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FOR MAHARASHTRA BOARD (MSBSHSE) CLASS 12 EXAM PREPARATION

Maharashtra Board (MSBSHSE) Class 12 2026 June Session Question Paper · Maths (Commerce)

EXAM
Maharashtra Board (MSBSHSE) Class 12

YEAR
2026

TYPE
June Session Question Paper

SUBJECT
Maths (Commerce)

Page No. 1/11	Subject Code J-280	Seat No.							

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DATE : 24/06/2026

Time : 11.00 - 2.00

SUBJECT : MATHEMATICS & STATISTICS (COMMERCE) (88)

DURATION : 3 Hours | TOTAL PAGES : 11 | TOTAL MARKS : 80

General Instructions :

(i) All questions are compulsory.

(ii) There are six questions divided into two sections.

(iii) Write answers of Section-I and Section-II in the same answer book.

(iv) Use of logarithmic tables is allowed. Use of calculator is not allowed.

(v) For L.P.P. and Time Series graph paper is not necessary. Only rough sketch of graph is expected.

(vi) Start answer to each question on a new page.

(vii) For each objective type of question (i.e. Q.1 and Q.4) only the first attempt will be considered for evaluation.

SECTION - I

Q. 1. (A) Select and write the correct answer of the following multiple choice type of questions (1 mark each) : (6) **12**

(i) If p is any statement then $(p \vee \sim p)$ is a

(a) Contradiction (b) Tautology

(c) Contingency (d) None of them

End of Page 1 (P.T.O.)

(ii) If $A=\begin{bmatrix}4 & x\\ 6 & 3\end{bmatrix}$ is a singular matrix then x is

(a) 2 (b) –2

(c) 3 (d) –3

(iii) If $y=e^{\log x}$ then $\frac{dy}{dx}$ is

(a) $\frac{e^{\log x}}{x}$ (b) $\frac{1}{2}$

(c) 1 (d) both (a) and (c)

(iv) If $0<\eta<1$, then the demand is

(a) elastic (b) unitary elastic

(c) relatively elastic (d) relatively inelastic

(v) $\int x^2(3)^{x^3}\,dx=$ _____

(a) $\frac{(3)^{x^3}}{3\cdot\log 3}+c$ (b) $(3)^{x^3}+c$

(c) $(\log 3)(3)^{x^3}+c$ (d) $x^2(3)^{x^3}+c$

(vi) $\int_{-9}^{9}\frac{x^3}{4-x^2}dx=$ _____.

(a) 1 (b) 0

(c) –1 (d) $\frac{3x^2}{(4-x^2)^2}$

(B) State whether the following statements are true or false (1 mark each) : (3)

(i) The slope of the tangent at any point (a, b) is called as gradient of the curve.

(ii) $\int\frac{1}{2x+3}dx=\log|2x+3|+c$

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(iii) Order and degree of a differential equation are always positive integers.

(C) Fill in the following blanks (1 mark each) : (3)

(i) The dual of $(p \wedge \sim q) \vee t$ is _____.

(ii) $\int e^x \left(\frac{1}{x} - \frac{1}{x^2}\right) dx =$ _____.

(iii) The integrating factor of the differential equation $\frac{dy}{dx} - y = x$ is _____.

Q. 2. (A) Attempt any TWO of the following questions (3 marks each) : (6) **14**

(i) Write the converse, inverse and contrapositive of the following statement.

'If a man is rich, then he is happy.'

(ii) Find the inverse of matrix $\begin{bmatrix} 1 & 2 & 3 \\ 1 & 1 & 5 \\ 2 & 4 & 7 \end{bmatrix}$ by adjoint method.

(iii) Find the rate of change of demand (x) of a commodity with respect to its price (y) if $y = \frac{5x+7}{2x-13}$

(B) Attempt any TWO of the following questions (4 marks each) : (8)

(i) Evaluate : $\int \frac{e^x}{\sqrt{e^{2x} + 4e^x + 13}} dx$

(ii) Evaluate : $\int_2^5 \frac{\sqrt{x}}{\sqrt{x} + \sqrt{7-x}} dx$

(iii) Find the area of ellipse $\frac{x^2}{25} + \frac{y^2}{4} = 1$

End of Page 3 (P.T.O.)

Q. 3. (A) Attempt any TWO of the following questions (3 marks each) : (6) **14**

(i) Determine whether the following statement pattern is tautology, contradiction or contingency.

