GULF SAHODAYA (SAUDI CHAPTER) EXAMINATION – 2007

Grade: XI

Total Pages : 03
Time : 3 Hours
Max. Marks:100

Subject : Mathematics

SET – A

General Instructions:

1. The question paper contains of 26 questions in all.
2. Question nos. 1 to 12 are of 3 marks each.
3. Question nos. 13 to 22 are of 4 marks each.
4. Question nos. 23 to 26 are of 6 marks each.
5. Use of calculator is strictly prohibited.
6. Log tables can be used for calculation.

---

1. If $\cup = \{1,2,3,,,,,,,10\}$, $A = \{1,2,4,6\}$, $B = \{3,4,5,6\}$ find $(A \cup B)'$ & $(B - A)'$

2. Find the general solution of : $\cos x + \cos 3x + \cos 5x = 0$

3. Prove that: $(\cos x - \cos y)^2 + (\sin x - \sin y)^2 = 4 \sin^2 \left(\frac{x-y}{2}\right)$

4. Prove that: $\frac{\sin 5x - 2 \sin 3x + \sin x}{\cos 5x - \cos x} = \tan x$

5. If $A = \{2, 5\}$, $B = \{7, 8\}$, $C = \{1, 2, 3\}$, find $(A \times B) \cup (A \times C)$

6. Reduce $\left(\frac{1}{1-4i} - \frac{2}{1+i}\right)$ into the standard form.

7. Find the sum of n terms of : $3.8 + 6.11 + 9.14 + - - -$

   OR

   The sum of first three terms of a GP is 16 and the sum of the next three terms is 128. Determine the first term and common ratio.

8. Find the middle terms of $\left(2x - \frac{1}{3x^2}\right)^9$

9. Evaluate: $\lim_{x \to 0} \frac{\cos 2x - 1}{x^2}$ **OR** $\lim_{x \to 3} \frac{x^4 - 81}{2x^2 - 5x - 3}$

10. Write the contra positive and converse of the following statements.
    (i) If n is a prime number, then it is odd.
    (ii) If two lines are parallel, they do not intersect in the same place.

11. A bag contains 5 red and 4 green balls. Two balls are drawn at random. Find the probability that one is red and other is green.

12. If E & F are two events such that

P(E) = 0.6 , P (A or B) = 0.85 and P (A and B) = 0.42, find P (B).

13. Sketch the graph of F : R $\rightarrow$ R defined by f (x) = $|x-2|$

14. Prove that : $\cos 6x = 32\cos^6 x - 48\cos^4 x + 18\cos^2 x - 1$.

15. Using Mathematical Induction, prove that:

$$1.3 + 2.3^2 + 3.3^3 - - - - + n.3^n = \frac{(2n-1)3^{n+1}+3}{4}$$

OR

Prove that $x^{2n} - y^{2n}$ is divisible by x + y

16. Convert: $\frac{1+7i}{(2-i)^2}$ into Polar form..

17. Find the number of arrangements of the letters of the word "English". How many of these arrangements (i) begin with E and end with h (ii) all Vowels occur together.

18. Find the value of n so that $\frac{a^{n+1}+b^{n+1}}{a^n+b^n}$ may be G. M. of a and b.

19. Find the equation of ellipse whose major axis is 20 and foci at (0 , $\pm$ 5).

OR

Find the co-ordinate of the foot of perpendicular drawn from (– 1, 3) on the line 3x – 4y – 16 = 0.

20. (i) The vertices a triangle are A (1, 2), B (4, 5) and C (0, – 3). Find the equation of the median through A.

(ii) Find the points of trisection of the line segment joining the points P (4, – 5, 3) and Q (1, 2, 4).

21. Find the equation of a circle passing through (– 1, 1) and whose centre lies on the point of inter section of the lines x – 3y – 11 = 0 and x + y – 3 = 0.

22. Find the derivative of $\frac{x\sin x}{3x^2-5x+1}$ w r t x.

23. Solve graphically: $3x + 2y \leq 150,\ x + 4y \leq 80,\ y \leq 20,\ x, y \geq 0.$

24. Prove that: $\cos^2 x + \cos^2\left(x + \pi/3\right) + \cos^2\left(x - \pi/3\right) = 3/2$

25. The first three terms in the expansion of $(a + b)^n$ are 729, 7290 and 30375 respectively. Find the values of a, b and c.

OR

The coefficients of $(r - 1)^{th}$, r^{th} and $(r + 1)^{th}$ term in the expansion of $(x + 1)^n$ are in the ratio 1:3:5. Find the values of n and r.

26. Find the AM and S.D. of :

Class Interval	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
frequency	10	15	9	7	12	11	6