Course Code : ECT 259 QVRU/RS–22/1183

Fourth Semester B. Tech. (Electronics and Communication Engineering) Examination

PROBABILITY THEORY AND STOCHASTIC PROCESSES

Time : 3 Hours] [Max. Marks : 60

Instructions to Candidates :—

(1) All questions are compulsory and carry marks as indicated.
(2) Assume suitable data wherever necessary.
(3) Due credit will be given to neatness.
(4) Use of Non – programmable calculator is permitted.
(5) Use of Standard Normal Distribution Table is permitted.

1. (a) A small company has hired two architects to create designs for the clients. Architect-1 makes 65% of the designs and Architect-2 makes 35% of the designs. Furthermore, 70% of the designs from Architect-1 get approved and 85% of the designs produced by Architect-2 get approved. Suppose a design is selected at random. If the selected design is approved, find the probability that it was created by the Architect-2. 3 (CO 1)

(b) You purchase a certain product. The manual states that the lifetime T of the product, defined as the amount of time (in years) the product works properly until it breaks down, satisfies :

$$P(T \geq t) = e^{-t/5}, \quad \text{for all} \quad t \geq 0$$

For example, the probability that the product lasts more than or equal to 2 years is given as $P(T \geq 2) = e^{-2/5} = 0{\cdot}6703$.

If, I purchase the product and use it for two years without any problems. What is the probability that it breaks down in the third year ?

3 (CO 1, CO 5)

(c) In a certain group of engineers, 60% have insufficient background of information theory, 50% have inadequate knowledge of probability, and 80% are in either one or both of these categories. What is the percent of people who know probability among those who have a sufficient background of Information theory ?

2 (CO 1)

(d) Suppose a balanced six sided die is about to be rolled out and we define following events, $A = \{1, 2\}$ and $B = \{2, 4, 6\}$:

(i) Check whether the events A and B are independent or not ?

(ii) Check whether the events A and B' are independent or not ?

3 (CO 1)

2. (a) A continuous distribution of a random variable X in the range of $(-3, 3)$ is defined below :

$$f(x) = \frac{1(3+x)^2}{16}, \qquad -3 \leq x \leq -1$$

$$= \frac{1(2-6(x)^2)}{16}, \qquad -1 \leq x \leq 1$$

$$= \frac{1(3-x)^2}{16}, \qquad 1 \leq x \leq 3$$

$$= 0, \qquad \textbf{Otherwise}$$

Verify that the area under the curve is unity. Also, Calculate the Mean.

5 (CO 1, CO 5)

(b) Suppose that the duration in minutes of long distance telephone conversation follows an exponential density function PDF expressed as :

$$f(x) = \frac{1}{5}[e^{-x/5}], \qquad \text{for } x > 0$$

Determine the probability that duration of conversation :

(i) Will exceed 5 minutes.

(ii) Will be between 3 and 6 minutes.

(iii) Will be less than 3 minutes.

3 (CO 1, CO 5)

(c) A company makes electronic gadgets. One out of every 50 gadgets is faulty, but the company doesn't know which ones are faulty until a buyer complains. Suppose the company makes a $ 3 profit on the sale of any working gadget, but suffers a loss of $ 80 for every faulty gadget because they have to repair the unit. Check whether the company can expect a profit in the long term. 3 (CO 1, CO 5)

3. (a) (i) Which of the bounds out of **Markov's and Chebyshev's** inequality are preferred when we have both mean and variance of Random Variable available with us ? Briefly justify answer of above question with suitable example. 3 (CO 1, CO 3)

(ii) Suppose that X is a random variable with mean and variance both equal to 16. Compute the **lower** bound on probability $P(0 < X < 32)$ using **Chebyshev's inequality**. 2 (CO 1, CO 3)

(b) If a patient is waiting for a suitable blood donor and the probability that the selected donor will match is **0·2**, then find the expected number of donors who will be tested till the match is found including the matched donor. 2 (CO 1, CO 5)

(c) A blindfolded marksman finds that on the average he hits the target **4** times out of **5**. If he fires **4** shots, what is the probability of :

(i) More than **2 hits**.

