

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BBA DEGREE EXAMINATION MAY 2026
(Second Semester)

Common to Branches – **BUSINESS ADMINISTRATION/ BUSINESS
ADMINISTRATION(INFORMATION SYSTEM)/ BUSINESS
ADMINISTRATION(RETAIL MANAGEMENT)BUSINESS ADMINISTRATION
(LOGISTICS)**

APPLIED OPERATIONS RESEARCH

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	Operations Research is a scientific approach to problems solving for executive management- stated by a) H M Wagner b) T L Saaty c) H A Taha d) G E Kimball	K3	CO1
	2	Which of the following method is not the general solution to O.R models? a) Analytical method b) Numerical method c) Monte Carlo method d) Graphical method	K3	CO1
2	3	How many occupied cells must a transportation matrix with 8 rows and 7 columns have so that it DOES NOT degenerate? a) 15 b) 55 c) 56 d) 14	K4	CO2
	4	Which of the following methods is commonly used to solve assignment problem? a) Stepping stone method b) Hungarian method c) North –West corner method d) Vogel's approximation method	K4	CO2
3	5	The size of payoff matrix of a game can be reduced by using the principle of a) game inversion b) rotation reduction c) dominance d) game transpose	K3	CO4
	6	For an M/M/1 queuing system with an arrival rate of 6 customers per hour and a service rate of 10 customers per hour. What is the average number of customers in the system? a) 2.4 customers b) 1.5 customers c) 3.0 customers d) 0.6 customers	K3	CO4
4	7	In production planning and control , sequencing problem can be solved by using a) Gantt chart b) Only Delhi method c) Both Break even point and Delphi method d) Only Break even point	K3	CO3
	8	The replacement policy that is imposed on an item irrespective of its failure is a) Group replacement b) Individual replacement c) Repair spare replacement d) Successive replacement	K3	CO3

Cont...

5	9	Critical path method is good for a) Small project only b) Large product only c) Both small and large projects equally d) Neither small nor large projects	K2	CO5
	10	PERT is used in the preparation of : a) Budgeting b) Scheduling c) Evaluating d) Finalizing	K2	CO5

SECTION - B (35 Marks)

Answer ALL questions

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

Module No.	Question No.	Question	K Level	CO																													
1	11.a.	Explain the nature and features of operations research.	K3	CO1																													
	11.b.	(OR) Solve the following LPP graphically: Maximize $Z = 3x + 4y$ Subject to the constraints $4x + 2y \leq 80$ $2x + 5y \leq 180$ and $x, y \geq 0$																															
2	12.a.	Obtain an initial basic feasible solutions to the following transportation problem by VAM . <table> <tr> <td></td> <td></td> <td></td> <td></td> <td>Capacity</td> </tr> <tr> <td></td> <td>40</td> <td>25</td> <td>22</td> <td>33</td> <td>200</td> </tr> <tr> <td></td> <td>44</td> <td>35</td> <td>30</td> <td>30</td> <td>60</td> </tr> <tr> <td></td> <td>38</td> <td>38</td> <td>28</td> <td>30</td> <td>140</td> </tr> <tr> <td>Demand</td> <td>200</td> <td>40</td> <td>120</td> <td>40</td> <td></td> </tr> </table>					Capacity		40	25	22	33	200		44	35	30	30	60		38	38	28	30	140	Demand	200	40	120	40		K4	CO2
					Capacity																												
	40	25	22	33	200																												
	44	35	30	30	60																												
	38	38	28	30	140																												
Demand	200	40	120	40																													
12.b.	(OR) What are the steps in the Hungarian method of solving an assignment problem?																																
3	13.a.	For the given payoff matrix: <table> <tr> <td></td> <td></td> <td colspan="2">Player B</td> </tr> <tr> <td></td> <td></td> <td>B₁</td> <td>B₂</td> </tr> <tr> <td>A₁</td> <td>10</td> <td>6</td> <td></td> </tr> <tr> <td colspan="2">Player A</td> <td></td> <td></td> </tr> <tr> <td>A₂</td> <td>8</td> <td>2</td> <td></td> </tr> </table> Determine the best strategies for players A and B and also the value of the game.			Player B				B ₁	B ₂	A ₁	10	6		Player A				A ₂	8	2		K3	CO4									
			Player B																														
		B ₁	B ₂																														
A ₁	10	6																															
Player A																																	
A ₂	8	2																															
13.b.	(OR) Explain the basic components of a queuing system.																																
4	14.a.	Describe the method of processing 'n' jobs through two machines.	K3	CO3																													
	14.b.	(OR) The cost of a machine is Rs.6100 and its scrap value is Rs.100. The maintenance costs found from experience are as follows: Year : 1 2 3 4 5 6 7 8 Cost* : 100 250 400 600 900 1200 1600 2000 (* indicates maintenance cost) When should the machine be replaced?																															
5	15.a.	Discuss the PERT algorithm.	K2	CO5																													
	15.b.	(OR) Distinct between PERT and CPM.																															

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	Use simple method to solve: Max $Z = x_1 + x_2 + 3x_3$ Subject to the constraints $3x_1 + 2x_2 + x_3 \leq 3$ $2x_1 + x_2 + 2x_3 \leq 2$ and $x_1, x_2, x_3 \geq 0$	K3	CO1																									
2	17	Solve the following minimal assignment problem: Job <table> <tr> <th></th><th>A</th><th>B</th><th>C</th><th>D</th></tr> <tr> <td>I</td><td>41</td><td>72</td><td>39</td><td>52</td></tr> <tr> <td>II</td><td>22</td><td>29</td><td>49</td><td>65</td></tr> <tr> <td>III</td><td>27</td><td>39</td><td>60</td><td>51</td></tr> <tr> <td>IV</td><td>45</td><td>50</td><td>48</td><td>52</td></tr> </table>		A	B	C	D	I	41	72	39	52	II	22	29	49	65	III	27	39	60	51	IV	45	50	48	52	K4	CO2
	A	B	C	D																									
I	41	72	39	52																									
II	22	29	49	65																									
III	27	39	60	51																									
IV	45	50	48	52																									
3	18	In a super market the average arrival rate of customers is 5 every 30 minutes. The average time it takes to list and calculate the customer's purchases at cash desk is 4.5 minutes, and this time is exponentially distributed. a) How long will the customer expect to wait for service at the cash desk? b) What is the chance that the queue length will exceed 5? c) What is the probability that the cashier is working?	K3	CO4																									
4	19	Find the sequence that minimizes the total elapsed time required to complete the following tasks on two machines: Task : A B C D E F G H I Machine I : 2 5 4 9 6 8 7 5 4 Machine II : 6 8 7 4 3 9 3 8 11	K3	CO3																									
5	20	A project schedule has the following characteristics: Activity : 1-2 1-3 2-4 3-4 3-5 4-9 5-6 5-7 6-8 7-8 8-10 9-10 Time : 4 1 1 1 6 5 4 8 1 2 5 7 i) Construct PERT network ii) Compute T_E , T_L for each event iii) Find the critical path	K2	CO5																									

Z-Z-Z END

