansion of this binomial?
a 2 b 3 c 4 d 5

24. What are the co-efficients in the expansion of the binmial?
a 1, 2, 3, 2, 1 b 1, 5, 6, 5, 1
c 1, 4, 6, 4, 1 d 1, 5, 10, 5, 1

25. What is the slope of a line passing through the points A(3, 4) and B(1, 2)?
a –1 b $\frac{1}{3}$ c 1 d 3

26. What will be the area of the triangle with the vertices A(5, 6) B(3, –1), C(1, 4)?
a $\frac{19}{2}$ sq. unit b 19 sq. unit
c 31 sq. unit d 38 sq. unit

27. The area of a triangle is 36 sq. cm. The length of the base twice the length of its height. what is the length of the base?
a 6cm b $6\sqrt{2}$ cm
c 12cm d $12\sqrt{2}$cm

28. $\underline{a}$, $\underline{b}$ are the position vectors respectively of the points A and B, then $\overrightarrow{AB}$ = what?
a $\underline{a} - \underline{b}$ b $\underline{b} - \underline{a}$
c $\frac{1}{2}(\underline{a} + \underline{b})$ d $\frac{1}{2}(\underline{a} - \underline{b})$

Answer the questions 29 and 30 based on the following information:
A metallic solid sphere of radius 2 cm is melted and a right circular cylinder of base of 2 cm is formed.

29. What will be area of the surface of the sphere?
a 50.27 cm^2 b 33.51 cm^2
c 16.76 cm^2 d 12.57 cm^2

30. What will be height of the right circular cylinder?
a 0.7 cm b 2 cm
c 2.67 cm d 8 cm

31. If $\cos\alpha = -\frac{\sqrt{3}}{2}$ while $\frac{\pi}{2} < \alpha < \pi$, what is the value of α?
a $\frac{5\pi}{6}$ b $\frac{2\pi}{3}$ c $\frac{7\pi}{6}$ d $\frac{4\pi}{3}$

32. In February 2000 A.D it rained on's days. What is the probability that it was rain on 12th February on that year?
a $\frac{5}{29}$ b $\frac{5}{28}$ c $\frac{1}{28}$ d $\frac{1}{29}$

33. What will be the area of the base of a regular hexagonal prism having side of 2 cm?
a $12\sqrt{3}$ cm^2 b $6\sqrt{3}$ cm^2
c $2\sqrt{3}$ cm_2 d $\sqrt{3}$ cm^2

34. In a bag there are 4 red, 5 white and 2 black balls. A ball is chosen at random. What is the probability that the ball will be red?
a $\frac{1}{4}$ b $\frac{2}{11}$ c $\frac{4}{11}$ d $\frac{5}{11}$

35. What is the domain of the function $F(x) = \frac{1}{x-5}$?
a $\{x : x \in R \text{ and } x \neq 5\}$
b $\{x : x \in R\}$
c $\{x : x \in R \text{ and } x \geq 5\}$
d $\{x : x \in R \text{ and } x > 5\}$

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

Jessore Board 2016

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

*[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. Which country belongs to George Cantor?
a Britain b Italy
c France d Germany

2. If F(x) = |x| then which one is the value of F(–3)?
a –3 b 0 c 3 d ±3

3. If $p(x) = x^2 - 5x + 6$ and p(x) is divided by (x – 4) then which one is the remainder of p(x)?
a 2 b 3 c 4 d x + 2

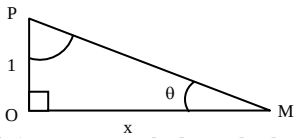
4. "In a cyclic quadrilateral the area of the rectangle contained by the two diagonals is equal to the sum of the area of the two rectangles contained by the two opposite sides." The theorem is called—
a Pythagoras' theorem
b Apolloneous' theorem
c Ptolemy's theorem
d Brahmmagupta's theorem

