

### University of Engineering & Management, Kolkata

1<sup>st</sup> Term Examination, September, 2022

Programme Name: B.Tech ( CSE / CSE(AIML) / CSE(IOT, CYS, BCT) )

Semester: 3rd

Course Name: MATHEMATICS - III

Course Code: BSC301

Full Marks: 30

Date:26th September, 2022 Time: 9.30 am - 10.30 am

#### GROUP - A (10 marks)

#### Answer the following questions. Each question is of 2 marks

 $5 \times 2 = 10$ 

- 1. i) If Y=3+5X then find var(Y) where var(X)=2
  - ii) For Binomial Distribution with n=15 and p=0.25 find P(X=4)
  - iii) Find the value of k such that the following function is a p.d.f.

$$f(x) = \begin{cases} k, -2 < x < 2 \\ 0, otherwise \end{cases}$$

- iv) The equations of regression lines are y=0.5x+a, x=0.4y+b. Find correlation coefficient.
- v) Find the s.d. of the observation 5,7,1,2,6,3.

#### GROUP - B (10 marks)

#### Answer the following questions. Each question is of 5 marks

 $2 \times 5 = 10$ 

- 2. The length of similar components produced by a company is approximated by a normal distribution model with a mean of 5 cm and a standard deviation of 0.02 cm. If a component is chosen at random, what is the probability that the length of this component is between 4.98 and 5.02 cm?
- 3. If from six to seven in the evening one telephone line in every five is engaged in a conversation: what is the probability that when 10 telephone numbers are chosen at random, only two are in use?

#### GROUP - C (10 Marks)

Answer the following question. The question is of 10 marks

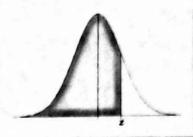
 $1 \times 10 = 10$ 

4. Set a second degree parabola in the following data:

X	1	2	3	4	
у	6	11	18	27	

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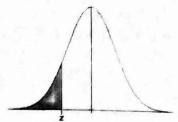
# Standard Normal Cumulative Probability Table



Cumulative probabilities for POSITIVE z-values are shown in the following table:

