SAMPLE QUESTION PAPER – Final Board Examination
CLASS XII -COMMERCE
MATHEMATICS &   STATISTICS

General Instructions:

Time Allowed : $2\frac{1}{2}$ hrs

Maximum Marks : 80

1. All questions are compulsory.
2. The question paper consists of 30 questions divided into five sections A, B, C, D, and E.
3. Section **A** contains **7** questions of **1** mark each , which are multiple choice type questions.
   Section **B** contains **7** questions of **2** marks each , Section **C** contains **7** questions of **3** marks
   each , Section **D** contains **7** questions of **4** marks each and section **E** contains **2** questions of **5**
   marks each.
4. There is no overall choice in the paper. However internal choice is provided in **2** questions of **3**
   marks , **2** questions of **4** marks each and **2** question s of **5** marks. In questions with choices only
   one of the choices is to be attempted.
5. Use of calculators is not permitted.

Section- A

**Question numbers 1 to 7 carry 1 mark each . In each question , four options
are provided , out of which one is correct. Select the correct option.**

1. Matrix A is called skew symmetric if ----

(A) $A' = A$ (B) $A' + A = I$ (C) $A' = -A$ (D) $A' = 0$

2. A matrix in which all the non-diagonal elements are zero is called ----- matrix

(A) Scalar   (B) Diagonal   (C)   Square   (D) Zero

3. If R is the relation in the set N given by R= { (a , b) / a = b - 2 , b > 6} then----

(A) (2, 6) $\in$ R   (B) (3, 8) $\in$ R   (C) (6, 8) $\in$ R   (D)   (8, 7) $\in$ R

4. $\int \dfrac{1}{x^2-a^2} dx = \; - - - -$

(A) $\frac{1}{2a} log \left|\frac{x+a}{x-a}\right| + c$ (B) $log \left|\frac{x+a}{x-a}\right| + c$

(C) $\frac{1}{2a} log \left|\frac{x-a}{x+a}\right| + c$ (D) $log \left|\frac{x-a}{x+a}\right| + c$

5. The difference between the resources and liabilities of a firm is called its -----

(A)   Future value   (B)   Present work

(C)   Profit   (D) Loss

6. An annuity is called ordinary annuity if -----
   (A) payments are made at the beginning of payment period.
   (B) payments are made after lapse of certain no of payment period.
   (C) Payments are made at the end of each payment period .
   (D) one time payment is made.

7. Amount of true discount on a bill of Rs 20,300 due 3 months hence at 6% per year is ---
   (A) Rs 250   (B) Rs 300   (C) Rs 400   (D) Rs 350

Section - B

Question numbers 8 to 14 carry 2 marks each.

8. By using determinants, find equation of line passing through (3,5) and (4,7).

9. If $x = a(\theta - sin\theta)$, $y = a(1 - cos\theta)$ then find $\frac{dy}{dx}$.

10. Write the constraints for the following shaded region.
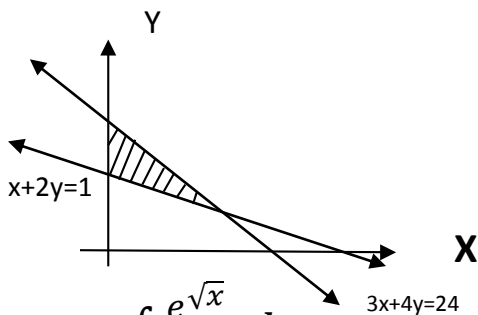
11. Evaluate $\int \frac{e^{\sqrt{x}}}{2\sqrt{x}} \, dx$

12. Evaluate $\int_0^1 \frac{x^2 + 3x + 2}{\sqrt{x}} dx$

13. A black and a red dice are rolled . Find the conditional probability of obtaining a sum greater than 9, given that the black die resulted in 5.

14. A, B and C are farmers sharing profits in the ratio 4:3:2 . B retires from the firm and A and C decided to share profits in the ratio 3:2. Calculate the gaining ratio.