(ii) At least **3 miss**. 2 (CO 1, CO 2)

(d) An integrated chip contains **1,00,000** components. Each component fails independently from the others and the yearly failure probability per component is 10^{-5}. Find the probability that the Integrated chip will be working one year after turn on ?
Assume that the Integrated chip fails if one or more component fails. 2 (CO 1, CO 2)

4. (a) (i) Give the applications of Central Limit Theorem.

(ii) In a communication system each data packet consists of **1,000** numbers of bits. Due to the noise, each bit may be received in error with probability **0·1**. It is assumed bit errors occur

independently. Calculate the probability that there are more than **120** errors in a certain data packet.
(Let us define **Xi** as the indicator random variable for the i^{th} bit in the packet. That is, **Xi = 1** if the i^{th} bit is received in error, and **Xi = 0** otherwise. Then the **Xi's** are **i.i.d.** and **Xi ~ Bernoulli (p = 0·1).**) 5 (CO 1, CO 3)

(b) A fair die is tossed **720** times :

(i) Use the Central limit Theorem to find true (exact) probability of getting **100 to 140** sixes.

(ii) Use Chebyshev's inequality to find lower bound for the probability of getting **100 to 140** sixes. 6 (CO 1, CO 3)

5. (a) Compute the Power Spectral Density of random process :

$X(t) = 10 \cos [2000 \pi t + \theta]$ where θ is a random variable with a **uniform pdf** in the interval $[-\pi, \pi]$. 4 (CO 2)

(b) Given a Stationary Random Process :

$X(t) = 10 \cos [100 t + \theta]$, where θ is a random variable with uniform probability distribution in the interval $[-\pi, \pi]$. Compute Autocorrelation of $X(t)$. 4 (CO 2)

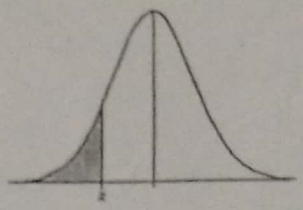
6. (a) A circuit has an impulse response given by :

$$h(t) = 1/T \quad , \quad 0 \leq t \leq T$$
$$= 0 \quad , \quad \text{elsewhere}$$

Evaluate $S_{YY}(w)$ in terms of $S_{XX}(w)$. 3 (CO 2, CO 4)

(b) Explain in detail about the processing of Random Signals through an LTI system. 5 (CO 2, CO 4)

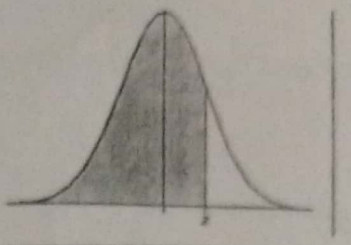
Standard Normal Cumulative Probability Table



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

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	0.0008	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	0.1611
-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	0.2451
-0.5	0.3085	0.3050	0.3015	0.2981	0.2946	0.2912	0.2877	0.2843	0.2810	0.2776
-0.4	0.3446	0.3409	0.3372	0.3336	0.3300	0.3264	0.3228	0.3192	0.3156	0.3121
-0.3	0.3821	0.3783	0.3745	0.3707	0.3669	0.3632	0.3594	0.3557	0.3520	0.3483
-0.2	0.4207	0.4168	0.4129	0.4090	0.4052	0.4013	0.3974	0.3936	0.3897	0.3859
-0.1	0.4602	0.4562	0.4522	0.4483	0.4443	0.4404	0.4364	0.4325	0.4286	0.4247
0.0	0.5000	0.4960	0.4920	0.4880	0.4840	0.4801	0.4761	0.4721	0.4681	0.4641

Standard Normal Cumulative Probability Table



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

z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990
3.1	0.9990	0.9991	0.9991	0.9991	0.9992	0.9992	0.9992	0.9992	0.9993	0.9993
3.2	0.9993	0.9993	0.9994	0.9994	0.9994	0.9994	0.9994	0.9995	0.9995	0.9995
3.3	0.9995	0.9995	0.9995	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9997
3.4	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9998

ACAD-27 a)	Shri Ramdeobaba College of Engineering and Management, Nagpur -13	Iss. No.: 01, Rev. No.: 00
Ref. Clause(s): 9.1		Date of Rev: 01/01/2018
Department: ECE	Semester : IV Section: A and B Course Code: ECT 259 Course Name: Probability Theory and Stochastic Processes	Page: 01/01
Programme: B. Tech.	Test: 2	Date of Exam: 16/07/2022
Max Marks:15	Session: 2021-22	Time: 1HOUR

Instructions: 1. Each Question carries marks as indicated.
2. Assume suitable data wherever necessary.
3. Use of standard normal distribution table is permitted.
4. All questions are compulsory.

