SECOND SEMESTER B.A./B.Sc. DEGREE EXAMINATION, APRIL 2020

(CBCSS—UG)

Information Technology

BIT 2C 04—ELECTRONICS AND COMMUNICATION TECHNOLOGY

(2019 Admissions)

Time : Two Hours　　　　　　　　　　　　　　　　　　　　　　Maximum : 60 Marks

Section A

Ceiling - 20 Marks.
Each question carries 2 marks.

1. How the base emitter and collector base junctions are biased in a PNP transistor when used in an amplifier ?
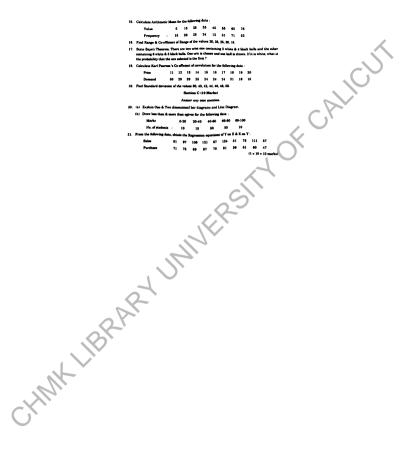
2. The layer formed at the pn junction is called depletion layer. Why ?

3. A multistage amplifier consists of three stages. The gains of the three stages are 40, 60 and 80 respectively. Calculate the overall gain in dB.

4. What are the distinguishing features of Colpitts and Hartley oscillators ?

5. What is the difference between FET and MOSFET ?

6. Differentiate between narrowband and wideband FM.

7. What are the main features of frequency division multiplexing ?

8. A multistage amplifier employs five stages each of which has a power gain of 30. What is the total gain of the amplifier in dB ?

9. What is amplitude shift keying ?

10. Explain the terms conductor and insulator.

11. Explain the principle of PAM.

12. Explain the main features of frequency division multiplexing.

Section B

Ceiling - 30 Marks.

Each question carries 5 marks.

13. Explain the biasing of a transistor to be used as an amplifier.

14. Draw the circuit of an RC phase shift oscillator and briefly explain its working.

15. Draw the circuit of any one LC oscillator and explain its working.

16. What is modulation ? Why is it necessary for the transmission of intelligence ?

17. Describe the generation of ASK signal with time domain representation.

18. Draw and explain the V-I characteristics of a pn junction.

19. Explain the mechanisms by which breakdown in pn junction takes place.

Section C

Answer any one question.

10 marks.

20. Explain the mechanism of electrical conduction in a semiconductor. How the conductivity of pure semiconductor is affected by adding traces of trivalent and pentavalent impurities ?

21. With a neat sketch explain the working of a centre-tap full-wave rectifier.

1. Define Statistics.

2. What is meant by a Questionnaire ? How is it prepared ?

3. What do you mean by Systematic Sampling ?

4. Explain Geographical Classification.

5. What is a Simple Bar diagram ?

6. Define Median. How will you find Median in the case of raw data ?

7. When Mode is said to be ill-defined ? In such cases, how will you find the mode ?

8. What are the merits and demerits of Standard deviation ?

9. What are Mutually exclusive, Independent and Dependent events ?

10. Define a Binomial Distribution.

11. Distinguish between Positive and Negative correlation.

12. What are the limitations of Regression ?

Section B (Ceiling - 20 Marks)

Each question carries 5 marks.

13. Distinguish between Census method and Sampling survey.

14. Draw a Histogram for the following data :

Marks	10-15	15-20	20-25	25-30	30-35
No. of students	5	20	47	38	10

SECOND SEMESTER B.A./B.Sc. DEGREE EXAMINATION, APRIL 2020

(CBCSS—UG)

Information Technology

BIT 2B 02—OBJECT ORIENTED PROGRAMMING WITH C++

(2019 Admissions)

Time : Two Hours　　　　　　　　　　　　　　　　　Maximum : 60 Marks

Section A (Ceiling 20 Marks)

Each question carries 2 marks.