5. If $\left(\frac{5b}{a}\right)^{2x-6} = 1$ then what is the value of x?
a 1 b 2 c 3 d 6

6. What is the sum up to infinity in the series $\frac{1}{3} + \frac{1}{3^2} + \frac{1}{3^3} + \ldots\ldots\ldots\ldots$?
a 0 b $\frac{1}{3}$ c $\frac{1}{2}$ d 1

7. i. Circumference = $2\pi \times$ radius
ii. Radian angle is a constant angle
iii. 1 Radian is expressed in 1^R
Which one of the following is correct?
a i & ii b ii & iii
c i & iii d i, ii & iii

Answer to the questions No. 8 – 10 from the given figure:



8. If ∠P = acute angle then which one is the base of the above figure?
a OP b OM
c PM d $\sqrt{1+x^2}$

9. What is the value of tanθ?
a $\frac{1}{x}$ b $\frac{1}{x^2}$
c $\sqrt{1+x^2}$ d $\frac{1}{\sqrt{1+x^2}}$

10. What is the length of PM?
a $\sqrt{1-x^2}$ b $\frac{1}{x}$
c $\sqrt{1+x^2}$ d $\frac{1}{\sqrt{1+x^2}}$

11. The value of $\cos\left(2\pi + \frac{\pi}{6}\right)$ is—
a $-\frac{\sqrt{3}}{2}$ b $-\frac{1}{\sqrt{3}}$ c $\frac{\sqrt{3}}{2}$ d $\frac{1}{\sqrt{2}}$

12. If $\log_{\sqrt{8}} x = 3\frac{1}{3}$, then the value of x is—
a 32 b 16 c 8 d 64

13. i. "Logarithm" is a Greek word
ii. 'Logos' means discussion and 'arithmas' means number
iii. $\text{Log}_e x = \ln x$
Which one of the following is correct?
a i & ii b ii & iii
c i & iii d i, ii & iii

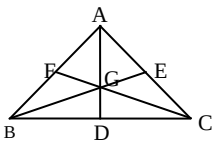
14. What is the number of term in the expansion of $(1 + x)^{n-1}$?
a $\frac{n-1}{2}$ b n – 1
c n d n + 1

15. What is the product of slope of the equations x – 2y – 10 = 0 and 2x + y – 3 = 0?
a –2 b –1 c 0 d 1

16. For what values of 'a' the points $(a^2, 2)$, (a, 1) and (0, 0) are collinear?
a 0, –1 b 2, 2 c 0, –2 d 0, 2

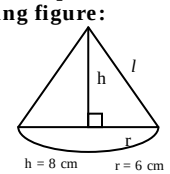
17. If the position vector of P and Q are (a – b) and (a + b) then which one is the value of $\overrightarrow{PQ}$?
a $2\underline{a}$ b $2\underline{b}$ c $\underline{a} + \underline{b}$ d $\underline{a} - \underline{b}$

18.



G is the centroid of the ΔABC and
i. AG : GD = 1 : 2
ii. $\overrightarrow{AB} + \overrightarrow{AC} = 2\overrightarrow{AD}$
iii. $\overrightarrow{AD} + \overrightarrow{BE} + \overrightarrow{CF} = 0$
Which one of the following is correct?
a i & ii b ii & iii
c i & iii d i, ii & iii

Answer the question no. 19 – 21 for the following figure:



19. What is the length of slant height?
a 8 cm b 9 cm
c 10 cm d 11 cm

20. What is the area of the curved surface?
a 187.5 sq. cm b 188.5 sq. cm
c 287.5 sq. cm d 278.5 sq. cm

21. What is the volume of the given figure?
a 301.59 cubic cm b 300 cubic cm
c 305.59 cubic cm d 412 cubic cm

Answer the questions no 22 – 24 from the following information:
In a bag there are 4 red balls, 5 white balls and 6 black balls. A ball is chosen at random.