Que No.	Description	Marks	COs Mapped
Q.1	Suppose that number of customers visiting an ice-cream shop is a random variable with mean 40. Calculate the probability that number of customers visiting the shop will exceed 60. 0.666	2	CO1, CO5
Q. 2	Computers from a particular company are found to last on an average for 3 years without any hardware malfunction with standard deviation of two months. At least what percentage of the computers will last between 31 months and 41 months?	2	CO1, CO3
Q. 3	Consider a Random Process $\{X(t), t \in R\}$ defined as $X(t) = A\cos(w_0 t + \phi)$, where ϕ is Uniformly distributed i. e. $\phi \sim U(0, 2\pi)$. A and w_0 are constants. Compute **Mean of X(t)**	2	CO2, CO4
Q. 4	A normally distributed IQ score have a mean of 100 and standard deviation of 15. Use the standard Z-table to answer following questions: What is the probability of randomly selecting someone with an IQ score a) less than 80 b) greater than 136 c) between 95 and 110	3	CO3, CO5
Q.5	A certain group of welfare recipients receives SNAP benefits of $110 per week with a standard deviation of $20. If a random sample of 25 people is taken, Using CLT, find the probability that their mean benefit will be greater than $120 per week?	2	CO3, CO5
Q.6	A random process X(t) having auto-correlation function $R_{XX}(\tau) = e^{-4\|\tau\|}$ is applied as input to the LTI system with impulse response $h(t) = e^{-2t}u(t)$. Find the PSD $S_{YY}(\omega)$ of output Y(t).	4	CO4

Course Code : ECT 256 QVRU/RS–22/1184

Fourth Semester B. Tech. (Electronics and Communication Engineering) Examination

ANALOG AND DIGITAL COMMUNICATION

Time : 3 Hours] [Max. Marks : 60

Instructions to Candidates :—

(1) All questions are compulsory.
(2) All questions carry marks as indicated against them.
(3) Assume suitable data and illustrate answers with neat sketches wherever necessary.

1. (a) A carrier power 400 W is modulated on depth 75%. Determine total power in DSBFC, DSBSC and SSB. Comment on the results. 5 (CO 1)

   (b) A 20 MHz carrier is modulated by 400 Hz modulating signal. The carrier voltage is 5 V and maximum deviation is 10 KHz. Write down standardized mathematical equation and bandwidth for FM and PM waves. 5 (CO 1)

2. (a) Analyze the effect of Noise in DSBSC system. 5 (CO 2)

   (b) What is the need of Pre-Emphasis and De-Emphasis in FM. Describe in detail Pre-Emphasis and De-Emphasis in FM. 5 (CO 2)

3. (a) Derive an expression for SNR in PCM for analog signal input. 5 (CO 3)

   (b) Write short note on time division multiplexing and digital multiplexer. 5 (CO 3)

4. Describe in detail MSK Transmitter with mathematical expression. Draw waveforms for MSK Transmitter if input is 01100111. 10 (CO 4)

MSK o/p
00, 10, 11, 01, 00, 10, 11, 11

$P_c\left(1+\frac{m^2}{2}\right)$

5. A Convolution Code is described by X1 = [1 0 1]; X2 = [1 1 1];
Draw the convolution encoder and state diagram. If the received sequence for above encoder is 100111, decode the sequence using Viterbi decoding algorithm.
10 (CO 4)

6. Describe any **Two** in detail :—

(I) Inter Symbol Interference.

(II) Optimum detection of signals in noise.