1. Briefly explain the advantages of OOP language.

2. Define data abstraction and encapsulation.

3. Briefly explain typedef statement.

4. What is the use of goto statement ? Give example.

5. What is an abstract class ? What is its use ?

6. What is an in-line function ? Give example.

7. What is friend function ?

8. What is containership ?

9. Differentiate classes and structures.

10. Write note in if-else statement.

11. What do you mean by pure virtual function ?

12. What is meant by type casting ?

Section B (Ceiling 20 Marks)

Each question carries 5 marks.

13. Explain 'this pointer' with an example.

14. Explain 'operator overloading' with an example.

15. Calculate Arithmetic Mean for the following data :

Value	5	15	25	35	45	55	65	75
Frequency :	15	20	25	24	12	31	71	52

16. Find Range & Co-efficient of Range of the values 20, 35, 25, 30, 18.

17. State Baye's Theorem. There are two urns one containing 5 white & 4 black balls and the other containing 6 white & 5 black balls. One urn is chosen and one ball is drawn. If it is white, what is the probability that the urn selected is the first ?

18. Calculate Karl Pearson 's Co-efficient of correlation for the following data :

Price	11	12	13	14	15	16	17	18	19	20
Demand	30	29	29	25	24	24	24	21	18	15

19. Find Standard deviation of the values 30, 40, 42, 44, 46, 48, 58.

Section C (10 Marks)

Answer any one question.

20. (a) Explain One & Two dimensional bar diagrams and Line Diagram.

    (b) Draw less than & more than ogives for the following data :

Marks	0-20	20-40	40-60	60-80	80-100
No. of students :	10	15	30	35	10

21. From the following data, obtain the Regression equations of Y on X & X on Y :

Sales	91	97	108	121	67	124	51	73	111	57
Purchase	71	75	69	97	70	91	39	61	80	47

(1 × 10 = 10 marks)

15. Explain static data members and static member functions.

16. Compare visibility modes private, public and protected.

17. Write a C++ program to create student class, read and print N student's details using array of objects ?

18. Explain the C++ stream classes put() and get() with examples.

19. Explain seek() function with an example for manipulating file.

Section C (10 Marks)

Answer any one question.

20. What are constructors ? Differentiate between constructors and destructors. Explain the different types of constructors available in C++.

21. Explain in detail different types of inheritance with examples.

SECOND SEMESTER (CBCSS—UG) DEGREE EXAMINATION
APRIL 2021

Information Technology

BIT 2C 04—ELECTRONICS AND COMMUNICATION TECHNOLOGY

Time : Two Hours

Maximum : 60 Marks

Section A

Answer at least **eight** *questions.*

Each question carries 3 marks.

All questions can be attended.

Overall Ceiling 24.

1. What is the difference between majority and minority carriers ?

2. Why the layer formed at the *pn* junction is called depletion layer ?

3. Differentiate FET and MOSFET.

4. What are the advantages of pulse modulation system?

5. Differentiate between narrowband and wideband FM.

6. Draw the transfer characteristics of n channel JFET.

7. Explain the output characteristics of a CE transistor configuration.

8. Define FET parameters and obtain the relationship between them.

9. What is pre-emphasis ?

10. Explain the principle of PPM.

11. Explain the main features of time division multiplexing.

12. Differentiate between Time and Digital Modulation Techniques ?

(8 × 3 = 24 marks)

Section B

13.   What are the advantages of negative feedback in amplification ?

14.   Explain the mechanisms by which breakdown in *pn* junction takes place.

15.   Explain the mechanism of hole current flow in a semiconductor.

16.   Describe the generation of SSB signal using Phase Shift Method.

17.   Explain the working of any one of the full-wave rectifier with circuit diagram and input output waveforms.

18.   Explain how zener diode maintains constant voltage across the load ?

19.   In what aspects FM differ from AM ? Briefly explain the relative merits of the two methods.

(5 × 5 = 25 marks)

Section C

20.   Define amplitude modulation and derive expression for a sinusoidal carrier voltage amplitude modulated by another sinusoidal voltage. Also draw the waveform of amplitude modulated signal.

21.   Derive the expression for rectification efficiency of a half-wave rectifier.

(1 × 11 = 11 marks)

SECOND SEMESTER (CBCSS—UG) DEGREE EXAMINATION, APRIL 2021

Information Technology

BIT 2C 03—PROBABILITY AND STATISTICS

Time : Two Hours

Maximum : 60 Marks

Section A

Answer at least **eight** *questions.*
Each question carries 3 marks.
All questions can be attended.
Overall Ceiling 24.

