

BUDHA DAL PUBLIC SCHOOL, PATIALA

FINAL EXAMINATION (10 March 2026)

Class : XI (Set – A)

Subject : Mathematics (Applied) (241)

Time: 3hrs.

MM: 80

General Instructions :

1. This Question paper contains - five sections A, B, C, D and E. Each section is compulsory.
2. Section A has 20 MCQ's questions of 1 mark each.
3. Section B has 5 questions of 2 marks each.
4. Section C has 6 questions of 3 marks each.
5. Section D has 4 questions of 5 marks each.
6. Section E has 3 case based questions of 4 marks each.

Section – A

- Q1. Which of the following binary numbers 24?
a) 1101111 b) 11000 c) 111111 d) 11001
- Q2. The value of $\left(-\frac{1}{27}\right)^{-2/3}$ is
a) 9 b) -9 c) $\frac{1}{9}$ d) $-\frac{1}{9}$
- Q3. How many leap years do 300 years have?
a) 75 b) 74 c) 72 d) 73
- Q4. For any set A, $(A')'$ is equal to
a) A' b) A c) ϕ d) None of these
- Q5. Let A and B be two sets such that $n(A) = 16$, $n(B) = 14$, $n(A \cup B) = 25$, then $n(A \cap B)$ is
a) 120 b) 30 c) 5 d) 15
- Q6. If the sum of n-terms of an AP is giving by $S_n = 3n + 2n^2$ then common difference of AP is
a) 3 b) 2 c) 6 d) 4
- Q7. The Product of 5 terms of G.P whose 3rd term is 2 is
a) 5^2 b) 2^5 c) 3^2 d) 3^5
- Q8. In how many ways a committee consisting of 3 men and 2 women can be chosen from 7 men and 5 women
a) 45 b) 350 c) 4200 d) 230
- Q9. If 'KOLKATA' is coded as '111512111201', 'MUMBAI' will be coded as
a) 1220121268 b) 132113219 c) 1422142210 d) 1523152311
- Q10. Which of the following relations is a function?
a) $R = \{(4, 6), (3, 9), (-11, 6), (3, 11)\}$ b) $R = \{(1, 2), (2, 4), (2, 6), (3, 5)\}$
c) $R = \{(2, 1), (4, 3), (6, 5), (8, 7), (10, 9)\}$ d) $R = \{(0, 1), (1, 3), (2, 4), (3, 1)\}$

A-1



Q11. $\lim_{x \rightarrow 4} \frac{4x+3}{x-2}$ is equal to

- a) $\frac{17}{2}$ b) $\frac{19}{2}$ c) $\frac{11}{2}$ d) $\frac{13}{2}$

Q12. The derivative of $4\sqrt{x} - 2$ is

- a) $\frac{1}{\sqrt{x}}$ b) $\frac{2}{\sqrt{x}}$ c) $\frac{3}{\sqrt{x}}$ d) $-\frac{4}{\sqrt{x}}$

Q13. A coin is tossed twice. The probability of getting atleast one tail is

- a) $\frac{1}{4}$ b) $\frac{3}{2}$ c) $\frac{3}{4}$ d) $\frac{1}{2}$

Q14. A card is drawn from a deck of 52 cards. The probability of getting a king or a heart or a red card is

- a) $\frac{11}{26}$ b) $\frac{15}{26}$ c) $\frac{4}{13}$ d) $\frac{7}{13}$

Q15. The letters of the word "SOCIETY" are placed at random in a row. The probability that three vowels occur together is

- a) $\frac{1}{7}$ b) $\frac{2}{7}$ c) $\frac{3}{7}$ d) $\frac{4}{7}$

Q16. The mean of 6, 10, 7, 13, 4, 12, 8, 12 is

- a) 7 b) 8 c) 9 d) 10

Q17. The variance of first 5 natural number is

- a) 1 b) 2 c) 3 d) 4

Q18. The equation of line joining points $(-1, 3)$ and $(4, -2)$ is

- a) $x + y - 2 = 0$ b) $x - y + 2 = 0$ c) $x + y + 2 = 0$ d) $x - y - 2 = 0$

In the following questions a statements - Assertion (A) and Reason (R). Answer the question selecting appropriate option given below:

- a) Both A and R are true and R is correct explanation for A.
b) Both A and R are true but R is not correct explanation for A.
c) A is true but R is false.
d) A is false but R is true.

Q19. Assertion (A) : Mean is affected by extreme values of in a data set.

Reason (R) : Median is calculated using all observations

Q20. Assertion (A): If E and F are independent events such that $P(E) = 0.2, P(F) = T$ and

$$P(E \cup F) = 0.9, \text{ then } T = \frac{7}{5}$$

Reason (R) = For two independent events E and F, $P(E \cup F) = P(E) + P(F)$

Section - B

Q21. The average of 4 positive integers is 39. The highest integer is 73 and the lowest integer is 19. The difference between remaining two integers is 18. Find the remaining integers.

Q22. Find LCM of 4!, 5! and 6!

A - 2

Q23. Find the domain of $f(x) = \frac{x}{x^2+3x+2}$

Q24. Find the derivative of $(2x+3)(5x^2-7x+1)$ w.r.t x

Q25. Calculate the interest earned and the amount due if a sum of Rs. 15000 is invested for $1\frac{1}{2}$ years at 8% per annum compound interest being compounded semi annually.

