

KENDRIYA VIDYALAYA SANGATHAN KOLKATA-1

SAMPLE QUESTION PAPER :2021-22

CLASS : XI

SUBJECT:-APPLIED MATHEMATICS

Max Marks:-40

Time: - 2 hours

General instructions

- (i) This question paper consists of three parts A ,B and C. Each part is compulsory.
 - (ii) Part A comprises of 6 questions of 2 marks each. Internal choice has been provided in two questions.
 - (iii) Part B comprises of 4 questions of 3 marks each. Internal choice has been provided in one question.
 - (iv) Part C comprises of 4 questions of 3 marks each. It contains one case study based question. Internal choice has been provided in one question.
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PART – A

SECTION- I

Q -1. Evaluate - $C(15,8) + C(15,9) - C(15,6) - C(15,7)$

OR

How many 4-digit numbers can be formed by using the digits 1 to 9 if repetition of digit is not allowed?

Q -2. Derivative of $(3x^2 - 5x + 1)^7$

Q -3. A coin is tossed three times .Consider the following events:

A : 'No head appears' **B:** 'Exactly one head appears' **C:**'Atleast two head appears'

Do they form a set of mutually exclusive.

OR

From the set $\{1,2,3,4,5\}$,two numbers a and b ($a \neq b$) are chosen at random.Find the probability that $\frac{a}{b}$ is an integer .

Q -4. A and B are two events such that $P(A) = 0.54$, $P(B) = 0.69$ and $P(A \cap B) = 0.35$, find $P(A \cap B^c)$.

Q -5. For what value of x are the points (1,5), (x,1) and (4,11) collinear?

Q -6. How much will Rs. 25000 amount to in 2 years, at compound interest if the rates for the successive years are 4% and 55 per year?

SECTION B

Q -7. Find the coordinates of focus, the equation of directrix and the length of latus-rectum of the conic represented by the equation $5x^2 = -12y$.

Q-8. The value of a machine depreciates at the rate of 10% per annum. It was purchased 3 years ago. If its present value is Rs 43740, find its purchase price.

OR

Find the future value of an annuity of Rs. 500 made annually for 7 years at interest rate of 14% compounded annually. Given that $(1.14)^7 = 2.5023$.

Q -9. Ms. Chawla goes to a shop to buy a leather coat which cost Rs. 885 (list price). The rate of GST is 18%. She tells the shopkeeper to reduce the price to such an extent that she has to pay Rs. 885, inclusive of GST. Find the reduction needed in the price of the coat.

Q-10. Mr. Pandey lives in Lucknow, Uttar Pradesh. The reading of electric meter of his house is found to be 5678 units. If the previous month's reading was 4803 units and connection load is 4 kW. Calculate his electricity bill for that month.

Tariff plan is given below:

Energy charges

No. of units	0-150	151-300	301-500	>500
Price per unit (in Rs.)	Rs.5.5	Rs. 6	Rs. 6.5	Rs. 7

Fixed charges Rs. 110 per kW/month

Energy tax is 5% of tariff rates

Surcharge is Rs. 0.26 per unit

SECTION- C

Q- 11. In how many ways can final eleven be selected from 15 cricket players if

(i) there is no restriction

(ii) one of them must be included

- (iii) one of them, who is in bad form, must always be excluded
 (iv) two of them being leg spinners, one and only one leg spinner must be included?

Q-12. If the function $f(x) = \begin{cases} 3ax + b, & x > 1 \\ 11, & x = 1 \\ 5ax - 2b, & x < 1 \end{cases}$ is continuous at $x=1$, find the values a and b .

Q-13. An integer is chosen at random from the numbers 1 to 50. what is the probability that the integer chosen is a multiple of 2 or 3 or 10?

OR

A car manufacturing factory has two plants X and Y. Plant X manufactures 70% of the car and plant Y manufactures 30%. 80% of the cars at plant X and 90% of the cars at plant Y are rated of standard quality. A car is chosen at random and is found to be of standard quality. What is the probability that it has come from plant X?

CASE STUDY

Q-14. In financial year 2019-20, Varan's (age 38 years) gross salary was Rs 7,28,000 (exclusive of HRA). He deposited Rs. 8000 per month in NPS and paid Rs. 21825 as premium of LIC. He deposited Rs. 5000 in his PPF account and paid Rs. 40000 as the tuition fee of his two children.

Income Tax Slab for FY 2019-20 (A.Y. 2020-21) (For individual tax payers below the age of 60 years)	
Taxable Income	Income Tax
Upto ₹ 2,50,000	NIL
₹ 2,50,001 to ₹ 5,00,000	5% of taxable income exceeding ₹ 2,50,000
₹ 5,00,001 to ₹ 10,00,000	₹ 12,500 + 20% of taxable income exceeding ₹ 5,00,000
Above ₹ 10,00,000	₹ 1,12,500 + 30% of taxable income exceeding ₹ 10,00,000

For individual tax payers (60 years old or more but less than 80 years) (Senior Citizens)	
Taxable Income	Income Tax
Upto ₹ 3,00,000	NIL
₹ 3,00,001 to ₹ 5,00,000	5% of taxable income exceeding ₹ 3,00,000
₹ 5,00,001 to ₹ 10,00,000	₹ 10,000 + 20% of taxable income exceeding ₹ 5,00,000
Above ₹ 10,00,000	₹ 1,10,000 + 30% of taxable income exceeding ₹ 10,00,000

Tax rebate under section 87A. Section 87A provides tax relief to individual tax payers whose taxable income does not exceed to a specific amount. A tax rebate under section 87A is allowed to individual tax payers a maximum amount of ₹ 12500 for taxable income upto ₹ 5 lakh for Financial Year 2019-20.

Health and Education Cess. A cess is a form of tax collected by the government for the development or welfare of Health and Education sectors.

At present 4% health and education cess is levied on the income tax calculated.

(a) Calculate the taxable income by him.

(b) Calculate the income tax paid by him at the end of the financial.