1. Distinguish between Primary and Secondary data.

2. What you mean by Stratified random sampling ? What are its advantages over systematic sampling ?

3. Explain different types of Classification.

4. Distinguish between Simple table and Complex table.

5. What are the uses of diagrams ?

6. Find Arithmetic mean of the values 10, 90, 85, 103, 11.

7. What are the merits and demerits of mode ?

8. Define Quartile deviation & Co-efficient of Quartile deviation.

9. Probability that A will pass paper I is 0.3 and probability that he will pass paper II is 0.7. What is the probability that he will pass both the papers ? (Assuming passing the two papers as independent).

10. State Addition Theorem of Probability.

11. Define Probable error with its expression.

12. What are the properties of Regression Co-efficients ?

(8 × 3 = 24 marks)

Section B

Answer at least **five** *questions.*
Each question carries 5 marks.
All questions can be attended.
Overall Ceiling 25.

13. Distinguish between Sampling & Non-sampling errors.

14. Write the differences between Histogram & Pie-diagram.

Turn over

15. Find Median of the following data :

Wage(Rs.)	40	45	50	52	58	60
No. of workers	3	12	20	15	10	8

16. Find Mean deviation from mean and its co-efficient for the values 25, 63, 85, 75, 62, 70, 83, 28, 30, 12.

17. A committee of 5 is to be formed from a group of 8 boys and 7 girls. Find the probability that the committee consists of (a) 3 boys & 2 girls (b) Atleast one girl.

18. Distinguish between Correlation & Regression.

19. The ranking of 10 students in two subjects A & B are as follows, Find Spearman's Rank correlation co-efficient ?

A	6	5	3	10	2	4	9	7	8	1
B	3	8	4	9	1	6	10	7	5	2

(5 × 5 = 25 marks)

Section C

Answer any one question.
The question carries 11 marks.

20. (a) Draw a Pie-diagram to represent the distributions of a certain blood group 'O' among Gypsies, Indians and Hungarians :

Blood group	Gypsies	Indians	Hungarians	Total
0	343	313	344	1000

   (b) Draw less than & More than ogives for the following data :

Weights (Kg.)	10-19	20-29	30-39	40-49	50-59
Frequency	7	15	34	18	8

21. The following table shows the age(x) & Blood group(y) of 8 persons :

X	52	63	45	36	72	65	47	25
Y	62	53	51	25	79	43	60	33

Obtain the regression equation of y on x and find the expected blood pressure of a person who is 49 years old ?

(1 × 11 = 11 marks)

SECOND SEMESTER (CBCSS—UG) DEGREE EXAMINATION
APRIL 2021

Information Technology

BIT 2B 02—OBJECT ORIENTED PROGRAMMING WITH C++

Time : Two Hours   Maximum : 60 Marks

Section A

*Answer at least **eight** questions.*
Each question carries 3 marks.
All questions can be attended.
Overall Ceiling 24.

1. Define an Object. How to create an object in C++ program ?

2. What are Qualifiers ? Illustrate them with examples.

3. What are Destructors ? Explain.

4. Write short note on put() and get() functions in file stream.

5. Distinguish between break and continue statements in C++.

6. What is meant by an abstract class ? Why it is required ?

7. What is a static class member ? Explain its characteristics.

8. Explain briefly about stream class hierarchy.

9. Explain the working of virtual base class.

10. What is a Pointer ?

11. What are the different modes of inheritance ?

12. What are base and derived classes ? Give examples.

(8 × 3 = 24 marks)

Section B

Answer at least **five** *questions.*
Each question carries 5 marks.
All questions can be attended.
Overall Ceiling 25.

13. Explain the different data types available in C++ with suitable example.

14. What is function overloading ? Explain with a suitable example.

15. Explain the working of switch() case statement with an example.

16. What is multilevel inheritance ? How is it different from multiple inheritance ?

17. What is a virtual function ? Write rules for virtual functions. Explain with an example.

18. Explain the C++ stream classes read() and write() with examples.

19. Explain the seekp() function with an example for manipulating file pointers.

(5 × 5 = 25 marks)

Section C

Answer any **one** *question.*
The question carries 11 marks.