Section - C

Question numbers 15 to 21 carry 3 marks each.

15. Find $\frac{dy}{dx}$, $if\ xy = 100(x + y)$ l

16. If y= $(Logx)^{Cosx} + x^x$,$then\ find\ \frac{dy}{dx}$

17. Show that the function f: R $\rightarrow$R defined by f(x) = $\frac{2x-3}{3}$, $x \in R$ is $bijective.$

18. Find $\int_0^2 x\sqrt{2-x}\ dx$

OR

Find $\int_0^{\frac{\pi}{2}} \frac{\sqrt{sinx}}{\sqrt{sinx}+\sqrt{cosx}}\ dx$

19. Solve the differential equation
$$x(1+y)dx - y(1+x^2)dy = 0\ ,given\ that\ \ x = 1\ ,y = 0$$

20. Form a differential equation representing the family of curves by eliminating arbitrary constants a and b from $y^2 = a(b^2 - x^2)$.

OR

Form differential equations eliminating constants A and B from y = Ae^{3x} + Be^{-2x}

21. A , B , and C started a partnership and invested Rs 100,000 ,Rs 80,000 and Rs 1,20,000 respectively. C took loan of Rs 70,000 and paid 9.5% interest to the firm. The firm earned the profit of Rs 1,35,000 in addition to the interest from the loan. Find each partners total earnings if the profit are distributed in the ratio of the capital investments.
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Section - D

Question numbers 22 to 28 carry 4 marks each.

22. By using properties of determinants as far as possible , show that

$$\begin{vmatrix} x+4 & 2x & 2x \\ 2x & x+4 & 2x \\ 2x & 2x & x+4 \end{vmatrix} = (5x+4)(4-x)^2$$

23. Solve 2x − y + z = 3 , - x +2y − z = - 4 , x − y + 2z = 1 by using matrix method.

24. Find the values of a and b if the function f(x) given by
$$f(x) = x + a\sqrt{2}sinx \qquad ,\ 0 \le x < \frac{\pi}{4}$$

$$= 2x\ cotx + b \qquad ,\ \frac{\pi}{4} \le x < \frac{\pi}{2}$$

$$= a\ cos2x - b\ sinx \qquad ,\ \frac{\pi}{2} \le x \le \pi$$

Is continuous on [0, π].

25. Evaluate $\int \log(9 + x)\, dx$

OR

Evaluate $\int \dfrac{sec^2x}{\sqrt{4sec^2x - 4\, tanx - 1}}\, dx$

26. Maximise $Z = 5x + 3y$, subject to the constraints
$3x + 5y \le 15$, $5x + 2y \le 10$, $x \ge 0$, $y \ge 0$.

27. A man is known to speak truth 3 out of 4 times. He throws a die and then reports that it is a six. Find the probability that it is actually six.

OR

Two cards are drawn successively without replacement from a pack of 52 playing Cards. Find probability distribution of number of kings.

28. The difference between the true discount and bankers discount on a bill due 6 months hence at 4% per annum is Rs 8 .Find the present worth ,true discount , the bankers discount and the amount of the bill.

Section - E

Question numbers 29 to 30 carry 5 marks each.

29. A house is sold for Rs 50,000 down and 10 semi annual payments of Rs 5000 each ,the first due 3 years hence. Find cash price of the house if money is worth 6% p .a compounded semi annually (use log tables).

OR

At the beginning of each month Rs 5000 is deposited into a savings account in a post office that pays 12% p.a. compounded monthly .What is the future value of the amount in the account at the end of 6 years. (use log tables).

30. The profit of a monopolist is given by $P(x) = \dfrac{800x}{500+x} - x$, find the value of x for which P(x) is maximum. Find the maximum profit.

OR

The manufacturing cost of an item consists of Rs 1000 as fixed costs, material cost Rs 2 per unit and labour cost $\dfrac{x^2}{90}$ for x units produced. Find how many units of the items should be produced so that the average cost is minimum.

E N D