PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BVoc DEGREE EXAMINATION MAY 2022
(Second Semester)

Branch – BANKING, STOCK & INSURANCE

MATHEMATICS FOR BUSINESS

Time: Three Hours   Maximum: 50 Marks

SECTION-A (5 Marks)
Answer ALL questions
ALL questions carry EQUAL marks   (5 x 1 = 5)

1   Calculate the simple interest on the sum of Rs 6000 at 10% p.a. for 3 years.
    (i)   Rs 1000   (ii) Rs 1800
    (iii) Rs 18000   (iv) Rs 1200

2   Which is the simple interest on true discount
    (i)   Face Value   (ii) Amount due
    (iii) Bankers gain   (iv) Cash value

3   When the transportation problem is said to be balanced, if total demand is
    _____
    (i)   less than total supply   (ii) less than or equal to total supply
    (iii) greater than total supply   (iv) equal to total supply

4   When the value of the game is zero, then the game is called _____
    (i)   fair   (ii) unfair
    (iii) optimum   (iv) pure

5   When an operating characteristics are dependent on time then the queueing system is said to be _____
    (i)   steady state   (ii) transient state
    (iii) Poisson   (iv) None of the above

SECTION - B (15 Marks)
Answer ALL Questions
ALL Questions Carry EQUAL Marks   (5 x 3 = 15)

6   a   Calculate the total amount that will be received from the debtor when the principal Rs.10,000 is lent to him on interest for 4 years at 9%p.a.
                                    OR
    b   If a term deposit of Rs.4,000 earns an interest of Rs.2,500 in 50 months find the sum.

7   a   The banker's gain on a sum due 10 months hence at 6% p.a. is Rs.25. Find the sum due.
                                    OR
    b   Find the cash value of a bill of Rs.4,200 due 5 months hence at 7.5%p.a.

8   a   Prove that the number of basic variables of the general transportation problem at any stage of feasible solution must be m+n-1.
                                    OR
    b   Obtain the initial feasible solution to the following transportation problem using the north-west corner rule:

	D	E	F	G	Available
A	11	13	17	14	250
B	16	18	14	10	300
C	21	24	13	10	400
Requirement	200	225	275	250	

9 a   Determine the range of value of p and q which make the payoff element a_{22}, a saddle point for the game whose payoff matrix is given below.

Player B

$$\text{Player A} \begin{bmatrix} 2 & 4 & 7 \\ 10 & 7 & q \\ 4 & p & 8 \end{bmatrix}$$

OR

b   State the general rules for dominance property.

10 a   State the operating characteristics to design a queueing system.

OR

b   A T.V. repairman finds that the time spent on his jobs has an exponential distribution with mean 30 minutes. If he repairs sets in the order in which they came in and if the arrival of sets is approximately Poisson with an average rate of 10 per 8-hour day. What is repairman's expected idle time each day.

SECTION -C (30 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** Marks   (5 x 6 = 30)

11 a   Find the present value of Rs.595 due $3\frac{1}{2}$ years from now receiving simple interest at 5% per annum. How much is the true discount given?

OR

b   V.P.Balaraman deposits Rs. 12,000 in Pandurangan Associates and gets Rs.27,566.93 at the end of 3 years. Find the rate of compound interest which the company pays per month.

12 a   A person wishes to collect Rs.1,20,000 for a house at the time of retirement due after 18 years. If the rate of compound interest is 6%per annum, how much should he deposit annually to receive this amount?

OR

b   The banker's discount is 51 times the banker's gain. Calculate the term of the bill if interest is 8% p.a.

13 a   Obtain the initial feasible solution to the following transportation problem using the matrix minima method:

	D	E	F	G	Capacity
A	1	2	3	4	6
B	4	3	2	0	8
C	0	2	2	1	10
Demand	4	6	8	6	

OR

b   Apply Vogel's approximation method to obtain the initial feasible solution to the following transportation problem:

	D	E	F	G	Available
A	11	13	17	14	250
B	16	18	14	10	300
C	21	24	13	10	400
Demand	200	225	275	250	

14 a   Determine the optimum strategies and the value of the game for the payoff matrix

$$P_1 \begin{array}{c} P_2 \\ \begin{bmatrix} 5 & 1 \\ 3 & 4 \end{bmatrix} \end{array}$$

OR

b   Solve the game

Player B

$$\text{Player A} \begin{bmatrix} 3 & 2 & 4 & 0 \\ 3 & 4 & 2 & 0 \\ 4 & 2 & 4 & 0 \\ 0 & 4 & 0 & 8 \end{bmatrix}$$

15 a   The rate o arrival of customers at a public telephone booth follows poisson distribution, with an average time of 10 minutes between one customer and the next. The duration of a phone call is assumed to follow exponential distribution, with mean time of 3 minutes.
i) What is the probability that a person arriving at the booth will have to wait?

ii) What is the average length of the non-empty queues that form from time to time?

iii) Estimate the fraction of a day that the phone will be in use.

OR

b   In the production shop of a company the breakdown of the machines is found to be Poisson with an average rate of 3 machines per hour. Breakdown time at one machine costs Rs. 40 per hour to the company. There are two choices before the company for hiring the repairman. One of the repairman is slow but cheap, the other fast but expensive. The slow cheap repairman demands Rs.20 per hour and will repair the broken down machines exponentially at the rate of 4 per hour. The fast expensive repairman demands Rs.30 per hour and will repair the broken down machines exponentially at the rate of 6 per hour. Which repairman should be hired?

Z-Z-Z   END