20. Why is friend function is required ? Write a program to add two complex numbers using friend function.

21. Write a program to find the area of different shaped polygons namely triangle, rectangle, and square using function overloading.

(1 × 11 = 11 marks)

SECOND SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION, APRIL 2021

Information Technology

BIT 2C 03—PROBABILITY AND STATISTICS

(2014 Admissions)

Time : Three Hours Maximum : 80 Marks

Part A

Answer all questions.
Each question carries 1 mark.

1. In a histogram with equal class intervals, heights of the bars are proportional to ——————.

2. The geometric mean of two numbers $\frac{1}{16}$ & $\frac{4}{25}$ is ——————.

3. Let $\overline{x_1}$ and $\overline{x_2}$ be the means of two sets of observations with sizes n_1, and n_2. Then the formula for calculating combined mean is given by ——————.

4. —————— is measure of dispersion which utilizes only extreme values.

5. The square of standard deviation is known as ——————.

6. If the mean of a series is 10 and coefficient of variation is 40 percent, variance of the series is ——————.

7. The range for Pearson's correlation coefficient is given by ——————.

8. If $P(B) = 1$, then $P(A/B) = $ ——————.

9. The probability of selecting one white ball from an urn containing six red, eight black, ten yellow and one green balls is ——————.

10. The relation between mean and variance of a Poisson distribution is ——————.

(10 × 1 = 10 marks)

Part B (Short Answer Type Questions)

Answer all questions.
Each question carries 2 marks.

11. What is population in Statistics ?

12. Why median is known as an insensitive average ?

13. What are absolute measures of dispersion ?

Turn over

14. Explain the terms "mutually exclusive" and "equally likely" events.

15. Distinguish between product moment correlation coefficient and rank correlation co-efficient.

$(5 \times 2 = 10 \text{ marks})$

Part C (Short Essay Type Questions)

Answer any five questions.
Each question carries 4 marks.

16. Explain systematic random sampling.

17. Distinguish between sampling and non-sampling errors.

18. The mean age of a combined group of men and women is 25 years. If the mean age of group of men is 26 and mean age of group of women is 21, find the percentage of men and women in that group.

19. A student obtained mean and standard deviation of 100 observations as 40 and 5.1 respectively. It was later found that one observation was wrongly copied as 50, the correct figure being 40. Find the correct mean and standard deviation.

20. If A, B & C are mutually exclusive and exhaustive events such that $P(A) = \frac{1}{2} P(B) = \frac{1}{3} P(C)$, find the values of P(A), P(B) & P(C).

21. It is given that $P(A \cup B) = \frac{5}{6}$, $P(A \cap B) = \frac{1}{3}$ and $P(\overline{B}) = \frac{1}{2}$. Determine P (A) and P (B). Hence show that A and B are independent.

22. Explain what is meant by co-efficient of correlation between two variables ? Distinguish between positive and negative correlation.

23. The co-efficient of rank correlation of marks obtained by ten students in Mathematics and Statistics was found to be 0.50. It was later discovered that the difference in ranks in two subjects obtained by one of the students was wrongly taken as 3, instead of 7. Find the correct co-efficient of rank correlation.

$(5 \times 4 = 20 \text{ marks})$

Part D (Essay Questions)

Answer any five questions.
Each question carries 8 marks.

24. Draw the cumulative frequency curves for following distribution showing the marks 59 students in Statistics. Hence obtain median mark :

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of students	4	8	11	15	12	6	3

25. Calculate the lower and upper quartiles from the following data :

Central value	2.5	7.5	12.5	17.5	22.5
Frequency :	7	18	25	30	20

26. Find mean deviation from mean and mean deviation from median for the following data :

X	10	11	12	13	14
f	3	12	18	12	3

27. Calculate coefficient correlation from the following data :

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

28. Given below the information relating marks obtained in an examination in English and Mathematics :

	English	Mathematics
Mean marks	18	100
S.D of marks	14	20

The correlation co-efficient = 0.80

Obtain the two regression lines and estimate : (i) the expected marks in Mathematics of student who has 70 marks in English ; (ii) expected marks in English if scored 90 marks in Mathematics.