22. What is the probability of getting red ball?
a $\frac{4}{15}$ b $\frac{1}{3}$ c $\frac{2}{5}$ d $\frac{3}{5}$

23. What is the probability of getting white ball?
a $\frac{4}{15}$ b $\frac{1}{3}$ c $\frac{2}{5}$ d $\frac{4}{5}$

24. What is the probability of getting black ball?
a $\frac{4}{15}$ b $\frac{1}{3}$ c $\frac{2}{5}$ d $\frac{1}{6}$

25. What is the dom of the function $F(x) = \sqrt{x-1}$?
a x < 1 b x ≤ 1
c x > 1 d x ≥ 1

26. What is the partial fraction of $\frac{x}{x^2-4}$?
a $\frac{1}{x+2} + \frac{1}{x-2}$ b $\frac{1}{2(x+2)} + \frac{1}{2(x-2)}$
c $\frac{1}{2(x+2)} - \frac{1}{2(x-2)}$ d $\frac{1}{x+2} - \frac{1}{x-2}$

27. Which one is the solution of the inequality 3x – 2y – 12 < 0?
a (4, 0) b (4, 3) c (4, –3) d (0, –6)

28. Which one is the factor of $a^3 - a^2 - 10a - 8$?
a (a + 1) (a + 2) (a – 3)
b (a + 1) (a + 2) (a – 4)
c (a + 1) (a – 2) (a + 3)
d (a + 1) (a – 2) (a + 4)

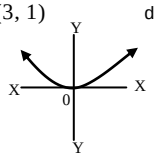
Answer to the questions no. 29 – 31 considering the following information:
Given that, U = {x : x ∈ N, x < 7}
A = {x : x ∈, x is even number and x < 7}
B = {x : x ∈ N, x is odd number and x < 7}
C = {x : x ∈ N, 2 ≤ x < 6}

29. Which is the expression of A′∩B′ in tabler method below?
a { } b {0} c {∅} d U

30. What is the number of elements of P(C)?
a 32 b 16 c 8 d 4

31. Follow the statements:
i. A′∩B′ = (A ∪ B)′
ii. A ∪ (B ∩ C) = (A ∪ B) ∪ (A ∪ C)
iii. n(C) = 4
Which one of the following is correct?
a i & ii b i & iii
c ii & iii d i, ii & iii

32. If $x^y = y^x$ and x = 2y, then which is the value of (x, y)?
a (2, 4) b (4, 2)
c (3, 1) d (1, 3)



33. i. The graph shows the equation of parabola
ii. The equation of the graph is $x^2 = ay$
iii. The equation of the graph is $x = ay^2$
Which one of the following is correct?
a i & ii b ii & iii
c i & iii d i, ii & iii

34. What is the area of the triangle with 3x + 4y = 12, x-axis and y-axis?
a 3 q. units b 4 sq. units
c 6 sq. units d 12 sq. units

35. What is the value of $\frac{\lfloor n-1}{\lfloor n-2}$?
a n b n – 1
c n(n – 1) d n – 2

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

Barisal Board 2016

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

*[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. If $\cos\theta = -\frac{1}{2}$ and $\pi < \theta \le \frac{3\pi}{2}$, then which one of the value of $\tan\theta$?
a $-\sqrt{3}$ b $\frac{1}{\sqrt{3}}$ c 1 d $\sqrt{3}$

2. If $\sin^2\theta - \cos^2 = \cos\theta$ (where $0° \le \theta \le \pi$) then—
i. $\theta = \pi$ ii. $\theta = \frac{\pi}{3}$
iii. $\theta = \frac{2\pi}{3}$
Which one of the following is correct?
a i & ii b i & iii
c ii & iii d i, ii & iii

3. If $\cos\theta = \frac{b}{a}$ and $a > b > 0$, then—
i. $\sin\theta = \frac{\sqrt{a^2 - b^2}}{a}$ ii. $\cot\theta = \frac{b}{\sqrt{a^2 - b^2}}$
iii. $\cos\theta - \sec\theta = \frac{a^2 - b^2}{ab}$
Which one of the following is correct?
a i & ii b i & iii
c ii & iii d i, ii & iii

