GOVERNMENT OF KARNATAKA

KARNATAKA STATE PRE-UNIVERSITY EDUCATION EXAMINATION BOARD

II YEAR PUC EXAMINATION

(05)

SCHEME OF VALUATION

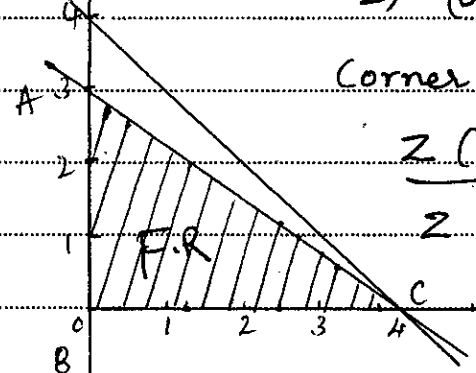
Subject Code : 31 Subject : STATISTICS

Qn. No.		Marks
I	Section - A	
1.	Registration method or Census method	1
2.	'It is the cost met by a specified class of consumers in buying a Basket of goods and services'	1
3.	prices are increased by 80 %.	1
4.	Statistical data recorded at successive time points	1
5.	mean = $p = 1/3$	1
6.	Poisson distribution	1
7.	It is the probability of rejecting null hypothesis when it is true	1
8.	$H_0 : \mu_1 = \mu_2$	1
9.	-5	1
10.	Controling the quality of the product in the manufacturing stage itself is called process control	1

Qn. No.		Marks
II	Section – B	
11	$CDR = D/p \times 1000$	1
	$= 18.92$	1
12.	i) It (Satisfies) TRT and FRT	any 2
	ii) It is free of bias	
	iii) It is the G.M of (Laspeyer's and Paasche's)	(2 marks)
13.	$P_{01}(DB) = \frac{P_{01}(L) + P_{01}(P)}{2}$	1
	$= 292$	1
14.	Trend is a overall change that occurs in time series over a long period of time.	1
	ex: Increasing population	1
15.	n is large, p is small	1
	$np = \lambda$ (finite)	1
16.	$\beta_1 = 0$, $\beta_2 = 3$	2
17.	'A hypothesis which is being tested for possible rejection under the assumption that it is true' – null hypothesis	1
	'A hypothesis which is accepted when the null hypothesis is rejected' – Alternate hypothesis	1
18.	$S.E(p) = \sqrt{pq/n}$	1
	$= 0.0816$	1

Qn. No.		Marks
19.	Mean = 0 , variance = $\frac{n}{n-2}$	1+1 = 2
20.	If an LPP has only one optimal solution then it is said to have unique solution	1
	If an LPP has more than one optimal solution then it is said to have multiple soln	1
21	$\begin{bmatrix} 5 & 10 \\ 3 & 4 \end{bmatrix}$ method	1
	value of the game = 5	1
22.	Control chart is a graphical device which is used to see whether a production process is in Statistical Control or not.	1
	np or d chart	1
III	Section - C	
23.	$ASFR = \frac{\text{Number of births to females of specified age group}}{\text{Total female population of specified age group}} \times 1000$	1
	ASFR's: 33.33, 115, 140, 125, 50, 21.66, 1.25	2
	Σ ASFR's = 486.24	0
	TFR = 5 × Σ Quinquennial ASFR's	1
	TFR = 2431.2	1
24.	i) Defining the purpose and scope of the index number	
	ii) Selection of base period	
	iii) Selection of items	
	iv) Obtaining price quotations	

Qn. No.		Marks
	v) Selection of weights vi) Selection of formula } any 5 vii) Selection of averages	5
25.	p : 116, 120, 125, 125, 150	2
	$\Sigma wp = 12630$ $\Sigma w = 100$	1
	$CPI = \frac{\Sigma wp}{\Sigma w}$	1
	$= 126.3$	1
26.	5 YMT : 367, 376, 382, 387, 396, 400, 403, 410	2
	5 MA : 73.4, 75.2, 76.4, 77.4, 79.2, 80, 80.6, 82	2
	Position	1
27.	$n = 5$, $p = 0.6$, $q = 0.4$	1
	$P(x) = {}^5C_x (0.6)^x (0.4)^{n-x}$	
	$x = 0, 1, 2, 3, 4, 5$	1
	(i) $P(x = 2) = 0.2304$	1
	(ii) $P(x = 4 \text{ or more}) = P(x=4) + P(x=5)$	1
	$= 0.2592 + 0.07776$	
	$= 0.3369$	1
28.	$Z = \frac{x-M}{\sigma} = \frac{x-60}{5}$	1
	(i) $P(50 < x < 60) = P(-2 < Z < 0)$	2
	$= 0.4772$	1
	ii) $P(x > 60) = P(Z > 0) = 0.5$	1
29.	$H_0 : \mu_1 = \mu_2$ $H_1 : \mu_1 \neq \mu_2$ (TTT)	1
	$Z = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}} = \frac{90-88}{\sqrt{\frac{15^2}{300} + \frac{10^2}{200}}} = 1.78$	1+1+1

