

GULF SAHODAYA (SAUDI CHAPTER) EXAMINATION-2015

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 case.
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SECTION-A

- 1) If  $A = \{-1, 1\}$ , Find  $A \times A \times A$ .
- 2) Find the general term in the expansion of  $(x^2 - y)^6$ .
- 3) Find the length of the median drawn from the vertex A of  $\Delta ABC$  where A (1, 1, 5), B (3,-5,8) and C (-1,7,-6) respectively.
- 4) Write the negation of the following statement:  
P: For every positive real number  $x$ , the number  $(x - 1)$  is, also positive.
- 5) Write the contrapositive and converse of the following statement:  
P:  $x$  is an even number implies that  $x$  is divisible by 4.
- 6) Write the following statement in form of "if p, then q"  
There is a traffic jam whenever it rains.
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SECTION-B

- 7) If  $U = \{1,2,3,4, \dots, 11\}$ ,  $A = \{2, 5, 9, 10\}$ ,  $B = \{1,4,7,9\}$   
3) verify that (i)  $(A \cup B)' = A' \cap B'$  (ii)  $(A \cap B)' = A' \cup B'$
- 8) Evaluate the limit:  $\lim_{x \rightarrow 0} \left( \frac{\operatorname{cosec} x - \cot x}{x} \right)$
- 9) Let  $A = \{1,2,3,4,5,6\}$  and let R be the relation on A defined by  
 $R = \{(a, b) : a, b \in A, b \text{ is exactly divisible by } a\}$ .  
(i) Write R in roster form (ii) Write domain of R (iii) Write range of R

10) Write the complex number  $\frac{1+7i}{(2-i)^2}$  in the polar form.

OR

Find the square roots of  $-7 + 24i$

11) The sum of two numbers is 6 times their geometric mean, show that the numbers are in ratio  $(3+2\sqrt{2}) : (3-2\sqrt{2})$

12) Find the derivative of  $\frac{x \tan x}{\cos x + \sin x}$

13) Prove that :

$$\cot 4x (\sin 5x + \sin 3x) = \cot x (\sin 5x - \sin 3x)$$

14) If  $\tan x = \frac{3}{4}$  and  $x$  lies in the 3<sup>rd</sup> quadrant, find the values of  $\sin \frac{x}{2}$ ,  $\cos \frac{x}{2}$  and  $\tan \frac{x}{2}$ .

15) Prove by using principle of mathematical induction, for all  $n \in N$

$$1^2 + 3^2 + 5^2 + \dots + (2n-1)^2 = \frac{n(2n-1)(2n+1)}{3}$$

16) Find the coordinates of the foci, the vertices, the length of major and minor axes and the length of latus rectum of the following curve.

$$36x^2 + 4y^2 = 144$$

OR

Find the equation of the circle which passes through  $(0, 0)$  and cuts off intercepts  $a$  and  $b$  on the coordinate axis.

17) Find the equation of a line parallel to  $y$ -axis and drawn through the point of intersection of the lines  $x - 7y + 5 = 0$  and  $3x + y = 7$

OR

Find the equation of a line which passing through the point of intersection of the lines

$4x + 7y - 3 = 0$  and  $2x - 3y + 1 = 0$  that makes equal intercepts on the axes.

18) A point  $R$  with  $x$ -coordinate 4 lies on the line segment joining the points

$P(2, -3, 4)$  and  $Q(8, 0, 10)$ . Find the coordinate of point  $R$

19) A group of 6 has to be formed from 7 boys and 4 girls, in how many ways can it be done when the group consists of

(i) At least one girl (ii) At most 3 boys

OR

Find the number of the words with or without meaning which can be made using all the letters of the word AGAIN. If these words are to be arranged as in a dictionary what will be the 50<sup>th</sup> word?

**SECTION-C**

20) 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% buy A and B, 3% buy B and C, 4% buy A and C. If 2% buy all three, find the number of families which buy newspaper (i) A only (ii) B only (iii) none of the three. (iv) Why according to you it important to read newspaper daily?

21) Solve graphically:  $4x + 3y \leq 60$ ,  $2x - y \leq 0$ ,  $x \geq 3$ ,  $x \geq 0$ ,  $y \geq 0$

22) The coefficient of three consecutive terms in the expansion of  $(x + 1)^n$  are in ratio of

1: 3: 5 find n

OR

Find the value of:  $(a^2 + \sqrt{a^2 - 1})^4 + (a^2 - \sqrt{a^2 - 1})^4$

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

C.I	70-75	75-80	80-85	85-90	90-95	95-100	100-105	105-110	110-115
f	3	4	7	7	15	9	6	6	3

24) If  $S_1, S_2, S_3$  are the sum of first n natural numbers, their squares and their cubes, respectively, show that  $9S_2^2 = S_3(1 + 8S_1)$

OR

Let the sum of n, 2n, 3n terms of an A.P be  $S_1, S_2, S_3$  respectively, show that

$$S_3 = 3(S_2 - S_1)$$

25) In a  $\Delta ABC$  prove that:  $a^2 + b^2 + c^2 = 2(bc \cos A + ca \cos B + ab \cos C)$ .

26) In a class of 60 students, 30 opted for Football, 32 opted for Cricket and 24 opted for both. If one student is selected at random, find the probability that

(a) The student has opted for Football or Cricket.

(b) The student has opted neither Football nor Cricket.

(c) The student has opted Football but not Cricket.

(e) Why do you think it is important for everybody to play outdoor games.

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