29. Two unbiased dice are thrown :

   (a) What is the probability that both dice show the number 5 ?

   (b) What is the probability that both dice show the same number ?

   (c) What is the probability that sum of the two numbers shown is 8 ?

   (d) Given that the sum of the two numbers shown is 8, find conditional probability that the number on the first die is larger than number on the second die.

30. In a factory, machines A and B are producing springs of same type. Of this production, machines A and B produce 5% and 10% defective springs respectively. Machines A and B produce 40% and 60% of the total output of the factory. One spring is selected at random from the total output.

   (a) What is the probability that it is defective ?

   (b) If the spring is found to be defective, what is the probability that it is produced by machine A ?

31. Let P(x) be the probability function of a discrete random variable X which assumes the values x_1, x_2, x_3, x_4, such that $2P(x_1) = 3P(x_2) = P(x_3) = 5P(x_4)$. Find the probability distribution and cumulative probability distribution of X.

(5 × 8 = 40 marks)

C 4154   (Pages : 3) Name...

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SECOND SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION
APRIL 2021

Information Technology

BIT 2C 04—ELECTRONICS AND COMMUNICATION TECHNOLOGY

(2014 Admissions)

Time : Three Hours   Maximum : 80 Marks

Part A

Answer **all** *questions.*
Each question carries 1 mark.

1. In the breakdown region, a zener diode behaves like a ———————— source.

 a) Constant voltage.   b) Constant current.

 c) Constant resistance.   d) None of the above.

2. A transistor has ————————.

 a) One pn junction.   b) Two pn junctions.

 c) Three pn junctions.   d) Four pn junctions.

3. A single stage transistor amplifier contains ———————— and associated circuitry.

 a) Two transistors.   b) One transistor.

 c) Three transistor.   d) None of the above.

4. An oscillator converts ————————.

 a) A.c. power into d.c. power.   b) D.c. power into a.c. power.

 c) Mechanical power into a.c. power.   d) None of the above.

5. An oscillator employs ———————— feedback.

 a) Positive.   b) Negative.

 c) Neither positive nor negative.   d) Data insufficient.

6. In a phase shift oscillator, the frequency determining elements are ————————.

 a) L and C.   b) R, L and C.

 c) R and C.   d) None of the above.

7. Demodulation is done in ——————————.

     a) Receiving antenna.
     b) Transmitter.
     c) Radio receiver.
     d) Transmitting antenna.

8. One of the disadvantages of PCM is :

     a) It requires large bandwidth.
     b) Very high noise.
     c) Cannot be decoded easily.
     d) All of the above.

9. Which of the following is usedas an optical transmitter on the Fiber Optical Communications ?

     a) APD.
     b) LSA diode.
     c) PIN diode.
     d) LED.

10. The term dispersion describes the process of :

     a) Separating light into its component frequencies.

     b) Reflecting light from a smooth surface.

     c) The process by which light is absorbed by an uneven rough surface.

     d) Light scattering.

                                    (10 × 1 = 10 marks)

Part B

*Answer **all** questions.*
Each question carries 2 marks.

11. What is reverse bias in a diode ?

12. What is a DC amplifier ?

13. What is De-emphasis in FM transmission ?

14. What is quantization noise ?

15. What is Companding ?

                                    (5 × 2 = 10 marks)

Part C

*Answer any **five** questions.*
Each question carries 4 marks.

16. What is a Zener diode ?

17. Explain Darlington pair amplifier.

18. Explain Oscillator.

19. Explain balanced modulator.

20. Explain delta modulation with any three features.

21. Explain television receiver with a block diagram.

22. Explain two types of signal distortion in fibre optics.

23. Explain fibre optics communication system with a block diagram.

(5 × 4 = 20 marks)

Part D

Answer any five questions.
Each question carries 8 marks.

24. Compare Bi Polar Junction Transistor and Field effect Transistor.

25. Explain the application of transistor as amplifier.

26. Discuss on negative feedback and its advantage in amplification.

27. Explain the working of monostable multivibrator using IC555.

28. Explain amplitude modulation.

29. Explain Pulse Amplitude Modulation.

30. Explain frequency shift keying.

31. Discuss on various types of fibre optics.

(5 × 8 = 40 marks)

SECOND SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION
APRIL 2021

Information Technology

BIT 2C 03—PROBABILITY AND STATISTICS

(2017 Admissions)

Time : Three Hours   Maximum : 80 Marks

Part A

Answer all questions.
Each question carries 1 mark.

