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.*

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 is 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 (AUB)' = A'∩ B'.

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

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

9) Draw the graph of

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

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 nth 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 $tanx$ by the first principle.

13) Find the general solutions of the following equation

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

14) Prove that $\frac{sin5x - 2sin3x + sinx}{cos5x - cosx} = tanx$

15) Prove by using P.M.I, for all n∈ N

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

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 7questions 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 $\mathbf{5\ {}^{4}p_{r} = 6\ {}^{5}p_{r-1}}$.

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: $\boldsymbol{3x + 2y \leq 150, x + 4y \geq 80, x \geq 15, x \geq 0, y \geq 0}$

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 $\frac{1.3.5.....(2n-1)}{n!} 2^n x^n$, where n 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 + ----------

OR

The ratio of the A.M. and G.M.0f two positive numbers a and **b**, is m: n.

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

25) In a ΔABC prove that: $\frac{b^2-c^2}{a^2} sin2A + \frac{c^2-a^2}{b^2} sin2B + \frac{a^2-b^2}{c^2} sin2C = 0$

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.