KOTHARI INTERNATIONAL SCHOOL, NOIDA
ANNUAL EXAMINATION, SESSION: 2025-26
GRADE: 11 SUBJECT: APPLIED MATHEMATICS (241)

DATE& DAY: WEDNESDAY FEBRUARY 18, 2026
MAXIMUM MARKS: 80 **TIME ALLOTTED: 3 HOUR**
NAME: _____ **ROLL NO: _____**

GENERAL INSTRUCTIONS:

- ***i).*** *This is objective &Subjective Question Paper containing 38 questions.*
- ***ii).*** *This paper contains 20 questions of 1 marks each, 5 questions of 2 marks each and 6 questions of 3 marks each 4 questions of 5 marks each and 3 case based question of 4 marks*
- ***iii).*** *1 marks questions are MCQs.*
- ***iv).*** *2 marks questions are Short Answer Type Questions and are to be answered in 50-80 words.*
- ***v).*** *5 marks questions are Long Answer Type Questions and are to be answered in 80-120 words.*
- ***vi).*** *This question paper contains Case/Source Based Questions.*

SECTION – A

Q1. If a single letter is selected at random from the word **PROBABILITY**, then the probability of vowels is **(1)**

a) $\frac{2}{11}$

b) $\frac{1}{3}$

c) $\frac{4}{11}$

d) $\frac{3}{11}$

Q2. The coefficient of correlation is **(1)**

a) the square root of the coefficient of determination

b) the square of the coefficient of determination

c) greater than the coefficient of determination

d) equal to the coefficient of determination

Q3. The income tax act was passed in the year **(1)**

a) 1961

b) 1947

c) 1991

d) 1960

Q4. If $3^{5x} = \frac{1}{81}$, then x is **(1)**

a) - 4

b) 4

c) $\frac{-4}{5}$

d) $\frac{4}{5}$

Q5. If R = {(x, y) : x, y∈ **W** , $x^2 + y^2 = 169$}, then domain of R is **(1)**

a) { - 13, - 12, - 5, 0, 5, 12, 13}

b) {0, 5, 12, 13}

c) {0, 1, 2, 3,... 13}

d) {0,± 1, ± 2,... ± 13}

Q6. $2^4 = 16$ in logarithmic form is **(1)**

a) $\log_4 16 = 2$

b) $\log_2 16 = 4$

c) $\log_4 2 = 16$

d) 4 log 2 = log 16

Q7. If A and B are two events such that P(B) $=\frac{3}{5}$, P($\frac{A}{B}$) $=\frac{1}{2}$ and P(A ∪ B) $=\frac{4}{5}$, thenP(A) equals. **(1)**

a) $\frac{3}{5}$

b) $\frac{1}{2}$

c) $\frac{1}{5}$

d) $\frac{3}{10}$

Q8. The equation of circle which passes through the origin and whose centre is (3, 4) will be: **(1)**

a) $x^2 + y^2 - 3x - 4y = 0$

b) $x^2 + y^2 + 6x + 8y = 0$

c) $x^2 + y^2 - 6x - 8y = 0$

d) $x^2 + y^2 + 3x + 4y = 0$

Q9. Danger leads to _____. **(1)**

a) Help

b) Fear

c) Attack

d) Enemy

Q10. Mean deviation of n observations x_1 , x_2 , ... x_n from their mean $\bar{x}$ is **(1)**

a) $\frac{1}{n}\sum_{i=1}^{n}|x_i - \bar{x}|$

b) $\sum_{i=1}^{n}(x_i - \bar{x})$

c) $\sum_{i=1}^{n}(x_i - \bar{x})^2$

d) $\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^2$

Q11. If $\log 50 = \log 2 + \frac{x}{2} \log 5$, then x is **(1)**

a) 3

b) 1

c) 4

d) 2

Q12. The amount of money today which is equal to a series of payments in the future is: **(1)**