(III) Probability of error evaluations in matched filter. 10 (CO 5)

ISI

1) ~~Inter~~ intersymbol interference is not a noise it is spreading or dispersion

2) ISI occur due to fading

3) To avoid ISI we used Nyquist criterior

4) when channel is not ideal in the CKt then ISI occur

ACAD-27 a)	Shri Ramdeobaba College of Engineering and Management, Nagpur -440013		Iss. No.: 01, Rev. No.: 00
Ref. Clause(s): 9.1			Date of Rev: 01/01/2018
Department: Electronics & Communications	Semester : IV Course Code: ECT 256 Course Name: Analog & Digital Communication	Shift: First and Second	Page: 01/01
Programme: B.E.	Test: 1		Date of Exam: 18/05/2022
Max Marks: 15	Session: 2021-2022	Time: 1 Hour	

Instruction: All questions are compulsory

Q. No.		Marks	CO	EO
1	An AM signal has a peak unmodulated carrier voltage 100 V with resistance 50 Ohm. By considering modulation index 1, Estimate 1. The Carrier Power 2. Lower and Upper sideband Power 3. Total Sideband Power 4. Total Power of AM Signal 5. Sketch the AM Power Spectrum	05	CO 1	L2
2	Illustrate the effect of White Noise in Double sideband Suppressed Carrier (DSBSC) Communication system with block diagram and mathematical details.	05	CO 2	L3
3	The analog message signal is to be transmitted Using PCM with a maximum error 0.001. The signal has frequency of 100 Hz and amplitude range -10V to 10V. Calculate 1. Step Size 2. Number of bits in each PCM Sample 3. Signal to Noise ratio in dB 4. Bit rate 5. Transmission bandwidth.	05	CO 3	L3

Course Code : ECT 257 QVRU/RS–22/1181

Fourth Semester B. Tech. (Electronics and Communication Engineering) Examination

ANALOG CIRCUITS

Time : 3 Hours] [Max. Marks : 60

Instructions to Candidates :—

(1) All questions are compulsory.
(2) All questions carry marks as indicated against them.
(3) Assume suitable data and illustrate answers with neat sketches wherever necessary.

1. (a) Identify the topology for the circuit given in Fig. 1. Sketch the h - parameter equivalent circuit.

The transistor shown in the circuit has $h_{ie} = 1100\,\Omega$, $h_{fe} = 50$, $h_{re} = h_{oe} = 0$. Calculate β, A_v, A_{vf}, R_{if}, R_{of} and R'_{of}.

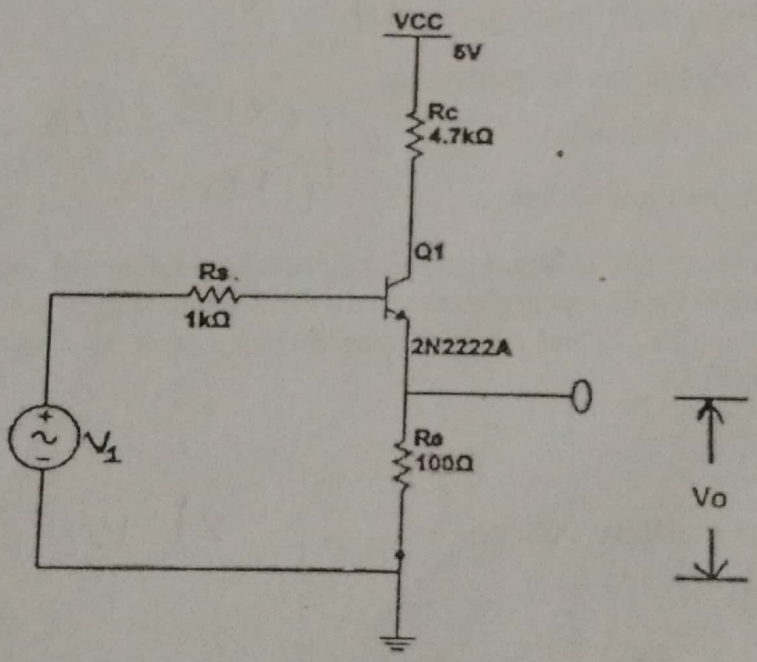


Fig. 1

10 (CO 1, CO 2)

2. (a) Evaluate the efficiency of class A amplifier. 5 (CO 3)

(b) Prove that in case of push-pull class B amplifier, the efficiency at the time of maximum power dissipation is just 50%. 5 (CO 3)

3. (a) Develop the equation for the sustained frequency of oscillation for Hartley oscillator. 7 (CO 2)

(b) In a transistorized Hartley oscillator the two inductances are 2 mH and 20 μH while the frequency is to be changed from 950 kHz to 2050 kHz. Calculate the range over which the capacitor is to be varied. 3 (CO 2)

4. (a) An emitter biased dual input balanced output differential amplifier has following specification :

