EPITOME MODEL ISLAMIC SCHOOLS

MATHEMATICS INTERVIEW QUESTIONS

Instruction: Attempt all questions from this section

Time Allowed for this section: 20 minutes

SECTION A: MCQ

1. Convert the binary number 101101 to its decimal equivalent.
   A. 45
   B. 46
   C. 47
   D. 48

2. In base 8, what is the value of $(456)_8$ when converted to base 10?
   A. 298
   B. 300
   C. 302
   D. 304

3. Express 0.625 as a fraction in its lowest terms.
   A. 1/2
   B. 3/4
   C. 5/8
   D. 7/10

4. Simplify $\sqrt{(16/81)}$ in its simplest radical form.
   A. 4/9
   B. 2/9
   C. 4/3
   D. 2/3

5. What is the value of $2^3 \times 3^2$ in standard form?
   A. 72
   B. 512
   C. 216
   D. 648

6. If a:b = 3:4 and b:c = 5:6, what is the ratio a:c?
   A. 3:6
   B. 15:24
   C. 5:8
   D. 3:10

7. Convert 0.375 to a percentage.
   A. 37.5%
   B. 3.75%
   C. 375%
   D. 0.375%

8. If 20% of a number is 45, what is 35% of the same number?
   A. 78.75

B. 225
C. 63
D. 90

9. Simplify the ratio 48:72:96 to its lowest terms.
A. 2:3:4
B. 4:6:8
C. 1:2:3
D. 3:4:6

10. A mixture contains 2/5 salt and the rest water. If 3 liters of water is added, the salt becomes 1/3 of the new mixture. Find the original volume of the mixture.
A. 6 liters
B. 9 liters
C. 12 liters
D. 15 liters

11. Simplify $8^{(2/3)} \times 2^{(-1/3)}$.
A. 4
B. 2
C. 8
D. 1/2

12. Solve for x: log_2 (x) + log_2 (x-1) = 1.
A. x = 2
B. x = $\sqrt{2}$
C. x = 1 + $\sqrt{2}$
D. x = 3

13. If $3^x = 81$, what is the value of x?
A. 4
B. 3
C. 2
D. 5

14. Express log_10 (100 / 10) as a single logarithm.
A. log_10 10
B. 1
C. 0
D. 2

15. Simplify $(16^{(3/4)}) / (4^{(1/2)})$.
A. 2
B. 4
C. 8
D. 1

16. If A = {1, 2, 3, 4}, B = {3, 4, 5, 6}, find A ∩ B.
A. {3, 4}
B. {1, 2, 5, 6}

C. {1, 2, 3, 4, 5, 6}
D. Ø

17. The universal set U = {1,2,3,4,5,6,7,8,9,10}, A = {even numbers}, B = {multiples of 3}. Find n(A ∪ B).
A. 6
B. 7
C. 8
D. 10

18. If n(A) = 5, n(B) = 7, n(A ∪ B) = 9, find n(A ∩ B).
A. 3
B. 4
C. 2
D. 1

19. Factorize x^2 - 5x - 24 completely.
A. (x-8)(x+3)
B. (x-6)(x+4)
C. (x-3)(x-8)
D. (x+6)(x-4)

20. Solve the quadratic equation x^2 - 6x + 8 = 0 by factorization.
A. x=2,4
B. x=1,8
C. x=3,3
D. x=-2,-4

21. Solve the inequality 2x - 3 > 5 and express in interval notation.
A. (4, ∞)
B. [4, ∞)
C. (-∞, 4)
D. [4, ∞)

22. Expand $(2x + 3y)^2$.
A. $4x^2$ + 12xy + 9y^2
B. $4x^2$+ 6xy + 9y^2
C. $4x^2$+ 12xy + 3y^2
D. $4x^2$+ 9y^2

23. If f(x) = $2x^2$ - 3x + 1, find f(-1).
A. 6
B. 2
C. 0
D. 4

24. Solve for x: $3^{(x+1)}$ = 27.
A. 2
B. 3
C. 1

D. 4

25. Simplify $(x^2 + 2x + 1)/(x + 1)$.
A. x + 1
B. x - 1
C. x^2 + 1
D. x

26. The roots of the equation $x^2 - px + q = 0$ are 2 and 3. Find p and q.
A. p=5, q=6
B. p= -5, q= -6
C. p=1, q=6
D. p=5, q= -6

27. Find the 5th term of the arithmetic sequence where first term a=2, common difference d=3.
A. 14
B. 11
C. 8
D. 17

28. The sum of the first n terms of a GP is given by $S_n = 3(2^n - 1)$. Find the first term.
A. 3
B. 1
C. 2
D. 6

29. In an AP, if the 3rd term is 7 and the 7th term is 15, find the common difference.
A. 2
B. 1
C. 3
D. 4

30. In a triangle ABC, angle A = 40°, angle B = 60°. What is angle C?
A. 80°
B. 100°
C. 70°
D. 90°

31. The exterior angle of a regular polygon is 72°. How many sides does it have?
A. 5
B. 6
C. 4
D. 8

32. In circle with center O, chord AB subtends 120° at the center. What is the angle at the circumference?
A. 60°
B. 120°
C. 90°
D. 30°

33. Prove that the sum of angles in a quadrilateral is 360° (conceptual: which theorem?). But MCQ: The reason is based on:
A. Two triangles
B. One triangle
C. Circle theorem
D. Pythagoras

34. If two lines are parallel, and a transversal makes 65° with one, what is the corresponding angle?
A. 65°
B. 115°
C. 90°
D. 180°

35. Find the area of a circle with radius 7 cm (use π=22/7).
A. 154 cm²
B. 44 cm²
C. 22 cm²
D. 49 cm²

36. The volume of a cylinder with radius 5 cm and height 10 cm is:
A. 250π cm³
B. 50π cm³
C. 100π cm³
D. 785 cm³ (approx)

37. Surface area of a cube with side 4 cm.
A. 96 cm²
B. 64 cm²
C. 24 cm²
D. 16 cm²

38. The area of a trapezium with parallel sides 10 cm and 6 cm, height 5 cm.
A. 40 cm²
B. 80 cm²
C. 30 cm²
D. 50 cm²

39. If a cone has base radius r and slant height l, surface area (lateral) is:
A. πrl
B. πr²
C. 2πrl
D. πr(l + r)

40. In a right triangle, sin θ = 3/5, find cos θ.
A. 4/5
B. 3/4
C. 5/3
D. 5/4