ADAMAS UNIVERSITY
END-SEMESTER EXAMINATION: JULY 2020

Name of the Program: B. Tech   Semester: IV
Stream: CSE/ECE/EE
PAPER TITLE: Digital Electronics   PAPER CODE: EEC42102
Maximum Marks: 40   Time duration: 3 hours
Total No of questions: 08   Total No of Pages: 02

Instruction for the Candidate:
1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

Answer all the Groups
Group A
Answer all the questions of the following   **5×1 = 5**

1. a) Convert $A0F9.0EB_{16}$ to decimal.

    b) Reduce the following Boolean expression: $AB + \overline{\overline{AC}} + A\overline{B}C(AB + C)$

    c) Differentiate Combinational and Sequential Circuit.

    d) Show how the J-K flip flop can be operated as a toggle flip flop.

    e) What is the difference between Ring and Johnson Counter?

GROUP –B
(**Short Answer Type Questions**)
Answer *any three* of the following   **3×5 = 15**

2. a) Simplify the following Boolean function using K-Map and realize the simplified expression using logic gates.   [3]
$$f(A,B,C,D) = \prod_M (1,4,5,11,12,14) \cdot d(6,7,15)$$
    b) Implement the Boolean function using 8:1 multiplexer   [2]
$$f(A,B,C,D) = \sum_m (1,3,4,11,12,13,14,15)$$

3. a) Construct a Master slave JK flip flop with truth table and explain the operations.   [3]

    b) Design a 3:8 line Decoder.   [2]

4. Obtain the set of prime implicants for the boolean expression   [5]
$$f = \sum_m (1,2,3,5,6,7,8,9,12,1315)$$

5. Implement the following set of Boolean functions with a PLA: [5]
$$F_1(A,B,C) = \sum_m (0,1,2,4)$$
$$F_2(A,B,C) = \sum_m (0,5,6,7)$$

GROUP –C
(Long Answer Type Questions)
Answer *any two* of the following   **2×10 = 20**

6. a) Design MOD-6 Asynchronous/Ripple Up Counter using JK Flip Flop [4]

b) Write the different conditions to check for determining the type of Decoder, number of AND gates and OR gates for realization of Boolean expression using PLDs. Realize the following set of logical expressions using ROM, PLA and PAL. [6]

$$Y_1 = AC + \overline{A}B$$
$$Y_2 = ABC + AB\overline{C} + \overline{A}BC$$
$$Y_3 = A\overline{B}C + AB\overline{C} + A\overline{B}\overline{C}$$

7. a) Define a Register. What is the difference between a Register and a Shift Register? Explain the data movement technique through a Parallel-In Serial Out Shift Register. [1+2+2]

b) How does a JK flip flop differ from an SR flip flop in its operation? What is its advantage over an SR flip flop? [3+2]

8. a) Design 2-bit Magnitude Comparator Circuit. [4]

b) Explain the operation of master slave J-K flip flop and show how the race around condition is eliminated in it. [6]

————————————

ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING AND TECHNOLOGY
END-SEMESTER EXAMINATION: JULY 2020

Name of the Program: B.Tech.   **SEMESTER-IV**
Stream: ECE/EE
PAPER NAME: Analog Communication   **PAPER CODE: EEC42104**

Maximum Marks: 40   **Time: 3 Hours**

Total No of questions:08   **Total No of Pages: 02**

Instruction for the Candidate:
1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

Answer all the Groups
Group A
Answer all the questions of the following

$$5 \times 1 = 5$$

1.
   (a) Calculate the upper side band power of a modulated carrier of 1 KWatt and modulated to 30%.
   (b) What is the theoretical band width of a WBFM signal?
   (c) Derive the Noise figure of a standard DSB-SC receiver,
   (d) Write down the PSD of white noise.
   (a) A signal $x(t) = 100cos24\pi \times 10^3 t$ is ideally sampled with a sampling period of 50 μs and then passed through an ideal lowpass filter with cutoff frequency of 15kHz. Which of the following frequency is/are present at the filter output?

