PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BCA DEGREE EXAMINATION DECEMBER 2019
(First Semester)

Branch - COMPUTER APPLICATIONS

STATISTICS AND OPERATIONS RESEARCH

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks!
Answer ALL questions
ALL questions carry EQUAL marks (10 x 1 = 10)

1 The positional average is
(i) Mean (ii) Median (iii) Mode (iv) Hormonic Mean

2 Formula for co-efficient of variation is
(i) C.V = $\frac{\text{c n}}{\text{Mean}}$ xlOO (ii) C.V = ^^xl00 S.D
(iii) C.V^ $\frac{\text{Mean x S.D}}{100}$ (iv) C.V $\frac{100}{\text{Mean x S.D}}$

3 The coefficient of correlation is independent of
(i) change of scale (ii) change of origin
(iii) both change of scale and origin (iv) none of them

4 For a two tailed test when 'n' is large, the value of z at 0.05 level of significant is
(i) 1.645 (ii) 2.58
(iii) 1.96 (iv) 2.33

5 Test of hypothesis Ho:^i=70 vs. Hi; jit>70 leads to
(i) one sided left-tailed test (ii) one-sided right tailed test
(iii) two-tailed test (iv) none of these

6 Analysis of variance utilises
(i) F-test (ii) *T* test
(iii) Z-test (iv) t-test

7 Decision variables in an operations research model are
(i) controllable (ii) uncontrollable
(iii) parameters (iv) constants

8 Linear programming problem (LPP) must have an
(i) objective that we aim to maximize (or) minimize
(ii) constraints that we need to specify
(iii) decision variables that we need to determine
(iv) all of the above

9 The initial solution of a transportation problem obtained by
(i) North-west comer rule would invariably be optimum
(ii) least cost method does not provide the least cost solution to a T.P
(iii) VAM would invariably be very near to optimum solution
(iv) MODI method is infeasible

10 A dummy activity is used in network diagram, when
(i) Two parallel activities have the same tail and head events
(ii) the chain of activities may have a common event, yet be independent by them
(iii) both (i) & (ii)
(iv) none of the above

SECTION - B (35 Marks)
Answer ALL Questions
ALL Questions Carry EQUAL Marks (5 x 7 = 35)

11 a The following data relate to the monthly expenditure (in rupees) of two families A and B.

Items	Expenditure (in Rs.)	
	Family A	Family B
Food	16000	12000
Clothing	8000	6000
Rent	6000	5000
Light & Fuel	2000	1000
Miscellaneous	8000	6000

Represent the above data by a suitable percentage diagram.

OR

b Calculate the standard deviation for the following data:

Light Span:	4-6	6-8	8-10	10-12	12-14
No. of Neon Lights:	10	17	32	21	20

12 a Calculate the rank correlation coefficient for the following data

X:	92	89	87	86	83	77	71	63	53	50
Y:	86	83	91	77	68	85	52	82	37	57

OR

b Explain the procedure for testing the difference between two means using t-test.

13 a Explain the procedure for testing the equality of two population variances using F-test.

OR

b Ten oil tins are taken at random from an automatic filling machine. The mean weight of the tins is 15.8 kg and standard deviation 0.50 kg, does the. sample mean differ significantly from the intended weight of 16 kg? [t-test for table value 9 d.f at 5% level is 2.26]

14 a Explain the mathematical formulation of the linear programming problem with an example.

OR

b Use graphical method to solve the following L.P.P

Maximize (z)=6xi+x_2

Subject to the constraints

2XI+X_2>3

X2-X]>o andxi,x_2>0.

15 a Draw a network diagram for the following data:

Activity:	A	B	C	D	E	F	G	H	I	J
Preceding Activity:	-	A	A	B	A	B,E	C	D,F	G	H,I

OR

b Use Vogel's Approximation method to obtain an IBFS of the transportation problem.

	D,	D_2	D_3	D_4	Supply
- Q,	11	13	17	14	250
o_2	16	18	14	10	300
o_3	21	24	13	10	400

SECTION - C (30 Marks)

Answer any THREE Questions

ALL Questions Carry EQUAL Marks (3 x 10 = 30)

16 Calculate the mean, median and mode for the following data:

Variable:	10-13	13-16	16-19	19-22	22-25	25-28	28-31	31-34	34-37	37-40
Frequency:	8	15	27	51	75	54	36	18	9	7

17 Calculate the Karl Pearson's coefficient of correlation for the following data:

X:	100	200	300	400	500	600	700
Y:	30	50	60	80	100	110	130

18 The table given below shows the data obtained during out break of small pox.

	Attacked	Not attacked
Vaccinated	31	469
Not Vaccinated	185	1315

Test the effectiveness of vaccination in preventing the attack from small pox. Test your result with the help of *%²* at 5% level of significance.

(x§.o_5(l) = 3.84l)

19 Solve the LPP problem by simplex method.

Max z=15xi+6x_2+9x_3+2x4

subject to 2XI+X_2+5X_3+6X_4<20

3XI+X_2+3X_3+25X4<24 .

7XI+X_4<70

XJ,X_2,X_3, X4>0

20 The following table shows the jobs of a network along with their time estimates. the time estimates are in days.

Job	1-2	1-6	2-3	2-4	3-5	4-5	5-8	6-7	7-8
a	3	2	6	2	5	3	1	3	4
m	6	5	12	5	11	6	4	9	19
b	15	14	30	8	17	15	7	27	28

(i) Draw the project network

(ii) Find the critical path

(iii) Find the probability of the project being completed in 31 days.

Z-Z-Z END