$|V_{cc}| = |-V_{ee}| = 10$ v, $R_{c1} = R_{c2} = 2{\cdot}7$ KΩ, $R_E = 3{\cdot}9$ kΩ. The transistors used have $V_{BE} = 0{\cdot}7$ v and $\beta_{ac} = \beta_{dc} = 100$,

Determine :—

(1) The operating point of each transistor,

(2) Differential mode gain,

(3) Common mode gain,

(4) Input impedance,

(5) Output impedance. 5 (CO 3)

(b) Design a dual input balanced output differential amplifier with constant current bias to satisfy the following requirements :– Differential voltage gain, $A_d = 40 \pm 10$, Current supplied by the constant current bias circuit is 4 mA and supply voltage = ±10 V. 5 (CO 3)

5. (a) Define :

(1) Input offset voltage.

(2) CMRR.

(3) Slew rate.

(4) Input offset current. 4 (CO 4)

(b) For the circuit shown in Fig. 2, find V_0 in terms of V_1 and V_2.

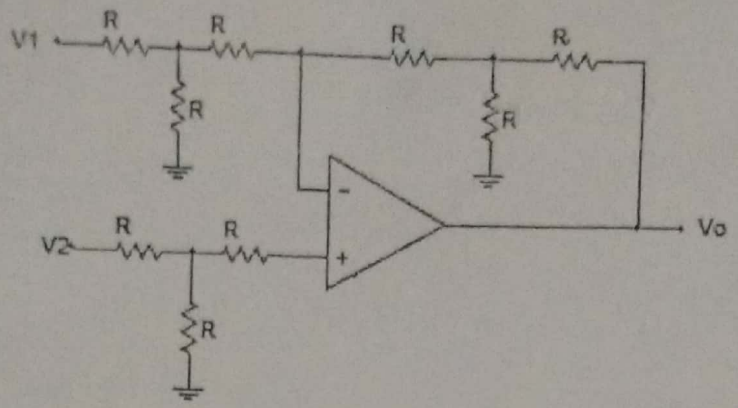


Fig. 2 6 (CO 4)

6. (a) Design an astable multivibrator using IC 555 having output frequency 5 kHz and 60% duty cycle. 5 (CO 4)

(b) Design 2nd order Butterworth high pass filter having cut-off frequency 2 KHZ. Then determine its frequency response. 5 (CO 5)

$$H(s) = \frac{A_0}{s^2 + \alpha s + 1}$$

$$\boxed{s^2 + 1.414s + 1}$$

$$\alpha = 3 - \alpha$$

Course Code : ECT 258

QVRU/RS–22/1182

Fourth Semester B. Tech. (Electronics and Communication Engineering) Examination

MICROPROCESSORS

Time : 3 Hours]

[Max. Marks : 60

Instructions to Candidates :—

(1) All questions are compulsory and carry marks as indicated.
(2) Due credit will be given to neatness and diagrams.
(3) Use of electronic gadgets leaving scientific calculator is not allowed.
(4) Assume suitable data wherever necessary.

1. (a) Draw and explain architecture of 8085 microprocessor. 5 (CO 1)

   (b) What are interrupts ? How is the address of the Interrupt Service routine calculated in vectored interrupts ? Explain with an example. 5 (CO 3)

2. (a) Draw Interfacing diagram for interfacing memory with 8085 microprocessor such that it should contain 16 kbyte of EPROM and 32 kbyte of RAM. 6 (CO 2, CO 3)

   (b) Write a program that transfers 2000 bytes of data from EEPROM to RAM. (Assume source and destination address) 4 (CO 2)

3. (a) Interface a 8 channel ADC with 8085 at port B of 8255 which is at address 81H. Draw and explain along with a program to take 20 samples of ADC at channel 2 with a gap of 1 second and store the samples from memory location 9000h onwards. 8 (CO 3, CO 4)

   (b) Explain BSR mode of 8255 in short with an example. 2 (CO 2)

4. (a) With a neat diagram explain the flag structure of 8086. 4 (CO 1)

(b) Explain the working of following 8086 instructions :—

(i) MOV AX, [SI]

(ii) ADD BYTE PTR [DI], 1. 6 (CO 2)

5. (a) Classify the types of interrupts and the action taken by 8086 when an interrupt occurs. 5 (CO 3)