0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
		0.5080	0.5120		0.5199	0.5239	0.5279		0.5359
The second secon	0.5438	0.5478	0.5517						0.5753
0.5793	0.5832	0.5871	0.5910	0-000 - 000 - 000 - 000					0.6141
0.6179	0.6217	0.6255	0.6293						0.6517
0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
A STATE OF THE STA				0.7389	0.7422	0.7454			0.7549
TOTAL CONTRACTOR				0.7704	0.7734	0.7764	<del></del>		0.7852
				0.7995	0.8023	0.8051	0.8078		0.8133
0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
				0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
THE RESIDENCE OF THE PARTY OF T				0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
A CONTRACTOR OF THE PARTY OF TH				0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
0.0222	0.0245	0.0357	0 9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
								0.9535	0.9545
							0.9616	0.9625	0.9633
							0.9693	0.9699	0.9706
		0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
			0.0700	0.0702	0.0708	0.0803	0.9808	0.9812	0.9817
100000000000000000000000000000000000000									0.9857
The contract of the contract o									0.9890
									0.9916
AND ACCOUNTS OF THE PARTY OF TH									0.9936
0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.5502	0.000	
0.0000	0.0040	0 9941	0.9943	0.9945	0.9946	0.9948	0.9949		0.9952
100000000000000000000000000000000000000						0.9961	0.9962	0.9963	0.9964
The state of the s					1	0.9971	0.9972	0.9973	0.9974
					1.000	0.9979	0.9979	0.9980	0.9981
						0.9985	0.9985	0.9986	0.9986
0.9981	0.9902	0.0002	0.0000	0,5504				0.0000	0.9990
0.9987	0.9987	0.9987	0.9988	0.9988	0.9989				
		0.9991	0.9991		0.9992				0.9993
		0.9994	0.9994		0.9994				0.9995
					0.9996	0.9996			0.9997
					0.9997	0.9997	0.9997	0.9997	0.9998
0.0001	0.0001			0.0001					
	0.6179 0.6554 0.6915 0.7257 0.7580 0.7881 0.8159 0.8413 0.8643 0.8849 0.9032 0.9192 0.932 0.9452 0.9554 0.9641 0.9713 0.9772 0.9821 0.9861 0.9893	0.5000 0.5040 0.5398 0.5438 0.5793 0.5832 0.6179 0.6217 0.6554 0.6591  0.6915 0.6950 0.7257 0.7291 0.7580 0.7611 0.7881 0.7910 0.8159 0.8186  0.8413 0.8438 0.8643 0.8665 0.8849 0.8869 0.9032 0.9049 0.9192 0.9207  0.9332 0.9345 0.9452 0.9463 0.9554 0.9564 0.9641 0.9649 0.9713 0.9719  0.9772 0.9778 0.9821 0.9826 0.9861 0.9864 0.9893 0.9896 0.9918 0.9920  0.9938 0.9940 0.9953 0.9955 0.9965 0.9966 0.9974 0.9975 0.9987 0.9987 0.9993 0.9993 0.9995 0.9995	0.5000         0.5040         0.5080           0.5398         0.5438         0.5478           0.5793         0.5832         0.5871           0.6179         0.6217         0.6255           0.6554         0.6591         0.6628           0.6915         0.6950         0.6985           0.7257         0.7291         0.7324           0.7580         0.7611         0.7642           0.7881         0.7910         0.7939           0.8159         0.8186         0.8212           0.8413         0.8438         0.8461           0.8643         0.8665         0.8686           0.8849         0.8869         0.8888           0.9032         0.9049         0.9066           0.9192         0.9207         0.9222           0.9332         0.9453         0.9474           0.9554         0.9564         0.9573           0.9641         0.9649         0.9656           0.9772         0.9778         0.9783           0.9821         0.9826         0.9830           0.9940         0.9988         0.9918           0.9953         0.99955         0.99956           0.9965	0.5000         0.5040         0.5080         0.5120           0.5398         0.5438         0.5478         0.5517           0.5793         0.5832         0.5871         0.5910           0.6179         0.6217         0.6255         0.6293           0.6554         0.6591         0.6628         0.6664           0.6915         0.6950         0.6985         0.7019           0.7257         0.7291         0.7324         0.7357           0.7580         0.7611         0.7642         0.7673           0.7881         0.7910         0.7939         0.7967           0.8159         0.8186         0.8212         0.8238           0.8413         0.8438         0.8461         0.8485           0.8643         0.8665         0.8686         0.8708           0.8849         0.8869         0.8888         0.8907           0.9032         0.9049         0.9066         0.9082           0.9192         0.9207         0.9222         0.9236           0.9332         0.9345         0.9357         0.9370           0.9452         0.9463         0.9474         0.9484           0.9554         0.9564         0.9573	0.5000         0.5040         0.5080         0.5120         0.5160           0.5398         0.5438         0.5478         0.5517         0.5557           0.5793         0.5832         0.5871         0.5910         0.5948           0.6179         0.6217         0.6255         0.6293         0.6331           0.6554         0.6591         0.6628         0.6664         0.6700           0.6915         0.6950         0.6985         0.7019         0.7054           0.7257         0.7291         0.7324         0.7357         0.7389           0.7580         0.7611         0.7642         0.7673         0.7704           0.7811         0.7910         