

GULF SAHODAYA (SAUDI CHAPTER) EXAMINATION-2014

GRADE-11

SUBJECT: MATHEMATICS

SET-A

TIME: 3hours

M.M: 100

General Instructions:

- (i) All questions are compulsory.
 - (ii) The question paper consists of 26 questions divided into three sections A, B and C-section A comprises 6 questions of 1mark each, section B comprises 13 questions of 4 marks each and section C comprises 7 questions of 6 marks each.
 - (iii) There is no overall choice. However, internal choice has been provided for 4 questions in section B & 2 questions in section C. You have to attempt only one alternative in all such.
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SECTION-A

- 1) Describe the set $\{x: x \in N, x \text{ is a prime no, } 10 < x < 30\}$ in roster form.
- 2) Find the coefficients of x^7 in the expansion of $(x - \frac{1}{x})^{13}$.
- 3) Find the centroid of a ΔABC if the coordinates of A (1, 1, 5), B (3,-5, 7) and C (-1, 7,-6) respectively.
- 4) Write the negation of the following statement:
P: For every real number x , $x^2 > x$.
- 5) Write the contra positive of the following statement:
"If a triangle is equilateral, it is isosceles".
- 6) Find the component statements of the following and check whether they are true or not. "All prime numbers are either even or odd".

SECTION-B

7) Let $U = \{x: x \in N, x \leq 9\}$; $A = \{x: x \text{ is an even number}, 0 < x < 10\}$

$B = \{2, 3, 5, 7\}$; verify that $(A \cup B)' = A' \cap B'$.

8) For what value of a and b if $\lim_{x \rightarrow 1} f(x) = f(1)$?

$$f(x) = \begin{cases} a + bx, & x < 1 \\ 4, & x = 1 \\ b - ax, & x > 1 \end{cases}$$

9) Draw the graph of

$$f(x) = \begin{cases} 1 - x, & x < 0 \\ 1, & x = 0 \\ 1 + x, & x > 0 \end{cases}$$

10) Find the square roots of $-15 - 8i$

OR

If $(x + iy)^3 = u + iv$, then show that $\frac{u}{x} + \frac{v}{y} = 4(x^2 - y^2)$

11) If the first and n th term of a G.P. are a and b , respectively, and if P is the

Product of n terms, prove that $P^2 = (ab)^n$

12) Find the derivative of $\tan x$ by the first principle.

13) Find the general solutions of the following equation

$$\tan^3 x - \tan x = 0$$

14) Prove that $\frac{\sin 5x - 2\sin 3x + \sin x}{\cos 5x - \cos x} = \tan x$

15) Prove by using P.M.I, for all $n \in N$

$$1 + \frac{1}{1+2} + \frac{1}{1+2+3} + \dots + \frac{1}{1+2+3+\dots+n} = \frac{2n}{n+1}$$

16) Find the length of latus rectum, transverse axis, conjugate axis, vertices, foci,

eccentricity and equations of directrices of the hyperbola $9x^2 - 16y^2 = 144$

OR

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

- 17) Find the equation of the perpendicular bisector of the line segment joining the points (0, 3) and (-4, 1)

OR

Find the equation of a line which passes through the points (22, -6) and the Intercept on the x - axis exceeds the intercept on the y - axis by 5.

- 18) Find the ratio in which the line segment joining the points P (4, 8, 10) and Q (6, 10, -8) is divided by XY-plane, also find the coordinates of that point.
- 19) An examination paper consists of 12 questions; there are 7 questions in part A and 5 questions in part B. A candidate is required to attempt 8 questions, selecting at least 3 from each part. In how many ways the candidate selects the questions?

OR

Find r , if ${}^5P_r = 6 {}^5P_{r-1}$.

SECTION-C

- 20) In a survey of 25 students, it was found that 15 had taken Mathematics, 12 had taken Physics and 11 chemistry, 5 had taken Mathematics & Chemistry, 9 had taken Mathematics & Physics, 4 had taken Physics & Chemistry, 3 had taken all three subjects. Find the number of students that had taken:
- (i) Only Mathematics (ii) None of the subjects
- (iii) Physics & Chemistry but not Maths (IV) Only one of the subjects
- 21) Solve graphically: $3x + 2y \leq 150, x + 4y \geq 80, x \geq 15, x \geq 0, y \geq 0$

- 22) The 2nd, 3rd and 4th terms in the expansion of $(x + a)^n$ are 240,720 and 1080 respectively. Find x, a & n .

OR

Show that the middle term in the expansion of $(1 + x)^{2n}$ is

$$\frac{1.3.5.....(2n-1)}{n!} 2^n x^n, \text{ where } n \text{ is a positive integer.}$$

- 23) Calculate mean, variance & Standard deviation for the following data:

Classes	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Freq.	3	7	12	15	8	3	2

- 24) Find the sum to n terms of the series: $.6 + .66 + .666 + \dots$

OR

The ratio of the A.M. and G.M. of two positive numbers a and b , is $m : n$.

$$\text{Show that } a : b = (m + \sqrt{m^2 - n^2}) : (m - \sqrt{m^2 - n^2})$$

- 25) In a ΔABC prove that: $\frac{b^2 - c^2}{a^2} \sin 2A + \frac{c^2 - a^2}{b^2} \sin 2B + \frac{a^2 - b^2}{c^2} \sin 2C = 0$

- 26) A debate competition on the topics "WORK IS WORKSHIP" is to be Organized. Out of 10 outstanding students consisting of 6 boys & 4 girls, 3 students are to be selected. What is the probability of selecting 1 boy & 2 girls? Give your comments about the topic.