(b) Write an 8086 Assembly Language program to count the number of 0's (zero bits) in BL register. 5 (CO 2)

6. (a) Attribute what you understand by real and virtual memory in detail. 5 (CO 4)

(b) Recall and explain the important features of Intel 386 microprocessor. 5 (CO 4)

ACAD-27 a)	Shri Ramdeobaba College of Engineering and Management,Nagpur -440013	Iss. No.: 01, Rev. No.: 00
Ref. Clause(s): 9.1		Date of Rev: 01/01/2018
Department: EC	Semester : IV Shift: A & B Course Code: ECT258 Course Name: Microprocessors	Page: 01/01
Programme: BE	**Test: 1**	Date of Exam: 17/05/22
Max Marks: 15	Session: 2021-22	Time: 1 hour

Instructions:

1. **All questions are compulsory and carry marks as indicated.**
2. **Use of scientific calculator is allowed.**
3. **Assume suitable data where ever required.**

Question No.	Questions	Marks	CO	EO
Q1	Remember and draw neat pin diagram and explain HOLD and status signal pins.	3	CO1	L1
Q2	Illustrate Implicit addressing mode and indirect addressing mode with examples	3	CO1	L2
Q3	Clarify how an instruction is fetched and executed with an example.	3	CO1	L2
Q4	Use the knowledge of assembly language and write program to multiply two immediate bytes of data.	3	CO2	L3
Q5	Use the knowledge of assembly language and write program to convert the data byte to its Binary coded decimal representation and store the result as two separate nibbles.	3	CO2	L3

ACAD-27 a)	Shri Ramdeobaba College of Engineering and Management, Nagpur -440013	Iss. No.: 01, Rev. No.: 00
Ref. Clause(s): 9.1		Date of Rev: 01/01/2018
Department: EC	Semester : IV Section : A & B Course Code:ECT258 Course Name: Microprocessors	Page: 01/01
Programme: BE	Test: 2	Date of Exam: 13/07/2022
Max Marks: 15	Session: 2021-22	Time 3:00 to 4 :00 pm (1 hour)

Instructions:

1) ALL QUESTION CARRY MARKS AS INDICATED
2) ALL QUESTIONS ARE COMPULSORY

Question No.	Questions	Marks	CO	EO
Q.1	Organize the instruction STA 9000h by drawing the timing diagram and explain it in detail.	05	CO3	L3
Q.2	Interface a common cathode seven segment display to the microprocessor at port address E0H. Write a program to count from 0 to 9 with a delay of 0.5sec between each count. Display the count on the seven segment display.	06	CO3,4	L4
Q.3.	Explain addressing modes of 8086 with examples.	04	CO2	L2

Course Code : ITT 299-1 QVRU/RS–22/1219

Fourth Semester Bachelor of Technology Examination

LINUX FUNDAMENTALS

Time : 3 Hours] [Max. Marks : 60

Instructions to Candidates :—

(1) All questions carry equal marks.
(2) Assume suitable data wherever necessary.
(3) Write answers to the point with neat diagrams.

1. (a) State and explain the different benefits of Linux Operating System over Windows. 4 (CO 1)

(b) List and discuss popular Linux distributions. 6 (CO 1)

2. (a) Explain purpose and content of following directories of Linux File system :
/ etc / dev 2 (CO 2)

(b) Explain *ln* command to create soft and hard link to file. 2 (CO 2)

(c) Explain the following command with its option :
(i) kill
(ii) nohup
(iii) cron 6 (CO 2)

3. (a) Explain the purpose and content of /etc/passwd and /etc/shadow file. 4 (CO 3)

(b) Write a command for the following :—
(iii) Create a new user with uid 2000.
(iii) Change a shell of ituser1 to csh shell.
(iii) Create user1 without home directory and own group. 3 (CO 3)

(c) Explain following commands :

(i) chgrp

(ii) userdel 3 (CO 3)

4. (a) What is package ? Explain the different activities performed in package management. 4 (CO 3)

(b) Write a command using yum for the following activity :

(i) Query a package.

(ii) Upgrading existing package.

(iii) Removing package.

(iv) Listing all installed package.

(v) Information about package.

(vi) Install new package. 6 (CO 3)

5. (a) Write a process using fdisk utility for the following :

(i) Create one primary partition of size 4 GB.