Qn. No.		Marks
	LOS = 5% $(K_1, K_2) = (-1.96, 1.96)$	
	H_0 is accepted	1
30.	$H_0 : \sigma = 60$ hrs $H_1 : \sigma < 60$ hrs (LTT)	1
	$\chi^2 = \frac{ns^2}{\sigma^2} = 20.41$	1+1
	d.f $= n-1 = 14$ $\therefore K_1 = 6.57$ at 5%.	1
	H_0 is accepted	1
31.	$\bar{d} = 2.2$, $s_d = 2.315$	
	$H_0 : \mu_1 = \mu_2$, $H_1 : \mu_1 > \mu_2$ (UTT) (Dhyna reduces B.P)	1
	$t_{cal} = \frac{\bar{d}}{s_d/\sqrt{n-1}} = 1.9$	1+1
	d.f $= n-1 = 4$, $t_{tab} = 3.75$ at 1%.	1
	H_0 is accepted	1
32.	Points : 1) (0, 4) (4, 0)	
	2) (0 3) (4, 0)	
		
	Corner points A(0, 3), B(0, 0), C(4, 0)	1
	Z(0, 3) = 6000 (Max)	1
	Z(0, 0) = 0	Soln.
	Z(4, 0) = 4000	
	Graph (2 lines)	2
	Feasible region	1
33.	$P - S_n = 6000$	1
	ΣC_i ; 100, 350, 750, 1350, 2250, 3450, 5050, 7050	1
	$P - S_n + \Sigma C_i$; 6100, 6350, 6750, 7350, 8250 9450, 11050, 13050	1

Qn. No.		Marks
	A(n) : 6100, 3175, 2250, 1837.5, 1650	
	(1575), 1578.57, 1631.25	1
	Replacement period is $n = 6$	1
34	$CL = \lambda' = 2.5$	1
	$LCL = \lambda' - 3\sqrt{\lambda'} = -2.24 = 0$	1+1
	$UCL = \lambda' + 3\sqrt{\lambda'} = 7.24$	1+1
IV	Section - D	
35	$ASDR = \frac{\text{Number of deaths in a Specified age group}}{\text{Total population in a specified age group}} \times 1000$	1
	ASDR's (A) : 20, 7.39, 2.63, 13.25, 39.06	2
	ASDR's (B) : 16.66, 12.5, 2.5, 9.09, 23.33	2
	$\Sigma PA = 1472320$	0
	$\Sigma PB = 1138280$	1
	$STDR = \frac{\Sigma PA}{\Sigma P}$	1
	STDR (A) = 14.72	1
	STDR (B) = 11.38	1
	City B is more healthier	1
36	$\Sigma P_1 q_0 = 1723$ $\Sigma P_1 q_1 = 1445$	
	$\Sigma P_0 q_0 = 1230$ $\Sigma P_0 q_1 = 1096$	4
	$P_{01}(L) = \frac{\Sigma q_0 P_1}{\Sigma q_0 P_0} \times 100 = 140.08$	2
	$P_{01}(P) = \frac{\Sigma q_1 P_1}{\Sigma q_1 P_0} \times 100 = 131.84$	2

Qn. No.		Marks
	$P_{01}(F) = \sqrt{P_{01}(L) \times P_{01}(P)} = 135.89$	2
37.	$\Sigma x = 0$, $\Sigma x^2 = 28$, $\Sigma xy = 92$	2
	$a = 91.42$, $b = 3.28$	2
	$y_c = 91.42 + 3.28x$	1
	for 2010, $x = 4$, $y_c = 104.54$	1
	Trend values :	
	81.58, 84.86, 88.14, 91.42, 94.7, 97.98, 101.26	4
38.	H_0 : Birth is Male and Female children are equiprobable (B.D is a good fit)	1
	H_1 : Male and Female children are not equiprobable (B.D is not good fit)	
	$n = 3$, $p = 1/2$, $q = 1/2$, $N = 80$	1
	Theoritical frequencies : 10, 30, 30, 10	3
	p.m.f of B.D	1
	$\chi^2 = \sum \frac{(O-E)^2}{E} = 13.33$	1+1
	d.f $= n - 1 = 3$, $K_2 = 7.81$ at 5%.	1
	H_0 is rejected	1
	$\therefore$ B.D is not a good fit	
V	Section – E	
39.	$\lambda = 3$, $P(x) = \frac{e^{-3} 3^x}{x!}$ $x = 0, 1, 2, \ldots$	1
	(i) $P(x = 3) = 0.2241$	1

Qn. No.		Marks
40.	(ii) $P(\text{atleast one}) = 1 - P(0)$	1
	$= 1 - 0.0498$	1
	$= 0.9502$	1
	H_0 : Demand for icecream is independent of Seasons	1
	H_1 : Demand for icecream is dependent of Seasons	
	$\chi^2 = \frac{N(ad-bc)^2}{(a+b)(c+d)(a+c)(b+d)}$	1
	$= \frac{200(90\times 60 - 10\times 40)^2}{100\times 100\times 130\times 70}$	1
	$= 54.94$	1
	d.f = 1 , $k_2 = 3.84$ at 5% los	0
	H_0 is rejected	1
41.	H_0 : $\mu = 30$ minutes	
	H_1 : $\mu < 30$ minutes } LTT	1
	$z = \frac{\bar{x}-\mu}{s/\sqrt{n}} = \frac{31-30}{2/\sqrt{100}} = 5$	3
	$-k = -2.33$ at 1% los	
	H_0 is accepted	1
42.	$R = 200$ items / month	
	$C_1 = Rs\ 15$ / month	1
	$C_3 = Rs\ 25$	

Qn. No.		Marks
	(i) EOQ $Q^\circ = \sqrt{\frac{2C_3R}{C_1}}$ = 25.82 items	2
	(ii) Re-order time $t^\circ = \frac{Q^\circ}{R}$ = 0.129 months	2
	—— o ——	