

The Indian School
Kingdom of Bahrain

Annual Examination 2012

Subject : Mathematics

Max Marks : 100

Class : XI

Time : 3hrs

Instructions

Section A - Questions from 1 – 10 carries 1 mark each

Section B - Questions from 11 – 22 carries 4 marks each

Section C - Questions 23 – 29 carries 6 marks each

All questions are compulsory however internal choices are given.

This question paper contains 3 printed pages and 29 questions

Section A

1. Define power set
2. Solve $4x+3 < 5x +7$
3. Find the coefficient of x^6y^3 in the expansion of $(x+2y)^9$.
4. If $a_n = \frac{n(n-2)}{n+3}$; find a_{20} .
5. Find the focus of the ellipse $16x^2 + y^2 = 16$
6. Evaluate $\lim_{x \rightarrow \infty} \frac{5x^3 - 7x^2 - 23}{4x^3 - 5x^2 + 4}$
7. Find $\frac{dy}{dx}$ if $y = \sin(8x)$
8. Write the contrapositive of the statement 'If a number is divisible by 9, then it is divisible by 3'
9. If p : 125 is a multiple of 7 or 8. Write down the component statements.
10. " To enter a country, you need a passport or a voter registration card" which type of OR is used.

Section B

11. Draw a rough sketch of the function $f(x) = \frac{1}{x}$, and write down the domain and range.
12. Let $A = \{1, 2, 3, 4, 5, \dots, 14\}$. Define a relation R from A to A by
 $R = \{(x,y): 3x-y = 0, \text{ where } x,y \in A\}$. Write down its domain, codomain and range.
13. Prove that $\frac{\sin 5x - 2\sin 3x + \sin x}{\cos 5x - \cos x} = \tan x$



14. Solve $\sin 2x - \sin 4x + \sin 6x = 0$

OR

In any ΔABC , prove that $\frac{b-c}{a} = \frac{\sin \left[\frac{B-C}{2} \right]}{\cos \frac{A}{2}}$

15. Prove that $1.2 + 2.3 + 3.4 + \dots + n.(n+1) = \frac{n(n+1)(n+2)}{3}$, using PMI.

16. Find the square root of the complex number $3+4i$.

OR

Convert in to polar form $\frac{1+3i}{1-2i}$

17. 4 boys and 5 girls are to be arranged in a row for a photograph. How many different arrangements are possible if a) all boys want to sit together. b) no two girls (all girls are separated) wish to sit together.

18. In an examination, a question paper consists of 12 questions divided into two parts i.e. Part I and Part II. Containing 5 and 7 questions, respectively. A student is required to attempt 8 questions in all, selecting at least 3 from each part. In how many ways can a student select the questions.

19. Find the equation of the line perpendicular to the line $x - 7y + 5 = 0$ and having x intercept 3

OR

If $3x - 4y + 2 = 0$ is an equation of a straight line. What will be the equation of the line if the origin is shifted to $(3,5)$.

20. Find the equation of the ellipse, with major axis along x axis and passing through the points $(4,3)$ and $(-1,4)$

21. Find the equation of the set of points which are equidistant from the points $(1, 2, 3)$ and $(3, 2, -1)$.

22. Evaluate $\lim_{x \rightarrow 0} \left(\frac{\cos 2x - 1}{\cos x - 1} \right)$ *limit x tends to 0.*

OR

Find the derivative of $x^2 - 2$ using first principle.

Section C

23. In a survey it was found that 21 people liked product A, 26 liked product B and 29 liked product C. If 14 people liked products A and B, 12 liked products C and A, 14 liked products B and C and 8 liked all the products A, B and C. Represent the data as Venn Diagram and also find a.) how many liked product C but not B b.) how many like exactly one product. c.) how many like at least two products .

24. If $\tan x = \frac{3}{4}$, x is in the third quadrant. Find the values of $\sin(x/2)$ $\cos(x/2)$ and $\tan(x/2)$

OR

In any triangle ABC, prove that $(b^2 - c^2)\cot A + (c^2 - a^2)\cot B + (a^2 - b^2)\cot C = 0$

25. Solve the system of inequalities graphically. $x + 2y \leq 10$, $x + y \geq 1$, $x - y \leq 0$, $x, y \geq 0$.
26. Show that the coefficient of the middle term in the expansion of $(1+x)^{2n}$ is equal to the sum of the coefficients of two middle terms in the expansion of $(1+x)^{2n-1}$
27. Find the sum to n terms of the series $3 \times 8 + 6 \times 11 + 9 \times 14 + \dots$

OR

If $a \left(\frac{1}{b} + \frac{1}{c} \right)$, $b \left(\frac{1}{c} + \frac{1}{a} \right)$, $c \left(\frac{1}{a} + \frac{1}{b} \right)$ are in A.P prove that a, b, c are in A.P.

28. Find the mean, variance and standard deviation of the following distribution

Class	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	3	7	12	15	8	3	2

29. Find the probability when a hand of 7 cards is drawn from a well shuffled deck of cards it contains i) all kings ii) 3 kings iii) at least three kings