0.7939         0.7967         0.7995           0.8159         0.8186         0.8212         0.8238         0.8264           0.8413         0.8438         0.8461         0.8485         0.8508           0.8643         0.8665         0.8686         0.8708         0.8729           0.8849         0.8869         0.8888         0.8907         0.8925           0.9032         0.9049         0.9066         0.9082         0.9099           0.9192         0.9347         0.9484         0.949	0.500         0.5040         0.5080         0.5120         0.5160         0.5199           0.5398         0.5438         0.5478         0.5517         0.5557         0.5596           0.5793         0.5832         0.5871         0.5910         0.5948         0.5987           0.6179         0.6217         0.6255         0.6293         0.6331         0.6368           0.6554         0.6591         0.6628         0.6664         0.6700         0.6736           0.6915         0.6950         0.6985         0.7019         0.7054         0.7088           0.7257         0.7291         0.7324         0.7357         0.7389         0.7422           0.7580         0.7611         0.7642         0.7673         0.7704         0.7734           0.7881         0.7910         0.7939         0.7967         0.7995         0.8023           0.8159         0.8186         0.8212         0.8238         0.8264         0.8289           0.8413         0.8438         0.8461         0.8485         0.8508         0.8531           0.8643         0.8665         0.8686         0.8708         0.8729         0.8749           0.8849         0.8869         0.8888	0.500         0.5040         0.5080         0.5120         0.5160         0.5199         0.5239           0.5398         0.5438         0.5478         0.5517         0.5557         0.5596         0.5366           0.5793         0.5832         0.5871         0.5910         0.5948         0.5987         0.6026           0.6179         0.6217         0.6255         0.6293         0.6331         0.6368         0.6406           0.6554         0.6591         0.6628         0.6664         0.6700         0.6736         0.6772           0.6915         0.6950         0.6985         0.7019         0.7054         0.7088         0.7123           0.7257         0.7291         0.7324         0.7357         0.7389         0.7422         0.7454           0.7580         0.7611         0.7642         0.7673         0.7704         0.7734         0.7764           0.7881         0.7910         0.7939         0.7967         0.7995         0.8023         0.8051           0.8166         0.8212         0.8238         0.8264         0.8289         0.8315           0.8413         0.8483         0.8461         0.8485         0.8508         0.8531         0.8554	0.500         0.504         0.5080         0.5120         0.5160         0.5199         0.5239         0.5279           0.5398         0.5438         0.5478         0.5517         0.5557         0.5596         0.5636         0.5675           0.5793         0.5832         0.5871         0.5910         0.5948         0.5987         0.6026         0.6064           0.6179         0.6217         0.6255         0.6293         0.6331         0.6388         0.6406         0.6443           0.6554         0.6591         0.6628         0.6664         0.6700         0.6736         0.6772         0.6808           0.6915         0.6950         0.6985         0.7019         0.7054         0.7088         0.7123         0.7157           0.7257         0.7291         0.7327         0.7369         0.7422         0.7454         0.7466           0.7580         0.7611         0.7642         0.7673         0.7704         0.7734         0.7764         0.7794           0.7881         0.7910         0.7939         0.7967         0.7995         0.8023         0.8015         0.8078           0.8153         0.8186         0.8212         0.8238         0.8264         0.8285         0.834<	0.500         0.501         0.502         0.5120         0.5160         0.5199         0.5239         0.5279         0.5319           0.5398         0.5438         0.5478         0.5517         0.5557         0.5596         0.6636         0.5675         0.5714           0.5793         0.5832         0.5871         0.5910         0.5948         0.5987         0.6026         0.6064         0.6103           0.6554         0.6591         0.6628         0.6664         0.6700         0.6736         0.6772         0.6808         0.6844           0.6915         0.6950         0.6985         0.7019         0.7054         0.7088         0.7123         0.7157         0.7190           0.7257         0.7291         0.7324         0.7357         0.7389         0.7422         0.7454         0.7446         0.7476         0.7517           0.7580         0.7611         0.7642         0.7673         0.7704         0.7734         0.7764         0.7744         0.7738         0.7815         0.8053         0.8051         0.8072         0.8166         0.8212         0.8238         0.8264         0.8289         0.8315         0.8340         0.8365           0.8413         0.8438         0.8461         <