1. The year wise recording of food production will be called ——————— classification.

2. Histogram can be drawn only for ———————— distributions.

3. Out of all measures of central tendency ———————— is the only measure which is not unique.

4. ——————— is the measure of dispersion which utilizes only extreme values.

5. The sum of squares of deviation taken from the mean 40 for 9 observations is 324. Then the co-efficient of variation is ————————.

6. The probability of an event cannot be greater than ———————.

7. If A, B, C and D are mutually exclusive events, then $P(A \cup B \cup C \cup D) =$ ————————.

8. If any one of the regression coefficients is greater than one, the other should be ———————.

9. In regression analysis, independent variable is also known as ———————.

10. The standard deviation of a Poisson distribution with mean 4 is ————————.

(10 × 1 = 10 marks)

Part B (Short Answer Type Questions)

Answer all questions.
Each question carries 2 marks.

11. The geometric mean and harmonic mean of two positive numbers is 8 and 6.4. Find those numbers.

12. The mean and variance of a set of observations are given by ten and zero respectively. What is your conclusion about the observations ?

Turn over

13. Distinguish between simple random sampling with replacement and with out replacement.

14. What is meant by cluster sampling ?

15. Define mathematical expectation.

(5 × 2 = 10 marks)

Part C (Short Essay Type Questions)

Answer any five questions.
Each question carries 4 marks.

16. Explain the methods of collecting the primary data.

17. What are the desirable properties of a good measure of central tendency ?

18. Distinguish between discrete and continuous random variables by giving examples.

19. Calculate mean and median of 32, 45, 20, 39, 52, 15, 55, 30, 18, 12.

20. Calculate standard deviation of 23, 25, 28, 31, 38, 40 and 46.

21. In two factories A and B engaged in the same industry, the average weekly wage and standard deviation are as follows :

Factory	Average	Standard deviation	No. of workers
A	36	5	250
B	38	4.5	150

Find the average and standard deviation of the workers in two factories taken together.

22. From the following information, obtain the correlation co-efficient :

$n = 25, \sum X = 125, \sum Y = 100, \sum X^2 = 650, \sum Y^2 = 460$ and $\sum XY = 508$.

23. Find the most likely price in Mumbai corresponding to the price Rs.70 at Kolkatta from the following data :

City	Average price	Standard deviation
Mumbai	67	3.5
Kolkatta	65	2.5

The correlation coefficient $r = 0.80$.

(5 × 4 = 20 marks)

Part D (Essay Questions)

Answer any five questions Each question carries 8 marks.

24. Draw histogram and frequency polygon for the following data :

Mark	0–10	10–20	20–40	40–50	50–60	60–70	70–90	90–100
No.of students.	4	6	14	16	14	8	16	5

25. The runs scored by two batsmen in 5 innings are given bellow. Which batsman is more consistent :

A	25	50	45	30	70
B	10	70	50	20	95

26. For the following data find Pearson's correlation co-efficient :

X	78	89	96	69	59	79	68	61
Y	125	137	156	112	107	136	123	108

27. Calculate the co-efficient of rank correlation for the following data :

Price of tea	75	88	95	70	60	80	81	50
Price of coffee :	120	134	150	115	110	140	142	100

28. Given the two equations of regression as $8x - 10y + 66 = 0$, $40x - 18y - 214 = 0$.

    (a) Identify the regression lines.

    (b) Obtain the correlation coefficient.

    (c) Find the means of X and Y.

    (d) Given the standard deviation of X = 3, find the standard deviation of Y.

29. (a) You need four eggs to make omelets for breakfast. You find a dozen eggs in the refrigerator but do not realize that two these are rotten. What is the probability that of the four eggs you chosen at random (i) None is rotten ; and (ii) Exactly one is rotten.

    (b) What is the probability that a leap year selected at random will contain 53 Thursdays or 53 Fridays ?