4. If $a(x + b) < c$ and $a < \theta$, then which is correct?
a $x < \frac{c}{a} - b$ b $x < \frac{c}{a} + b$
c $x > \frac{c}{a} - b$ d $x > \frac{c}{a} + b$

5. $2x + 3y - 7 < 0$, the solution of inequalities graph is—
i. all points at the origin side of the line
ii. all points at the (3, 3) point side of the line
iii. the line passing through the point (–1, 3)
Which one of the following is correct?
a i & ii b i & iii
c ii & iii d i, ii & iii

6. If $y^x = 9$, $y^2 = 3^x$, then (x, y) equal—
a $(2, 3), \left(-2, \frac{1}{9}\right)$ b $(2, \pm 3), \left(-2, \pm\frac{1}{3}\right)$
c $\left(2, \frac{1}{9}\right), (-2, -3)$ d $\left(-2, -\frac{1}{9}\right), (2, 3)$

7. If $y = 2x + 1$ and $y = 2x - 1$ are two straight line, then—
i. multiplication of slope is –4
ii. point of intersection is $\left(\frac{1}{4}, \frac{1}{2}\right)$
iii. bisector of y-axis respectively is 1, –1
Which one of the following is correct?
a i & ii b i & iii
c iii & iii d i, ii & iii

8. $2x - y + 7 = 0$ and $3x + ky - 5 = 0$ are parallel straight line, then the value of k is—
a 6 b 2 c $\frac{2}{3}$ d $\frac{-3}{2}$

9. If (2, –1) (a + 1, a – 3) and (a + 2, a) three points are collinear, then the value of a is—
a $\frac{1}{3}$ b 2 c $\frac{1}{2}$ d –1

10. The equation of a straight line passing through origin and the point (x_1, y_1) is—
a $y = mx$ b $y = \frac{x_1}{y_1}x$
c $y = \frac{y_1}{x_1}x$ d $y - y_1 = m(x - x_1)$

11. Diameter of a ball is 3 cm, then what is the volume?
a 3π cm^3 b $\frac{9}{2}\pi$ cm^3
c 9π cm^3 d 36π cm^3

1`2. The length, breadth and height of a rectangular parallelopiped are respectively 5 cm, 4 cm and 3 cm, then the area of surfaces is —
a 30 cm^2 b 47 cm^2
c 60 cm^2 d 94 cm^2

13. If $\log_{\sqrt{8}} x = 5\frac{1}{3}$, then value of x is—
a 256 b $\frac{128}{3}$ c 32 d 8

14. If $9\underline{a} - 4\underline{b}$ and $-3\underline{a} - \underline{b}$ are respectively the position vectors P and Q with respect to a vector origin. Then $\overrightarrow{PQ}$ is—
a $6\underline{a} - 5\underline{b}$ b $12\underline{a} - 3\underline{b}$
c $-12\underline{a} + 3\underline{b}$ d $\frac{9\underline{a} - 4\underline{b}}{-3\underline{a} - \underline{b}}$

15. An unbiased dice and one coin thrown. What is the probability of getting an odd number and only one 7?
a $\frac{1}{2}$ b $\frac{1}{4}$ c $\frac{1}{6}$ d $\frac{1}{12}$

16. How may tangents can be drawn of a curcle from a point which is outsid that circle?
a 1 b 2 c 3 d infinite

17. When $\cos\theta = \frac{\sqrt{3}}{2}$, then $\sin 3\theta$ = ?
a 0 b $\frac{\sqrt{3}}{2}$ c $\frac{1}{2}$ d 3

18. If a member of the set number n, then the number of real subset is—
a $2^n + 2$ b 2^{n+2}
c $2^n - 1$ d $2^n - 2$

19. If P and q two polynomial, then—
i. P – Q is a polynomial
ii. PQ may not be the polynomial
iii. $\frac{P}{Q}$ may or may not be a polynomial
Which one of the following is correct?
a i & ii b ii & iii
c i & iii d i, ii & iii