$[p \wedge (\sim p \vee q)]$

(ii) If $x^y = e^{x-y}$ then prove that $\frac{dy}{dx} = \frac{\log x}{(1+\log x)^2}$.

(iii) The manufacturing company produces x items at the total cost of ₹ $(180+4x)$. The demand function for this product is $P = (240 - x)$. Find x for which profit is increasing.

(B) Attempt any ONE of the following questions (4 marks each): (4)

(i) Solve the following equation by method of reduction :

$x - y + z = 4$

$2x + y - 3z = 0$

$x + y + z = 2$

(ii) In a certain culture of bacteria, the rate of increase is proportional to the number present. If it is found that the number doubles in 4 hours, find the number of times the bacteria increased in 12 hours by using the concept of application of differential equations.

(C) Attempt any ONE of the following questions (Activity) (4 marks each): (4)

(i) Demand function x, for a certain commodity is given as $x = 200 - 4p$, where p is the unit price. Find

(a) elasticity of demand as a function of p.

(b) elasticity of demand when $p = 10$. Interpret your result.

End of Page 4

Solution :

(a) Here, $x = 200 - 4p$

$\therefore$ Elasticity of demand is

$$\eta = \frac{-p}{x}$$

$$= \frac{-p}{(200-4p)}$$

$\therefore$ $$\eta = \frac{p}{50-p}$$

(b) When $p = 10$

$$\eta = \frac{10}{}$$

$$= 0.25$$

$\therefore$ Demand is for $p = 10$

(ii) Solve the following differential equations $\frac{dy}{dx} + y = 5$

Solution : $\frac{dy}{dx} + y = 5$

Given equation is a linear differential equation.

Here $P =$ $Q = 5$

$\therefore$ I.F. = $e^{\int p dx}$

$\therefore$ I.F. =

The solution of given linear differential equation is

By formula

$\therefore$ $y \cdot e^x = \int 5 \cdot e^x dx + c$

$\therefore$

End of Page 5 (P.T.O.)

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SECTION - II

Q. 4. (A) Select and write the correct answer of the following multiple choice type of questions (1 mark each) : (6) **12**

(i) The date on which period of the bill expires is called ____.

(a) Legal due date (b) Date of discounting

(c) Nominal due date (d) Date of drawing

(ii) Loss = ____.

(a) $\text{Claim} \times \frac{\text{Policy value}}{\text{Property value}}$ (b) $\text{Claim} \times \frac{\text{Property value}}{\text{Policy value}}$

(c) Claim × Property value (d) Claim × Policy value

(iii) In regression analysis $b_{yx} \cdot b_{xy}$ = _____.

(a) $V(x)$ (b) σ_x

(c) $(\sigma_y)^2$ (d) r^2

(iv) Moving averages are useful in identifying ____.

(a) Trend component (b) Irregular component

(c) Seasonal component (d) Cyclical component

(v) Price Index Number by Simple Aggregate Method is given by

(a) $\Sigma \frac{p_1}{p_0} \times 100$ (b) $\Sigma \frac{p_0}{p_1} \times 100$

(c) $\frac{\Sigma p_1}{\Sigma p_0} \times 100$ (d) $\frac{\Sigma p_0}{\Sigma p_1} \times 100$

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(vi) Objective function of LPP is

(a) a constraint

(b) a function to be maximized or minimized

(c) a relation between the decision variables

(d) a feasible region

(B) State whether the following statements are true or false (1 mark each) : (3)

(i) The difference between the banker's discount and true discount is called the Banker's gain.

(ii) One of the assumptions made while sequencing n jobs on 2 machines is : two jobs must be loaded at a time on any machine.

(iii) Quantity Index Number by simple aggreate method is given by $\frac{\Sigma q_1}{\Sigma q_0} \times 100$.

(C) Fill in the following blanks (1 mark each) : (3)

(i) If $P_{01}(L) = 225, P_{01}(P) = 144$ then $P_{01}(F) =$ _____.

(ii) Graphical solution set of the inequations $x \geq 0, y \geq 0$ lies in _____ quadrant.

(iii) For solving an assignment problem the matrix should be a ____ matrix.

End of Page 7 (P.T.O.)

Q. 5. (A) Attempt any TWO of the following questions (3 marks each) : (6) **14**

(i) Obtain the 4-yearly centered moving averages for the following data :

Years	1971	1972	1973	1974	1975	1976
Production	1	0	1	2	3	2

Years	1977	1978	1979	1980	1981	1982
Production	3	6	5	1	4	10

(ii) Find the sequence that minimizes the total elapsed time to complete the following jobs. Each job is processed in order *AB*. Also find the idle time for machine *B*.