Turn over

30. Suppose that there is a chance for a newly constructed house will collapse whether the design is faulty or not. The chance that the design is faulty is 0.10. The chance that the house collapse if the design is faulty is 0.95 and otherwise is 0.45.

    (a) What is the probability that a randomly selected house will collapse ?

    (b) If a randomly selected house collapsed, what is the probability that it is due to faulty design ?

31. Find the value of c , if $f(x) = c \left(\dfrac{1}{4}\right)^x$; $x = 1, 2, 3....$ is a probability density function. Also obtain

$P(2 < X \le 4)$ and $P(X \ge 3)$.

(5 × 8 = 40 marks)

SECOND SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION APRIL 2021

Information Technology

BIT 2C 04—ELECTRONICS AND COMMUNICATION TECHNOLOGY

(2017 Admissions)

Time : Three Hours   Maximum : 80 Marks

Part A

Answer **all** *questions.*

Each question carries 1 mark.

1. ——— diode is used as a voltage regulator.

   (a) PN-junction diode.   (b) Zener diode.

   (c) Light emitting diode.   (d) PIN diode.

2. N-type semiconductor is obtained by adding ——— impurities to intrinsic semiconductor.

   (a) Trivalent.   (b) Tetravalent.

   (c) Pentavalent.   (d) Divalent.

3. In oscillators ——— feedback is employed.

   (a) Positive.   (b) Negative.

   (c) No feedback.   (d) Degenerative.

4. ——— transistor configuration is known as emitter follower.

   (a) Common emitter.   (b) Common collector.

   (c) Common base.   (d) None of these.

5. In RC phase shift oscillator a single RC network produces ——— phase shift.

   (a) 180°.   (b) 270°.

   (c) 90°.   (d) 60°

Turn over

6. FET is a ———— controlled device.

    (a) Voltage.   (b) Current.

    (c) Phase.   (d) None of these.

7. The bandwidth of Amplitude modulated signal is ————.

    (a) ω_m.   (b) $2\omega_m$.

    (c) $3\omega_m$.   (d) $4\omega_m$.

8. The output of a balanced modulator consists of ————.

    (a) Single side band only.   (b) Double sideband only.

    (c) Single sideband with carrier. (d) Double sideband with carrier.

9. A carrier signal of 100 MHz modulated using a sine wave whose frequency is 75 kHz with a deviation frequency of 50 kHz. What will be the modulation index ?

    (a) 0.555.   (b) 0.667.

    (c) 0.778.   (d) 0.889.

10. Quantization noise in PCM can be reduced by ———— the number of levels.

    (a) Decreasing.   (b) Increasing.

    (c) Doubling.   (d) Squaring.

                                            (10 × 1 = 10 marks)

Part B (Short Answer Questions)

*Answer **all** questions.*

Each question carries 2 marks.

11. Draw and explain the forward bias characteristics of a diode.

12. Draw the circuit of a Darlington pair. What are its advantages ?

13. What is pinch-off in JFET ?

14. What are the advantages of SSB over AM.

15. What is pre-emphasis ? Why is it employed ?

                                            (5 × 2 = 10 marks)

Part C (Short Essay Questions)

*Answer any **five** questions.*

Each question carries 4 marks.

16. Explain the working of transistor switch with suitable circuit.

17. Explain the principle of LC oscillators.

18. Draw the circuit and frequency response of a single stage transistor amplifier and explain the working.

19. What are the different types of MOSFETs ? Compare them.

20. What is modulation? Explain the need for modulation ?

21. What is vestigial sideband transmission ? Explain.

22. Explain companding.

23. Explain PSK and FSK with necessary diagrams.

(5 × 4 = 20 marks)

Part D (Essay Questions)

*Answer any **five** questions.*

Each question carries 8 marks.

24. Explain the working of a diode as full wave rectifier with necessary diagrams.

25. Draw the circuit of a RC-phase shift oscillator. Explain its working.

26. Explain the working of SCR and its characteristics.

27. With a block diagram, explain the generation of AM.

28. Explain the generation of SSB with a block diagram.

29. Explain the superheterodyne receiver with a block diagram.

30. Explain differential PCM. What are the advantages of DPCM ?

31. Explain TDM and FDM.

(5 × 8 = 40 marks)