Group – B
(Short Answer Type Questions)
Answer *any three* of the following.

$$3 \times 5 = 15$$

2. Discuss about the roles of pre-emphasis and de-emphasis circuit in FM broadcasting.   [5]
3. What is slope detector? What are the problems of slope detectors and how is it overcome using a balanced slope detector?   [2+3]
4. Derive the expression of signal to noise ratio of DSB-SC system.   [5]
5. Compare VSB and SSB schemes of amplitude modulation.   [5]

(Long Answer Type Questions)
Answer *any two* of the following

$$2 \times 10 = 20$$

6. a) With the help of a block diagram describe the indirect (Armstrong) method of generating FM signal.

b) In an Armstrong-type FM generator the Crystal oscillator frequency is 200 KHz. The maximum phase deviation is limited to 0.2 to avoid distortion. Let the modulating frequency f_m range from 50 Hz to 15 KHz. The carrier frequency at the output is 108 MHz and the maximum frequency deviation is 75KHz. Select the multiplier and mixer oscillator frequencies.

c) Explain the working principle of PLL for FM demodulation.   [3+3+4]

7. a) Explain how the use of an RF amplifier improves the SNR of a Superheterodyne receiver.

b) What are the functions fulfilled by the IF amplifier in a radio receiver?

c) List and discuss the factors influencing the choice of the intermediate frequency for a radio receiver.

d) Consider a superheterodyne receiver designed to receive frequency band 1MHz to 30MHz with an IF of 40MHz. What is the range of frequencies generated by the local oscillator for this receiver? An incoming signal with frequency 10MHz is received at the 10MHz setting. At this setting of the receiver we also get an interference from some other signal. What is the carrier frequency of the interfering signal?   [2+2+2+4]

8. a) Discus the methods for modulation of PAM signal.

b) Compare PAM with PWM and PPM system of signal transmission.

c) Discuss the generation of PPM using 555 timer.   [3+2+5]

Name of the Program: B. Tech.   **Semester:** IV
Stream: EE
PAPER TITLE: Electrical Machines – II   **PAPER CODE:** EEE42102
Maximum Marks: 40   **Time duration:** 3 Hours
Total No of questions: 08   **Total No of Pages:** 02

Instruction to the Candidate:
1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

Answer all the Groups
Group A
Answer all the questions of the following   **5 × 1 = 5**

1. **a)** A three phase synchronous motor is not self starting. Why?

    b) In an alternator (synchronous generator) generated frequency is directly proportional to rotor speed. Write down the mathematical relation connecting speed and frequency.

    c) In any industrial alternator (synchronous generator), why the armature winding is mounted on the stator?

    d) What is "slip" of a three phase induction motor?

    e) Explain why a three phase induction motor is self starting.

GROUP –B
(**Short Answer Type Questions**)
Answer *any three* of the following   **3 × 5 = 15**

2. Describe with relevant circuit diagrams how three phase balanced emf is generated in a three phase alternator (synchronous generator). What are the assumptions that you have used in this model of the alternator (synchronous generator)?   (5)

3. (a) How do you define regulation of an alternator (synchronous generator)?   (2)
    (b) Draw the equivalent circuit of an alternator (synchronous generator) under loaded condition and draw the related phasor diagram.   (3)

4. Explain with diagrams the principle of operation of a three phase induction motor. What will be the speeds of an induction motor if it could be operated at slip = 0 and slip = 1?   (4+1=5)

5. (a) Draw the torque-slip characteristic of a three phase induction motor and indicate the stable and unstable zones of operation on the characteristic. (2)

(b) An 8-pole alternator runs at 750 rpm and supplies power to a 6-pole induction motor which runs at 970 rpm. What is the slip of the induction motor? (3)

GROUP –C
(**Long Answer Type Questions**)
Answer *any two* of the following **2 × 10 = 20**