## Standard Normal Cumulative Probability Table



Cumulative probabilities for NEGATIVE z-values are shown in the following table:

								Z		
z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
-3.4	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002
-3.3	0.0005	0.0005	0.0005	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0003
-3.2	0.0007	0.0007	0.0006	0.0006	0.0006	0.0006	0.0006	0.0005	0.0005	0.0005
-3.1	0.0010	0.0009	0.0009	0.0009	0.0008	8000.0	0.0008	0.0008	0.0007	0.0007
-3.0	0.0013	0.0013	0.0013	0.0012	0.0012	0.0011	0.0011	0.0011	0.0010	0.0010
-2.9	0.0019	0.0018	0.0018	0.0017	0.0016	0.0016	0.0015	0.0015	0.0014	0.0014
-2.8	0.0026	0.0025	0.0024	0.0023	0.0023	0.0022	0.0021	0.0021	0.0020	0.0019
-2.7	0.0035	0.0034	0.0033	0.0032	0.0031	0.0030	0.0029	0.0028	0.0027	0.0026
-2.6	0.0047	0.0045	0.0044	0.0043	0.0041	0.0040	0.0039	0.0038	0.0037	0.0036
-2.5	0.0062	0.0060	0.0059	0.0057	0.0055	0.0054	0.0052	0.0051	0.0049	0.0048
-2.4	0.0082	0.0080	0.0078	0.0075	0.0073	0.0071	0.0069	0.0068	0.0066	0.0064
-2.3	0.0107	0.0104	0.0102	0.0099	0.0096	0.0094	0.0091	0.0089	0.0087	0.0084
-2.2	0.0139	0.0136	0.0132	0.0129	0.0125	0.0122	0.0119	0.0116	0.0113	0.0110
-2.1	0.0179	0.0174	0.0170	0.0166	0.0162	0.0158	0.0154	0.0150	0.0146	0.0143
-2.0	0.0228	0.0222	0.0217	0.0212	0.0207	0.0202	0.0197	0.0192	0.0188	0.0183
-1.9	0.0287	0.0281	0.0274	0.0268	0.0262	0.0256	0.0250	0.0244	0.0239	0.0233
-1.8	0.0359	0.0351	0.0344	0.0336	0.0329	0.0322	0.0314	0.0307	0.0301	0.0294
-1.7	0.0446	0.0436	0.0427	0.0418	0.0409	0.0401	0.0392	0.0384	0.0375	0.0367
-1.6	0.0548	0.0537	0.0526	0.0516	0.0505	0.0495	0.0485	0.0475	0.0465	0.0455
-1.5	0.0668	0.0655	0.0643	0.0630	0.0618	0.0606	0.0594	0.0582	0.0571	0.0559
-1.4	0.0808	0.0793	0.0778	0.0764	0.0749	0.0735	0.0721	0.0708	0.0694	0.0681
-1.3	0.0968	0.0951	0.0934	0.0918	0.0901	0.0885	0.0869	0.0853	0.0838	0.0823
-1.2	0.1151	0.1131	0.1112	0.1093	0.1075	0.1056	0.1038	0.1020	0.1003	0.0985
-1.1	0.1357	0.1335	0.1314	0.1292	0.1271	0.1251	0.1230	0.1210	0.1190	0.1170
-1.0	0.1587	0.1562	0.1539	0.1515	0.1492	0.1469	0.1446	0.1423	0.1401	0.1379
-0.9	0.1841	0.1814	0.1788	0.1762	0.1736	0.1711	0.1685	0.1660	0.1635	0.161
-0.8	0.2119	0.2090	0.2061	0.2033	0.2005	0.1977	0.1949	0.1922	0.1894	0.1867
-0.7	0.2420	0.2389	0.2358	0.2327	0.2296	0.2266	0.2236	0.2206	0.2177	0.2148
-0.6	0.2743	0.2709	0.2676	0.2643	0.2611	0.2578	0.2546	0.2514	0.2483	0.245
-0.5	0.3085	0.3050	0.3015	0.2981	0.2946	0.2912	0.2877	0.2843	0.2810	0.277
-0.4	0.3446	0.3409	0.3372	0.3336	0.3300	0.3264	0.3228	0.3192	0.3156	0.312
-0.3	0.3821	0.3783	0.3745	0.3707	0.3669	0.3632	0.3594	0.3557	0.3520	0.348
-0.2	0.4207	0.4168	0.4129	0.4090	0.4052	0.4013	0.3974	0.3936	0.3897	0.385
-0.1	0.4602	0.4562	0.4522	0.4483	0.4443	0.4404	0.4364	0.4325	0.4286	0.424
0.0	0.5000	0.4960	0.4920	0.4880	0.4840	0.4801	0.4761	0.4721	0.4681	0.464
0.0	0.5000	0.4300	0.4820	0.4000						