20. $\sqrt{(x-1)(x-2)} + \sqrt{(x-3)(x-4)} = \sqrt{2}$. The solution is—
a (0, 2) b (0, 3)
c (2, 3) d (3, 5)

21. Probability tree is used to—
i. build the sample space
ii. make the shape of a tree
iii. find the probability of various event
Which one of the following is correct?
a i & ii b ii & iii
c i & iii d i, ii & iii

22. If S = {x : x ∈ ∇, F(x) = $\sqrt{2 - x}$}, then dom S is—
a {x ∈ ∇, x ≥ 2} b {x ∈ ∇, x ≤ 2}
c ∇ – {2} d ∇ + {2}

23. If (x – 2) is a factor of $p(x) = x^4 - 5x^3 + 7x^2 - a$, then what is the value of 'a'?
a 2 b 4 c 5 d 6

24. $-\frac{1}{3}, 1, \frac{1}{5}, \frac{1}{9}$ ..... Which is the n-th term of the sequence?
a $\frac{1}{5n-8}$ b $\frac{1}{3n-6}$ c $-\frac{1}{3n}$ d $\frac{1}{4n-7}$

Following information answer the question nos. 25 and no 26:
$\left(2x^2 - \frac{1}{2x}\right)^8$ is a binomial expansion.

25. What is the third term of the expansion?
a $-512x^{13}$ b $-224x^7$
c $256x^{10}$ d $448x^{10}$

26. Middle term of the expansion is—
a $70x^4$ b $14x^2$
c $-70x^4$ d $-224x^7$

27. If $b^2 - 4ac$ is not a perfect square, then what is the nature of roots?
a Real and rational b Real and irrational
c Real and equal d Imaginary

28. If $P(a) = 4a^4 + 12a^3 + 7a^2 - 3a - 2$, then which is the factor of P(a)?
a (2a – 1) b 4a + 1
c a – 1 d 4a – 1

29. Any right angle triangle ABC with side a, b, c median d, e, f and ∠C = 90°, then which one is true?
a $2(d^2 + e^2 + f^2) = 3c^2$
b $2(d^2 + e^2 + f^2) = 3(a^2 + b^2)$
c $d^2 + e^2 + f^2 = 3c^2$
d $4(d^2 + e^2 + f^2) = 3(a^2 + b^2 + c^2)$

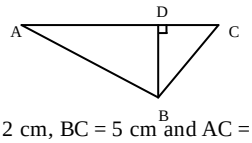
30. If U = {x : x ∈ N, x ≤ 10}; A = {x : x ∈ N, x ≤ 8 and x even number}, B = {x : x ∈ N, x multiples of 3}, then A ∩ B is—
a ∅ b {6}
c {6, 8} d {2, 3, 4, 6, 8}

31. An infinite geometric series whose first term $\frac{1}{2}$ and sum of infinity $\frac{3}{4}$, then the common ratio is —.
a $\frac{3}{4}$ b $\frac{2}{3}$ c $\frac{1}{2}$ d $\frac{1}{3}$

32. If $f(x) = \frac{4x - 9}{x - 2}$, then value of $f^{-1}(3)$ is—
a 3 b 1 c $\frac{3}{5}$ d –3

33. The slope of a straight line passing through the point A(–5, 4), B(3, 7) is—
a $-\frac{1}{10}$ b $-\frac{2}{11}$ c $\frac{3}{8}$ d $\frac{8}{3}$

Answer to the question nos. 34 and 35 according to the information given below:



AB = 12 cm, BC = 5 cm and AC = 13 cm.

34. From the triangle ABC
i. Half of perimeter is 15 cm
ii. Area is 30 cm^2
iii. $\sin B = \frac{12}{13}$
Which one of the following is correct?
a i & ii b i & iii
c ii & iii d i, ii & iii

35. What is the length of BD?
a 4.62 cm b 9.23 cm
c 10 cm d 24 cm

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