

GULF SAHODAYA (SAUDI CHAPTER) EXAMINATION 2014

SUBJECT: MATHEMATICS

GRADE-- 11

SET- B

M.Marks: 100

General instructions:

3 hrs

Time:

(i). All questions are compulsory .

Total

pages: 3

(ii). The question paper consists of 26 questions divided into three sections A, B and C.

Section A comprises of 6 questions of one mark each, Section B comprises of 13 questions of 4 marks each and Section C comprises of 7 questions of six marks each.

(iii). All questions in Section A are to be answered in one word, one sentence or as per the

exact 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 calculators is not permitted. However, you may ask for logarithmic tables, if

required.

SECTION A

1. Solve for x: $6 \leq -3(2x - 4) < 12$.
2. Find the coordinates of the focus of the parabola $y^2 - 8x = 0$.
3. Check whether the following sentences are statements. Give reasons for your answer
(i) 8 is less than 6 (ii) every set is a finite set.
4. Write the contrapositive of the following statement:
If a number is divisible by 4, then it is divisible by 2.
5. Find the component statements of the following statement and check whether they are true or not: $\sqrt{2}$ is a rational number or an irrational number.
6. Find the domain of the real function f defined by $f(x) = \sqrt{x - 2}$.

SECTION B

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

OR

Find the coordinates of the foci, the vertices, the length of the major and minor axes and the eccentricity of the ellipse $9x^2 + 4y^2 = 36$.

8. Find the ratio in which the line segment joining the points $(1, 2, 3)$ and $(-3, 4, -5)$ is divided by the xy -plane. Also find the coordinates of the point of intersection.

Page 2/3

9. Find the sum to n terms of the series: $1 \times 2 \times 3 + 2 \times 3 \times 4 + 3 \times 4 \times 5 + \dots$

10. Prove the following by using the principle of mathematical Induction:
 $7^n - 3^n$ is divisible by 4 for all natural numbers n .

11. Let $A = \{1, 2\}$, $B = \{1, 2, 3, 4\}$ and $C = \{5, 6\}$. Verify that $A \times (B \cap C) = (A \times B) \cap (A \times C)$.

12. Show that $A \cup B = A \cap B$ implies $A = B$.

13. Find the general solution of the equation: $\sin 2x - \sin 4x + \sin 6x = 0$

14. In any ΔABC , prove that $a \cos A + b \cos B + c \cos C = 2a \sin B \sin C$.

OR

Prove that $\cos 2x \cos \frac{x}{2} - \cos 3x \cos \frac{9x}{2} = \sin 5x \sin \frac{5x}{2}$.

15. Convert the following in the polar form: $\frac{i-1}{\cos \frac{\pi}{3} + i \sin \frac{\pi}{3}}$

OR

Find the square root of $-7 - 24i$.

16. Solve the following system of linear equations graphically:

$$4x + 3y \leq 60, \quad y \geq 2x, \quad x \geq 3, \quad y \geq 0$$

17. A group consist of 4 girls and 7 boys .In how many ways can a team of 5 members be selected if the team has

(i) No girl (ii) at least one boy and one girl.

18. How many words , with or without meaning, can be formed using all the letters of the word REPUBLIC at a time so that the vowels and consonants occur together? Do you remember republic day, what is its significance?

19. Find the coordinates of the foot of perpendicular from the point $(-1, 3)$ to the line $3x - 4y - 16 = 0$.

OR

If p is the length of the perpendicular from the origin to the line whose intercepts on the axes are a and b , then show that $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$

SECTION C

20. Find the mean and variance of the following frequency distribution.

Classes	0 - 30	30 - 60	60 - 90	90 - 120	120 - 150	150 - 180	180 - 210
Frequency	2	3	5	10	3	5	2

Page 3/3

21. In a survey of 100 students, the number of students studying the various languages is found as: English only 18; English but not Hindi 23; English and Sanskrit 8; Sanskrit and Hindi 8; English 26; Sanskrit 48 and no languages 24. Find
 (i) How many students are studying Hindi,
 (ii) How many students are studying English and Hindi both.

22. If $\tan x = -\frac{4}{3}$, $\frac{\pi}{2} < x < \pi$, find the value of $\sin \frac{x}{2}$, $\cos \frac{x}{2}$ and $\tan \frac{x}{2}$.

23. Find the coefficient of x^5 in the product $(1+2x)^6(1-x)^7$ using binomial theorem.
 OR

The coefficient of three consecutive terms in the expansion of $(1+x)^n$ are in the ratio 1 : 7 : 42, find n .

24. (i) Find the derivative of $\cos x$ from first principle.

(ii) Find $\lim_{x \rightarrow 0} \frac{x(e^x - 1)}{1 - \cos x}$.

25. The ratio of the A.M and G.M of two positive numbers a and b , is $m : n$. Show that $a : b = (m + \sqrt{m^2 - n^2}) : (m - \sqrt{m^2 - n^2})$.

OR

If a, b, c are in A.P; b, c, d are in G.P and $\frac{1}{c}, \frac{1}{d}, \frac{1}{e}$ are in A.P. Prove that a, c, e are in G.P.

26. Two students X and Y appeared in an examination. The probability that X will qualify the examination is 0.05 and that Y will qualify the examination is 0.10. The probability that both will qualify the examination is 0.02. Find the probability that
 (i) both X and Y will not qualify the examination.
 (ii) at least one of them will not qualify the examination.
 (iii) only one of them will qualify the examination.