6. (a) What is the "pitch factor" of a coil? Derive an expression for the "pitch factor" K_p of a short pitch coil. (1+3 = 4)

(b) What is the "distribution factor" of a winding? Derive an expression for the "distribution factor" of a distributed winding. (1+5 = 6)

7. (a) What is "hunting" in a synchronous motor? Explain. (3)

(b) Discuss how "hunting" can be reduced by using "damper windings"? (4)

(c) "Damper windings are also utilized during starting of synchronous motors"--- Explain how. (3)

8. (a) Describe the principle of operation of a single phase induction motor. Draw the torque slip curves of such a motor. (4+1 = 5)

(b) Calculate the reduction in starting current and starting torque when the supply voltage to a three phase squirrel cage motor is 80% instead of 100%. (5)

————————————

ADAMAS UNIVERSITY
END-SEMESTER EXAMINATION: JULY 2020

Name of the Program: B. Tech.   **Semester:** IV
Stream: EE
PAPER TITLE: Measurements and Instruments   **PAPER CODE:** EEE42104
Maximum Marks: 40   **Time duration:** 3 Hours
Total No of questions: 08   **Total No of Pages:** 02

Instruction to the Candidate:
1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

Answer all the Groups
Group A
Answer all the questions of the following   **5 × 1 = 5**

1. **a)** A milli-ammeter of resistance 50 Ω is connected in series with a circuit. Its power consumption is 0.5 mW. Supposing it is replaced with a milli-ammeter of 100 Ω resistance, then what will be the power consumption?

    b) What is direct method of measurement?

    c) What are the essential requirements of multipliers?

    d) Define nominal ratio of an instrument transformer.

    e) What is the use of shading band in a single phase induction type energy meter?

GROUP –B
(**Short Answer Type Questions**)
Answer *any three* of the following   **3 × 5 = 15**

2. What is creeping in a single phase induction motor?

3. *Never open the secondary winding circuit of a current transformer while its primary winding is energised*. Explain briefly.

4. Explain Kelvin's double bridge method for the measurement of low resistance.

5. What are the advantages of electrical transducer?

6. Describe how an unknown capacitance can be measured with the help of D'Sauty's bridge. What are the limitations of this bridge and how are they overcome by using a modified form of D'Sauty's bridge? Draw phasor diagrams to illustrate your answer. (4+3+3=10)

7. (a) Draw a circuit diagram of a multi-range ammeter and derive the expression of multiplying power, *m*, of multiplier in terms of internal resistance of the basic meter and resistance of the multiplier.

(4)

(b) A moving coil instrument gives a full scale deflection of 20 mA when a potential difference across its terminals is 200 mV. Calculate (a) the shunt resistance for a full scale deflection corresponding to 100 A, (b) the series resistance for full scale reading with 400 V. (2+2=4)

(c) Describe a method of reducing a errors due to temperature changes in the shunt connected instruments. (2)

8. (a) Explain how power can be measured in a 3 phase circuit with the help of two wattmeters. Illustrate your answer with the help of a phasor diagram for a balanced star connected load. (5)

(b) In a particular measurement, the wattmeter readings were 5000 W and 1000 W. Calculate the power and power factor if (i) both meter reads direct, and (ii) one of the meters has to be reversed.

(5)

————————————

Name of the Program: BCA/ BTECH   Semester: IV
Stream: CSE/ECE/EE/ME/CE
PAPER TITLE: HSS IV (Economics for Engineers)
PAPER CODE: HEC42180
Maximum Marks: 40   Time duration: 3 Hours
Total No of questions: 12   Total No of Pages: 02

Instruction to the Candidate:
1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

Section A

(Answer any **FIVE** *of the following questions)*   **Marks: 5*2=10**

---

1. State the Law of Demand.

2. What do you mean by Perfectly Elastic demand?

3. What do you mean by Opportunity Cost?

4. What do you mean by Income effect?

5. Explain two features of Perfectly Competitive market.

6. Why does an investor want to hold a portfolio?

Section B

(Answer any **TWO** *of the following questions)*   **Marks: 2*5=10**

---

7. State and explain the features of Monopolistic Competition.

8. Distinguish between Cardinal and Ordinal utility theory. Mention any two exceptions to the law of

demand.   (2+3)

9. Suppose due to adequate rainfall, there has been a good harvest for mangoes. How will the equilibrium price and quantity demanded change under the new situation? Explain diagrammatically.