I. nominal value of annuity

II. sinking value of annuity

III. present value of annuity

IV. future value of annuity

a) ii and iii

b) iv and i

c) only iii

d) i and ii

Q13. A shopkeeper bought a TV from a distributor at a discount of 25% of the listed price of₹ 32000. The shopkeeper sells the TV to a consumer at the listed price. If the sales are intra - state and the rate of GST is 18%, the tax (under GST) paid by the distributor to the State Government is: **(1)**

a) ₹ 2160

b) ₹ 2880

c) ₹ 720

d) ₹ 4320

Q14. If A and B are two events such that P(A) = 0.2, P(B) = 0.4 and P(AU B) = 0.6, then $P(\frac{A}{B})$ is equal to: **(1)**

a) 0.5

b) 0.3

c) 0

d) 0.8

Q15. If A and B are two independent events such that 0 < P(A) < 1 and 0 < P(B) < 1, then which of the following is not correct? **(1)**

a) A' and B' are independent

b) A and B' are independent

c) A' and B are independent

d) A and B are mutually exclusive

Q16. Relationship between annual nominal rate of interest and annual effective rate of interest, if frequency of compounding is greater than one: **(1)**

a) Effective rate > Nominal rate

b) Effective rate <= Nominal rate

c) Effective rate < Nominal rate

d) Effective rate = Nominal rate

Q17. The straight lines l_1, l_2, l_3 are parallel and lie in the same plane. A total number of m points are taken on l_1 ; n points on l_2 ; k points on l_3 , The maximum number of triangles formed with vertices at these points are **(1)**

a) ${}^{(m+n+k)}C_3$

b) ${}^{(m+n+k)}C_3 - {}^{m}C_3 - {}^{n}C_3 - {}^{k}C_3$

c) ${}^{m}C_3 \times {}^{n}C_3 \times {}^{k}C_3$

d) ${}^{m}C_3 + {}^{n}C_3 + {}^{k}C_3$

Q18. If n(A) = 3, n(B) = 2, then number of non-empty relations from set A to set B are **(1)**

a) 8

b) 63

c) 4

d) 64

Assertion – Reason based questions

In questions 8 and 9, a statement of assertion (A) is followed by a statement of Reason (R) is given. Choose the correct answer out of the following choices.

(a) Both A and R are true and R is the correct explanation of A.

(b) Both A and R are true and R is not the correct explanation of A.

(c) A is true but R is false.

(d) A is false but R is true.

Q19. **Assertion(A):** If the variance of a mesokurtic curve is 7, then fourth central moment is 147. **(1)**

Reason(R): For mesokurtic curve, $\beta_2 = 3$.

Q20. **Assertion (A):** If A.M. and G.M. between two positive numbers are 20 and 16 respectively, then numbers are 32 and 8. **(1)**

Reason (R): If A and G are A.M. and G.M. respectively of two positive numbers, then numbers are $A \pm \sqrt{A^2 - G^2}$.

SECTION B

Q21. A can do a piece of work in 80 days. He works at it for 10 days and then B alone finishes the remaining work in 42 days. In how much time will A and B, working together, finish the work? **(2)**

Q22. Find the values of the letter and give a reason for the steps involved. **(2)**

$$\begin{array}{r} B\ A \\ \times\ B\ 3 \\ 57\ A \end{array}$$

OR

Find the values of the letter and give a reason for the steps involved.

$$\begin{array}{r} A\ B \\ \times\quad 5 \\ CAB \end{array}$$

Q23. A school follows the following criterion for grading a student for annual result. **(2)**

Assessment	Weightage
Homework	25%
Quiz	30%
Test	10%
Final Exam	35%
	100%

A student Scored 88 marks in Homework, 71 marks in Quiz, 97 marks in Test and 90 marks in final exam for mathematics. Find the students annual result in mathematics.

Q24. Differentiate the function $\frac{1}{x}$ with respect to x. **(2)**

OR

Find the derivative of the given function: $\log\left(\frac{\sqrt{x+1}+\sqrt{x-1}}{\sqrt{x+1}-\sqrt{x-1}}\right)$

Q25. Convert the decimal number13 to the equivalent binary number. **(2)**

SECTION C

Q26. If AM and GM are between two positive numbers x and y are 13 and 12 respectively, find the numbers. **(3)**

OR

Find three numbers in G.P. whose product is 216 and the sum of their products in pairs is 156.