Section - C

Q26. Find the sum of first n terms of the series $0.6 + 0.66 + 0.666 + \dots$

Q27. Read the information and answer the questions.

In a family there are 6 persons A, B, C, D, E and F. They are Entrepreneur, Lawyer, Teacher, Manager, Doctor and Engineer. The doctor is the grandfather of F, who is an entrepreneur. The Engineer D is married to A. C is married to Lawyer.

B is the mother of E and F. There are two married couple in the family.

- What is the profession of B?
- How A is related to E?
- How D is related to F?

Q28. Is the function f defined by

$$f(x) = \begin{cases} 2x^2 - 3 & \text{if } x \leq 1 \\ 5 & \text{if } x > 1 \end{cases}$$

Continuous at $x = 0$? What about the continuity at $x = 1$ and $x = 2$?

Q29. Find the mean, variance and standard deviation for the given data:

$x!$	4	8	11	17	20	24	32
$f!$	3	5	9	5	4	3	1

Q30. Find the centre and radius of the circle $2x^2 + 2y^2 - 3x + 5y - 7 = 0$

Q31. A bank pays 8% interest per annum compounded half yearly. What equal amount should be deposited at the end of each half year for $1\frac{1}{2}$ years to get an amount of Rs. 2000 at the end of 18 months? (Value of $(1.04)^3 = 1.125$)

Section - D

Q32. If $A = \{1, 2, 3\}$, $B = \{1, 2, 3, 4\}$ and $R = \{(x, y) : (x, y) \in A \times B, y = x + 1\}$, then

- Find $A \times B$
- Write R in roster form
- Represent R by an arrow diagram
- write domain of R
- write range of R

Q33. The adjoining Venn diagram shows three events A, B and C and also the probabilities of the various regions. Determine

- $P(A)$
- $P(A \cup B)$
- $P(B \cap C)$
- $P(B - C)$
- Probability of exactly one of the three events.

Q34. The following data relate to the number of vehicles owned and road deaths for the population of 12 countries. Calculate Spearman's rank Correlation Coefficient.

Vehicles per 100 population	30	31	32	30	46	30	19	35	40	46	57	30
Road deaths per 1,00,000 population	30	14	30	23	32	26	20	21	23	30	35	26

Q35. a) Find the equation of a straight line perpendicular to $2x = 3y + 5$ and with x -intercept -4

b) The vertices of a quadrilateral are $(-4, 2)$, $(2, 6)$, $(8, 5)$ and $(9, -7)$ using slopes, show that the mid points of the sides of the quadrilateral form a parallelogram.

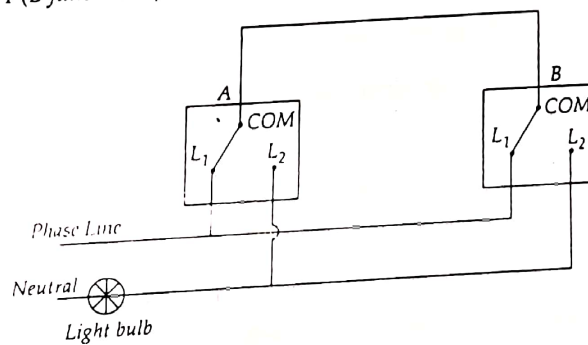
Section - E

Case Study based questions:

36. Following is a circuit diagram showing an electronic assembly consists of two sub-systems say A and B:

From previous testing procedures, the following probabilities are assumed to be known.

$$P(A \text{ fails}) = 0.2; P(B \text{ fails alone}) = 0.15; P(A \text{ and } B \text{ fail}) = 0.15.$$



Based on the above information, answer the following questions:

(a) What is probability that A fails alone?

OR

What is probability that neither A nor B fails?

(b) What is conditional probability that A fails given that B has failed?

(c) What is conditional probability that B fails given that A has failed?

37 Logarithm of a positive real number n has two parts:

- (i) Characteristic (ii) Mantissa.

(i) **Characteristic:** It is an integral part of $\log n$ which may be negative, zero or positive.

If n is greater than or equal to 1, then

characteristic = number of digits to the left of decimal -1 .

If n is less than 1, then

characteristic = $-(\text{number of 0's just after the decimal} + 1)$

(ii) **Mantissa:** It is positive fractional part of $\log n$. It is same for same significant figures in the same order and does not depend on the position of the decimal point.

Based on the above information, answer the following questions:

(a) If $\log 0.0004598 = \bar{4}.6626$, then find $\log 45.98$.

(b) If $\log 6832 = 3.8345$, then find $\log 0.06832$.

(c) If $\log 712.5 = 2.8528$ and $\log x = \bar{3}.8528$, then find x .

OR

If $\log 0.0009236 = \bar{4}.9653$ and $\log x = 4.9653$, then find x .

38

A manufacturer listed the price of his goods at ₹1600 per article. He allowed a discount of 25% to a wholesaler, who in turn allowed a discount of 20% on the listed price to a retailer. The retailer sells one article to a consumer at a discount of 5% on the listed price. All sales are intra-state and rate of GST is 5%.

Based on the above information, answer the following questions:

(a) Find the price per article inclusive of GST, which the wholesaler pays.

(b) Find the price per article inclusive of GST, which the retailer pays.

(c) Find the GST paid by the wholesaler to the State Government for the article.

OR

Find the GST paid by the retailer to the Central Government for the article.