	Jobs (Processing times in minutes)						
	I	II	III	IV	V	VI	VII
Machine *A*	12	6	5	11	5	7	6
Machine *B*	7	8	9	4	7	8	3

(iii) A car firm has 2 cars, which are hired out day-by-day. The number of cars hired on a day follows Poisson distribution with mean 1.5. Find the probability that some demand is refused on a given day.
[Given $e^{-1.5} = 0.2231$]

(B) Attempt any TWO of the following questions (4 marks each) : (8)

(i) Minimize : $z = 4x + 2y$

Subject to : $3x + y \geq 27$

$x + y \geq 21$

$x + 2y \geq 30$

$x \geq 0, y \geq 0$

Solve the above L.P.P. by graphical method.

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(ii) Four different machines can do any of the three required jobs, with different profits resulting from each assignment as shown below :

Jobs	Machines Profit (in ₹)			
	A	B	C	D
1	35	40	43	41
2	40	48	44	43
3	50	45	46	48

Find the optimal assignment schedule.

(iii) A random variable X has the following probability distribution :

x	1	2	3	4	5	6	7
$P[X = x]$	k	$2k$	$2k$	$3k$	k^2	$2k^2$	$7k^2+k$

Determine (a) k (b) $P(X < 3)$ (c) $P(X > 6)$ (d) $P(0 < X < 1)$

Q. 6. (A) Attempt any TWO of the following questions (3 marks each) : (6) **14**

(i) Find the amount a company should set aside at the end of every year if it wants to buy a machine expected to cost ₹ 4,31,000 at the end of 4 years and interest rate is 5% p.a. compounded annually.
[Given $(1.05)^4 = 1.2155$]

(ii) For the following bivariate data obtain equation of regression line Y on X:

X	1	2	3	4	5
Y	5	7	9	11	13

(iii) Following table shows the number of traffic fatalities (in a state) resulting from drunken driving from years 1975 to 1983 :

Years	1975	1976	1977	1978	1979	1980	1981	1982	1983
No. of deaths	0	6	3	8	2	9	4	5	10

Fit a trend line by least square method.

End of Page 9 (P.T.O.)

(B) Attempt any ONE of the following questions (4 marks each) : (4)

(i) Given that $\Sigma p_0 q_0 = 120$, $\Sigma p_0 q_1 = 160$, $\Sigma p_1 q_1 = 140$ and $\Sigma p_1 q_0 = 200$ Find Laspeyre's, Paasche's, Dorbish-Bowley's and Marshall-Edgeworth's Price Index Numbers.

(ii) A die is thrown 4 times. If 'getting an odd number' is a success, find the probability of (a) 2 successes (b) at least 3 successes (c) at the most 2 successes.

(C) Attempt any ONE of the following questions (Activity) (4 marks each) : (4)

(i) Rajesh gets a commission at 10% on cash sales and 8% on credit sales. If he receives ₹ 4,400 as commission on the total sales of ₹ 50,000, find the sales made by him on cash and on credit sales.

Solution :

Let cash sales be ₹ x

$\therefore$ Credit sales = ₹ $\square$

Total commission = 10% on x + 8% on $(50,000 - x)$

$\therefore$ $\square = x \times \frac{10}{100} + (50,000 - x) \times \frac{8}{100}$

$\therefore$ $x = \square$

$\therefore$ Commission on cash sales is ₹ 20,000 and on credit sales is ₹ $\square$

(ii) The equations of two regression lines are $16y + x = 64$ and $x + 4y = 5$. Find regression coefficients and correlation coefficient.

Solution :

Suppose that equation of regression line of Y on X be $16y + x = 64$ and equation of regression line of X on Y be $x + 4y = 5$

End of Page 10

Now $16y + x = 64$ and $x + 4y = 5$

$\therefore$ $y = \frac{-1}{16}x + 4$ and $x = -4y + 5$

$\therefore$ $b_{yx} = \square$ and $b_{xy} = \square$

$b_{yx} \times b_{xy} = \frac{1}{4}$

$\therefore$ $b_{yx} \times b_{xy} < 1$

$\therefore$ Our assumption is correct.

$\therefore$ $r^2 = \square$

$\therefore$ $r = \square$

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