Q27. Find the values of the letter and give a reason for the steps involved. **(3)**

$$\begin{array}{r} 2\,A\,B \\ +A\,B\,1 \\ \hline B\,1\,8 \end{array}$$

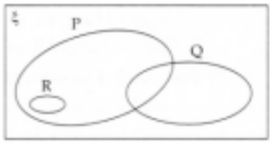
Q28. Find domain and range of the real function f(x) = $\frac{1}{1-x^2}$. **(3)**

Q29. The simple interest on a certain sum of money for 3 years at 5% per annum is₹ 1200. Find the amount due and the compound interest on this sum of money at the same rate after 3 years, interest is reckoned annually. **(3)**

Q30. For an industrial connection monthly consumption of water is 40 Kl, calculate the Water bill. Tariff rates can be considered as the table given below: **(3)**

Monthly Consumption (in Kilolitre)	Service Charge (in ₹)	Volumetric Charge (Per Kl in ₹)
Upto 20	146.41	5.27
20-30	219.62	*26.36
> 30	292.82	43.93
Plus Sewer Maintenance Charges: 60% of water volumetric charge		

Q31. In the adjacent Venn diagram, if $n(\xi) = 80$, $n(P) = 40$, $n(Q) = 28$, $n(P \cap Q) = 12$ and $n(P \cap R) = 10$, **(3)**



I. mark the number of elements in each region.

II. determine the value of n (P∪ Q) and n ((Q ∪ R)').

SECTION D

Q32. Find n, if, $(n + 2)! = 60 \cdot (n - 1)!$ **(5)**

OR

If there are 6 periods on each working day of a school, in how many ways can one arrange, 5 subjects such that each subject is allowed at least one period?

Q33. Evaluate: $\lim_{x \to 0} \frac{(\sin 3x + \sin 5x)}{(\sin 6x - \sin 4x)}$ **(5)**

Q34. Find the mean, variance and standard deviation of first 10 multiples of 4. **(5)**

OR

Calculate the mean deviation from the mean of the following distribution.

Marks	0-10	10-20	20-30	30-40	40-50
Number of students	5	8	15	16	6

Q35. Mr. Saxena from Bhopal, M.R has an electricity connection of 5 kW. He consumed 1264 units in one month. Calculate his electricity bill for that month. Tariff plan is given below: **(5)**

No. of Units (in kWh)	0 - 50	51 -100	101- 300	> 300
Price per unit (in ₹)	4.05	4.95	6.30	6.50

Fixed charge =₹ 250 per kW per month

Surcharge =Nil, Energy duty = ₹ 0.63 per unit

SECTION E

Q36. **Read the following text carefully and answer the questions that follow:** **4**

A market is in the form of a triangle whose vertices are B(- 2, 0), C(1, 12). The third vertex A of this trianagle lies on the mid point of the line joining the points (2, 1) and (4, 13).

I. What will be the coordinates of A? (1)

II. Find the slope of the line joining the points B and C? (1)

III. Equation of the line joining the points B and C? (2)

OR

Does point A lies on the line BC? (2)

Q37. **Read the following text carefully and answer the questions that follow:** **4**

Different organizations collect the data and analyse it quantitatively. During one such analysis some mistake crept in. The result given was that mean and variance of 100 observations as 40 and 5.1 but later on rechecking it was found that one observation was mistakenly taken as 50 instead of 40.

I. What is incorrect sum of variates? (1)

II. What is correct sum of observations? (1)

III. What is incorrect Σx^2 ? (2)

OR

What is corrected variance? (2)

Q38. A shopkeeper sells three types of flower seeds A_1, A_2, and A_3. They are sold as a mixture where the proportions are 4:4:2 respectively. The germination rates of the three types of seeds are 45%, 60% and 35%. **4**

I. What is the probability of a randomly chosen seed to germinate? (1)

II. What is the probability that the seed will not germinate given that the seed is of type A_3 ? (1)

III. What is the probability that the seed is of the type A_2 given that a randomly chosen seed does not germinate? (2)

OR

Find the probability that it is of the type A_1 given that a randomly chosen seed does not germinate? (2)