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

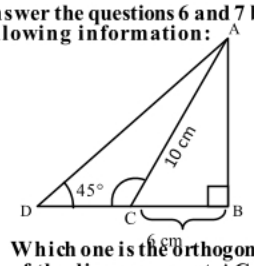
2. Among a certain group of students, 60 like cricket, 40 like football and 25 like both the game. How many students like at least one of the games?
a 25 b 75 c 100 d 125

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

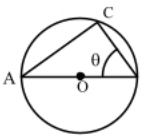
13. $16^x = 64^y$, then $\frac{y}{x}$ = what?
a $\frac{1}{4}$ b $\frac{2}{3}$ c $\frac{3}{2}$ d 4

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 $n < 5^3$

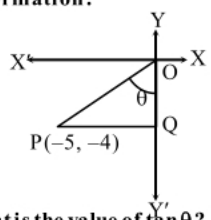
16. What is the rational fraction of 5.783?
a $\frac{5783}{1000}$ b $\frac{5783}{99}$ c $\frac{5726}{99}$ d $\frac{5726}{990}$

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 tanθ?
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 ≠ 1, b ≠ 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															