

GULF SAHODAYA (SAUDI CHAPTER) EXAMINATION 2009
GRADE – 11

Time: 3 Hours

Subject: Mathematics

Max. Marks: 100

Set - A

General Instructions:

- (i) All questions are compulsory.
 - (ii) The question paper consists of 29 questions divided into three Sections A, B and C. Section A comprises of 10 questions of 1 mark each, Section B comprises of 12 questions of 4 marks each and Section C comprises of 7 questions of 6 marks each.
 - (iii) All questions in Section A are to be answered in one word, one sentence or as per each requirement of the question.
 - (iv) There is no overall choice. However, internal choice has been provided in 4 questions of four marks each and 2 questions of six marks each. You have to attempt only one of the alternatives in all such questions.
 - (v) Use of calculator is not permitted. However, you may ask for logarithmic and statistical tables, if required
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Section A

1. If $A(3,-1,2)$, $B(1,2,-4)$, $C(-1,1,2)$ and $D(1,-2,8)$, show that ABCD is a parallelogram.
2. Write the converse of the statement, "If a number n is even, then n^2 is even."
3. A point is on the z – axis. What are its x – coordinate and y – coordinate?
4. Find the domain of $f(x) = \sqrt{1-x^2}$.
5. Find the truth value of the following compound statement $4 + 2 = 6$ (or) $9 + 7 = 15$.
6. Find the ratio in which the line joining the points $(2,4,-3)$ and $(-3,0,4)$ is divided by xy – plane.
7. A and B are two mutually exclusive events. If $P(A) = \frac{1}{4}$, $P(B) = \frac{2}{5}$, find $P(A \cup B)$.

8. Solve: $\frac{4+2x}{3} \geq \frac{x}{2} - 3$.

9. Write the contrapositive of the following statement: "If a number is divisible by 9, then it is divisible by 3."

10. A fair coin is tossed 2 times. Find the probability of getting atleast one head.

Section B

11. Let $U = \{1,2,3,4,5,6,7\}$, $A = \{2,4,6\}$, $B = \{3,5\}$ and $C = \{1,2,4,7\}$ find

(i) $A \cap (B \cup C)'$

(ii) $(B - A) \cup (A - C)$

12. The foci of a hyperbola coincide with the foci of the ellipse $\frac{x^2}{25} + \frac{y^2}{9} = 1$. Find the equation of the hyperbola if its eccentricity is 2.

(OR)

Find the equation of the circle with radius 5 whose centre lies on X-axis and passes through the point (2,3).

13. Solve $x^2 - 2x + \frac{3}{2} = 0$.

14. Prove that $\frac{1}{\tan 3\alpha + \tan \alpha} - \frac{1}{\cot 3\alpha + \cot \alpha} = \cot 4\alpha$.

15. By using Principle of Mathematical Induction prove that for all $n \in \mathbb{N}$, $4^n + 15n - 1$ is a multiple of 9.

(OR)

By using Principle of Mathematical Induction prove that for all $n \in \mathbb{N}$,

$$1.2 + 2.3 + 3.4 + \dots + n(n+1) = \frac{1}{3}n(n+1)(n+2).$$

16. A five digit number is formed by the digits 1, 2, 3, 4, 5 without repetition. Find the probability that the number formed is divisible by 2.

(OR)

One card is drawn from a well shuffled deck of 52 cards. If each outcome is

equally likely, calculate the probability that the card will be

- (i) a black card
- (ii) a red king
- (iii) not an ace
- (iv) a spade or heart.

17. A candidate is required to attempt 6 out of 10 questions which are divided into groups each containing 5 questions and he is not permitted to attempt more than 4 questions from each group. In how many ways can he make up this choice?

18. Convert the complex number $\frac{4}{\sqrt{3}+i}$ in the polar form.

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

20. If $A = \{a,b,c\}$, $B = \{d\}$ and $C = \{e\}$, verify that $A \times (B \cup C) = (A \times B) \cup (A \times C)$.

(OR)

Draw the graph of the function $f: \mathbb{R} \rightarrow \mathbb{R}$, defined by $f(x) = x^2 + 2$.

21. Find the number of different 8 letter arrangements that can be made from the letters of the word 'DAUGHTER' so that all vowels never occur together.

22. Solve graphically $3y - 2x \leq 4$, $x + 3y \geq 3$ and $x + y \leq 5$.

Section C

23. Transform the equation of the line $\sqrt{3}x + y - 8 = 0$ to

- (i) Slope intercept form and find its slope and y-intercept.
- (ii) Intercept form and find the intercepts on the coordinate axes.
- (iii) Normal form and find the inclination of the perpendicular segment from the origin on the line with x-axis and also find its length.

24. Show that $\frac{1 \cdot 2^2 + 2 \cdot 3^2 + \dots + n(n+1)^2}{1^2 \cdot 2 + 2^2 \cdot 3 + \dots + n^2(n+1)} = \frac{3n+5}{3n+1}$.

(OR)

Find the sum of 30 terms of the sequence 7, 7.7, 7.77, 7.777,.....

25. The coefficient of the $(r-1)^n$, r^n and $(r+1)^n$ terms in the expansion of $(x+r)^n$ are in the ratio 1:3:5. Find n and r.

(OR)

Show that the middle term in the expansion of $(1+x)^{2n}$ is $\frac{1.3.5\dots(2n-1)}{n!} 2^n x^n$

26. In a town of 10,000 families, it was found that 40% families buy newspaper A, 20% families buy newspaper B and 10% families buy newspaper C. 5% families buy A & B, 3% buy B & C and 4% buy A & C. If 2% families buy all the three papers, find the number of families which buy
- A only
 - B only
 - None of A, B or C.

27. (i) Find the derivative of $\frac{x^5 - \cos x}{\sin x}$. And

(ii) If $\lim_{x \rightarrow 1} \frac{x^4 - 1}{x - 1} = \lim_{x \rightarrow k} \frac{x^3 - k^3}{x^2 - k^2}$ find all the values of k.

28. Find the mean, variance and standard deviation for the following distribution giving 300 telephone calls according to the duration in seconds

Duration in sec.	0-30	30-60	60-90	90-120	120-150	150-180	180-210
No. of calls	9	17	43	82	81	44	24

29. If $\tan x = \frac{3}{4}$ and x lies in the 3rd quadrant, find the values of $\sin \frac{x}{2}$, $\cos \frac{x}{2}$ & $\tan \frac{x}{2}$.
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