PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BVoc DEGREE EXAMINATION DECEMBER 2025
(Second Semester)

Branch – **BANKING, STOCK & INSURANCE**

MATHEMATICS FOR BUSINESS

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	The 'fees' or the 'charge' paid by the borrower for using the money of the lender is called _____. a) Principal b) Interest c) Amount d) Unit of time	K1	CO1
	2	In Simple Interest, $P =$_____. a) $nr/100I$ b) $100I/nr$ c) $100I$ d) $100nr$	K2	CO1
2	3	The difference between banker's discount and true discount is the _____. a) True discount b) Banker's discount c) Banker's gain d) Principal	K1	CO2
	4	The value due on the due date from a bill of exchange is its _____. a) Due date b) Face value c) True discount d) Banker's discount	K2	CO2
3	5	In North-West Corner Method, the allocations are made _____. a)starting from the right hand side top corner b) starting from the left hand side top corner c) starting from the lowest cost cell d) starting from the lowest cost cell	K1	CO3
	6	The number of basic variables in an m X n transportation problem is _____. a) $m+n-1$ b) $m-n+1$ c) $m-n-1$ d) $m+n+1$	K2	CO3
4	7	In game theory the competitors are called ____. a) owners b) competitors c) clients d) players	K1	CO4
	8	The gain of one player is a loss for another player is called _____. a) a two-person zero sum game b) a three-person zero sum game c) zero sum game d) game	K2	CO4
5	9	The average number of customers being served per unit of time is denoted by _____. a) λ/μ b) ρ c) λ d) μ	K1	CO5
	10	The last symbol of $(a/b/c)$: (d/e) is _____. a) inter arrival and service time b) number of servers c) capacity of the system d) queue discipline	K2	CO5

Cont...

SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

<table>
<tr><th>Module No.</th><th>Question No.</th><th>Question</th><th>K Level</th><th>CO</th></tr>
<tr><td rowspan="3">1</td><td>11.a.</td><td>Find the compound interest on Rs.20,000 for 5 years at 20% per annum. What will be the simple interest in the above case?</td><td rowspan="3">K3</td><td rowspan="3">CO1</td></tr>
<tr><td colspan="2">(OR)</td></tr>
<tr><td>11.b.</td><td>At the end of each year, the value of a machine depreciates by 10% of its value at the commencement of the year. If the value of the machine at the commencement was Rs.58,750, find the value of the machine after 3 years.</td></tr>
<tr><td rowspan="3">2</td><td>12.a.</td><td>A person deposits Rs.5,000 every year with a company which pays him interest at 12% per annum. He allows his deposits to accumulate with the company at compound interest. What would be the amount standing to his credit one year after he has made his deposit for 15th time?</td><td rowspan="3">K3</td><td rowspan="3">CO2</td></tr>
<tr><td colspan="2">(OR)</td></tr>
<tr><td>12.b.</td><td>Find the cash value of a bill of Rs.4,200 due 5 months hence at 7.5% p.a.</td></tr>
<tr><td rowspan="3">3</td><td>13.a.</td><td>Obtain an initial basic solution by North – West Corner Method:
<table>
<tr><td></td><td>1</td><td>2</td><td>3</td><td>4</td><td>Availability</td></tr>
<tr><td>I</td><td>11</td><td>13</td><td>17</td><td>14</td><td>250</td></tr>
<tr><td>II</td><td>16</td><td>18</td><td>14</td><td>10</td><td>300</td></tr>
<tr><td>III</td><td>21</td><td>24</td><td>13</td><td>10</td><td>400</td></tr>
<tr><td>Demand</td><td>200</td><td>225</td><td>275</td><td>250</td><td></td></tr>
</table></td><td rowspan="3">K3</td><td rowspan="3">CO3</td></tr>
<tr><td colspan="2">(OR)</td></tr>
<tr><td>13.b.</td><td>Find the an initial basic solution by Matrix Minima Method:
<table>
<tr><td></td><td>D_1</td><td>D_2</td><td>D_3</td><td>D_4</td><td>Supply</td></tr>
<tr><td>S_1</td><td>1</td><td>2</td><td>3</td><td>4</td><td>6</td></tr>
<tr><td>S_2</td><td>4</td><td>3</td><td>2</td><td>0</td><td>8</td></tr>
<tr><td>S_3</td><td>0</td><td>2</td><td>2</td><td>1</td><td>10</td></tr>
<tr><td>Demand</td><td>4</td><td>6</td><td>8</td><td>6</td><td></td></tr>
</table></td></tr>
<tr><td rowspan="3">4</td><td>14.a.</td><td>For what values of λ, the game with following payoff matrix is strictly determinable?
Player B
Player A $\begin{bmatrix} \lambda & 6 & 2 \\ -1 & \lambda & -7 \\ -2 & 4 & \lambda \end{bmatrix}$</td><td rowspan="3">K3</td><td rowspan="3">CO4</td></tr>
<tr><td colspan="2">(OR)</td></tr>
<tr><td>14.b.</td><td>Solve the game and determine the value of the game for the following payoff matrix:
P_2
$P_1 \begin{bmatrix} 1 & 3 \\ 4 & 2 \end{bmatrix}$</td></tr>
</table>

5	15.a.	In a railway marshaling yard, goods trains arrive at a rate of 30 trains per day. Assuming that the inter-arrival time follows an exponential distribution and the service time distribution is also exponential with an average 36 minutes. Calculate the following: (i) the mean queue size and (ii) the probability that the queue size exceeds 10.	K3	CO5
		(OR)		
	15.b.	Explain the operating characteristics of a queueing system.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Mr. Somasundaram deposits a total of Rs.45,000 in two different banks which give 10% and 15% interest respectively. If the amounts repayable by the two banks at the end of 10 years are to be equal, determine the individual amounts of deposit.	K4	CO1
2	17	True discount on a bill drawn on 25th April for 7 months and discounted on 5th July is Rs.40 while the Banker's Discount is Rs.40.64. What is the value of the bill and the rate of interest?	K4	CO2
3	18	Find the staring solution in the following transportation problem by Vogel's approximation method. Also obtain the optimum solution : W_1 W_2 W_3 W_4 Supply O_1 21 16 25 13 11 O_2 17 18 14 23 13 O_3 32 27 18 41 19 Demand 6 10 12 15	K4	CO3
4	19	Solve the following 2*4 game graphically Player B Player A $\begin{bmatrix} 2 & 1 & 0 & -2 \\ 1 & 0 & 3 & 2 \end{bmatrix}$	K4	CO4
5	20	Assume that the goods trains are coming in a yard at the rate of 30 trains per day and suppose that the inter-arrival times follow an exponential distribution. The service time for each train is assumed to be exponential with an average of 36 minutes. If the yard can admit 9 trains at a time(there being 10 lines, one of which is reserved for shunting purposes), calculate the probability that the yard is empty and find the average queue length.	K4	CO5

Z-Z-Z END