Section C

*(Answer any **TWO** of the following questions)*   **Marks: 2*10=20**

10. Discuss the common characteristics of infrastructure assets.

11. What do you mean by Own Price, Cross Price and Income Elasticity of demand? Explain with examples.

12. Distinguish between Increase in demand and Extension of demand. What do you mean by Giffen goods?   (8+2)

ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING AND TECHNOLOGY
END-SEMESTER EXAMINATION: JULY 2020

Name of the Program: **B. Tech. in CSE/ECE/EE**   Semester: **IV**
PAPER TITLE: **Probability and Statistics**   PAPER CODE: **SMA42102**
Maximum Marks: **40**   Time duration: **3 hours**
Total No of questions: **08**   Total No of Pages: **02**

Instruction for the Candidate:
1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, and Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

Answer all the Groups
Group A
Answer all the questions of the following   **5 × 1 = 5**

1.   **a)** What is the physical significance of variance in probability distribution?
      b) What do we mean by Unbiased Estimator in Statistics?
      c) What is the sampling distribution of the sample mean, when the sample is drawn from a normal population with known population variance?
      d) State Bayes' Theorem.
      e) State statistical definition of probability and its limitation.

GROUP –B
(**Short Answer Type Questions**)
Answer *any three* of the following   **3 × 5 = 15**

2.   Obtain the rank correlation coefficient for the following data:

X	68	64	75	50	64	80	75	40	55	64
Y	62	58	68	45	81	60	68	48	50	70

3.   Two urns contain respectively 5 white, 7 black balls and 4 white, 2 black balls. One of the urn is selected by toss of a fair con and then 2 balls are drawn without replacement. If both balls drawn are white, what is the probability that the first urn is selected?
4.   Let T_1 and T_2 be two statistics with expectations $E(T_1) = \theta_1 + \theta_2$ and $E(T_2) = \theta_1 - \theta_2$. Find unbiased estimators of θ_1 and θ_2.
5.   If X is normally distributed with mean 12 and s.d. 4, find $P(0 \leq X \leq 12)$. [Given that the area under standard normal curve less than $z = 3$ is 0.9986]

6. **a)** The reading of voltage (V) and current (A) through a resistance (R) in an experiment are given by the following table:

Voltage	40	40	60	60	80	80	110	110
Current	5.1	4.8	6.2	5.9	0	10.3	13.0	12.7

Using linear regression, predict the value of current when voltage is 100. Also, predict the voltage value when current is 11.

b) Define regression coefficients and its two important properties. **7+3**

7. In a 300 ml soft-drink bottle of a particular brand the contents may vary little bit from bottle to bottle, because the filling machinery is not perfectly precise. Assuming normal distribution of the contents of the bottles about mean μ (true average of the contents of the bottle) and standard deviation of the distribution is 1.1 ml.

a) Obtain 99% confidence interval for μ on the basis of 3 observations (contents in ml.): 297.3, 298.7, and 299.2. What is the marginal error?

b) Let the margin of error is 1, then what should be the required sample size at 99% level of significance? **5+5**

8. **a)** The diameter of a component produced on a semi-automatic machine is known to be distributed normally with a mean of 15 mm and a standard deviation of 0.2 mm. If we pick up a random sample of size 10, what is the probability that the same mean will be between 14.95 and 15.05 mm? [Given that $\Phi(2.5) = 0.9938$].

b) Derive the maximum likelihood estimator for the parameter of the exponential distribution.
5+5

––––––––––––––––