(ii) Create one swap partition of size 2 GB.

(iii) Create one LVM partition of size 4 GB. 6 (CO 4)

(b) Explain following Logical Volume Management (LVM) commands :

(i) Vgcreate

(ii) lvcreate 4 (CO 4)

6. (a) Discuss the different ways to execute shall program. 2 (CO 5)

(b) Explain for loop and write a shell program to print all even numbers from range 1 to 1000. 4 (CO 5)

(c) Write a shell script to find factorial of an entered number. 4 (CO 5)

Doc. No.: FY-ACAD-33(a)	Shri Ramdeobaba College of Engineering and Management, Nagpur - 440 013	Iss. No.: 01 Rev. No.: 00
Clause No.: 9.1		Date of Rev.: 01/01/2018
Department: Physics	Name of Internal Examination: Test-1 Session: 2020-21 Semester: IV [Electronics and Communication Engineering] Sec-A&B	Page 1/1

Course Code: PHT251 Course Name: Introduction to Electromagnetic Theory	Date of Exam: 17-5-2022 Timing:11.00 am to 12.00 noon
Maximum Marks: 15	Duration: 1 Hrs

Note: 1] Assume suitable data wherever needed.

2] Neat and labelled diagram carry complete weightage.

Q. No.	Question	Marks	CO	EO
1	A person seating in the air plane measures the field at point - ($r = 5, \theta = 20^\circ, \varphi = -70^\circ$). What is its equivalent point in cartesian system?	1	1	2
2	The line charge density $\rho_L = 24\ Y^2$ m C/m is confined to y-axis. Find the total charge distributed on the y-axis when y = -5 to y = +5	2	2	2
3	What is scale factor? Obtain the scale factor for coordinate φ angle in spherical system.	2	1	1
4	Determine the equivalent vector field in spherical system for given vector $\mathbf{A} = 10\ \mathbf{a}_x$, at point P(x=-3, y=2, z=4).	3	1	5
5	Certain charge distribution has flux density - $\mathbf{D} = 8xyz^4\ \mathbf{a}_x + 16\ x^2z^4\ \mathbf{a}_y + 16\ x^2yz^3\ \mathbf{a}_z\ pC/m^2$. Find the volume charge density emitting the above flux.	3	2	4, 5
6	Solve the either side of divergence theorem for the surface bounded with $0 \le \rho \le 3$, $0 \le z \le 2$ radiating the $\mathbf{D} = 20\rho^2\ \mathbf{a}_\rho\ nC/m^2$ flux and hence obtain the charge enclosed by the closed surface.	4	2	4, 5

Teacher: R.A. Nafdey & P R Gandhi

Doc. No.: FY-ACAD-33(a)	Shri Ramdeobaba College of Engineering and Management, Nagpur - 440 013	Iss. No.: 01 Rev. No.: 00
Clause No.: 9.1		Date of Rev.: 01/01/2018
Department: Physics	Name of Internal Examination: TA-1 Session: 2021-22 Semester: IV Sec-A&B [Electronics & Communication Engineering]	Page 1/1
Course Code: PHT251 Course Name: Introduction to Electromagnetic Field		Date of Submission: 26th April 2022 Timing: 1o am to 11am
Maximum Marks: 15		Duration: 1Hr.

CO-1

Q. No.	Question	Marks
1	Transform the vector $10\mathbf{a}_x$ to spherical coordinate at P (x = -3, y = 2, z = 4)	3
2	The vector from the origin to point A is given as $6\mathbf{a}_x - 2\mathbf{a}_y - 4\mathbf{a}_z$, and unit vector directed from the origin towards point B is (2/3, -2/3, 1/3). If points A and B are 10 unit apart, find coordinates of point B.	4
3	Find the normal vector to the surface defined in $2x^2y - 5z$ at point P (-4, 3, 6).	3
4	A certain radiating antenna has radiation field $2\rho\cos^2\varphi - \rho \sin^2\varphi$. Find the radial part of field.	2
5	Find a) Vector G from origin to the midpoint of line joining A(2, -3,5) and B (6, -5,5). b) The vector C (-2,7,3) is given. Find the vector component of R_{AB} in the direction of R_{AC}.	3

Teacher: P R Gandhi & R.A. Nafdey