

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
COMMON TO BME ,ECE & EEE

DIFFERENTIAL EQUATIONS AND TRANSFORMS

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1 Solve $(D^2 - 1)(D + 2)y = 0$

2 Find y given $\frac{d^2y}{dx^2} - 4y = 6e^{5x}$

3 Define the Laplace transform of Periodic function

4 Find $L^{-1} \left[\frac{1}{s-3} + \frac{1}{s} + \frac{s}{s^2-4} \right]$

5 Find the constant a_0 of the Fourier series for function
 $f(x) = x$ in $0 \leq x \leq 2\pi$

6 If $f(x) = |x|$ expanded as a Fourier series in $-\pi < x < \pi$. Find a_0

7 State Parseval's identity for Fourier transforms

8 Find the Fourier sine transform of $\frac{1}{x}$

9 Define Unit impulsive function of Z transforms

10 Find $Z \left[\frac{a^n}{n!} \right]$

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a. Solve $(D^3 + 3D^2 + 3D + 1)y = 5 + \cos 2x$

OR

b. Solve $(x^2D^2 + 3xD + 1)y = \frac{\sin(\log x)}{x^2}$

12 a. (i) Find $L(t \cos^3 t)$

(ii) Find the Laplace transform of $\frac{\sin at}{t}$

OR

b.

(i) Find $L^{-1}\left[\log \frac{s-a}{s^2+a^2}\right]$

(ii) Find $L^{-1}\left[\frac{s}{(s^2-a^2)^2}\right]$

13 a.

Solve $y'' + y = 2e^t$ Where $y(0) = 1, y'(0) = 2$
 using Laplace transform

OR

b.

Express $f(x) = (\pi - x)^2$ as a Fourier series of
 period 2π in the Interval $0 < x < 2\pi$

14 a.

Obtain the cosine series for the function
 $f(x) = \cos x$ in $(0, \pi)$.

OR

b.

Find the Fourier Sine series for the function $f(x) = x$

in $0 < x < \pi$ and hence deduce that $\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$

15 a.

Find the Fourier Transform of $f(x)$ given by

$$f(x) = \begin{cases} 1, & |x| < a \\ 0, & |x| > a > 0 \end{cases}$$

Hence evaluate the value of the integral $\int_0^{\infty} \frac{\sin x}{x} dx$

OR

b.

(i) Find Fourier cosine transform of $f(x) = \begin{cases} \cos x & \text{if } 0 < x < 1 \\ 0 & \text{otherwise} \end{cases}$

(ii) Find the Fourier sine transform of $3e^{-4x} + 4e^{-3x}$

16 a.

Find the Fourier Sine transform of the function $f(x) = \frac{e^{-ax}}{x}$

OR

b.

(i) Find the inverse Z-transform of $F(z) = \frac{1}{1-az^{-1}}, |z| > |a|$

using power series method.

(ii) Find $Z^{-1} \left[\frac{Z-4}{(Z+2)(Z+3)} \right]$

17 a.

Find $Z^{-1} \left[\frac{z^2}{z^2+4} \right]$ using Residue theorem

OR

p.t.o

b. Find $Z^{-1}\left[\frac{3z^2 - 18z + 26}{(z-2)(z-3)(z-4)}\right]$ by the method of partial fraction.

18 a. Solve the equation $(D^3 + 2D^2 + D)y = e^{2x} + \sin x$

OR

b.

(i) Find $L[t^2 e^{3t} \sinh t]$ (ii) Find $L\left[\frac{1 - \cos t}{t}\right]$

Answer ALL questions

PART-C (2 x 15 = 30)

19 a.

(i) Solve $\frac{d^2 y}{dx^2} + 4\frac{dy}{dx} + 4y = e^{-x} \sin 2x$

(ii) Solve $(D^3 - 3D^2 + 3D - 1)y = x^2 e^x$

OR

b.

Find the Laplace transform of $f(t) = \begin{cases} \sin \omega t, & 0 < t < \frac{\pi}{\omega} \\ 0, & \frac{\pi}{\omega} < t < \frac{2\pi}{\omega} \end{cases}$

with $f\left(t + \frac{2\pi}{\omega}\right) = f(t)$

20 a.

Find the Fourier series expansion of period 2π for the function $y = f(x)$ which is defined in $(0, 2\pi)$ by means of the table of value given below. Find the series up to the third harmonic

x	0	$\frac{\pi}{3}$	$\frac{2\pi}{3}$	π	$\frac{4\pi}{3}$	$\frac{5\pi}{3}$	2π
y	1.0	1.4	1.9	1.7	1.5	1.2	1.0

OR

b.

Using Parseval's identity calculate

$$(i) \int_0^{\infty} \frac{dx}{(x^2 + a^2)^2}$$

$$(ii) \int_0^{\infty} \frac{x^2 dx}{(x^2 + a^2)^2} \text{ if } a > 0$$

SL.NO:1353

SL.NO:1358

SUBJECT CODE:17ECSE20

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING
ELECTIVE - SMART IOT APPLICATIONS

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 What are the top three programming languages used for IoT development?
- 2 What is a Web architecture?
- 3 What are the 6 levels of IoT?
- 4 What is NFC in computing?
- 5 What is wearable data?
- 6 Define Vision Intelligence of Qualcomm.
- 7 How many types of architectures are there in IoT and mention the layers in each?
- 8 List the addressing methods of IoT.
- 9 What are touchpoints in design thinking?
- 10 What is an IoT platform?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Explain about the enabling technologies of IoT.
OR
b. Explain the characteristics of cloud in IoT.
- 12 a. Explain IP based wireless sensor approach.
OR
b. Explain the application areas of 6LoWPAN.
- 13 a. Explain about adaptation layer of IoT stack.
OR
b. Write a detailed note on QualcommVuforia.
- 14 a. Write notes on Mixed Reality.

OR

b. Explain about IoT platform design methodology.

15 a. Explain about the main components in IoT.

OR

b. Describe the types of applications of IoT.

16 a. Explain in detail about the IoT architecture layers.

OR

b. Explain about the basic architecture of IoT.

17 a. Explain Bluetooth Low Energy and its applications.

OR

b. Discuss about the components of wearable technology.

18 a. Elaborate on different issues that are addressed by DfX methodologies.

OR

b. Explain about Microsoft IoT platform?

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Discuss about Address Mapping Mechanisms of IOTs.

OR

b. Explain about the framework of wearable technology.

20 a. Explain about deployment model of cloud computing.

OR

b. Discuss about the services provided by the IoT platform.

SL.NO:1358

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
COMMON TO EEE,ECE AND MECT

PARTIAL DIFFERENTIAL EQUATIONS & LINEAR ALGEBRA

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1 Find the partial differential equation by eliminating arbitrary constants a and b from $(x-a)^2 + (y-b)^2 + z^2 = 1$

2 Solve $(D^2 - 6DD' + 9D'^2)z = 0$

3 List the laws assumed to derive the one dimensional heat flow equation

4 Classify the partial differential equation $u_{xx} + xu_{xy} = 0$

5 Define Linear independence

6 Prove that $(1,1,1), (0,1,1)$ and $(0,1,-1)$ generate $\mathbb{R}^3(\mathbb{F})$

7 State Cauchy-Schwarz inequality

8 Let V be an inner product space. Let $u, v \in V$ be arbitrary and ' α ' any scalar. Prove that $\|u\| > 0$, if $u \neq 0$

9 State the dimension of $L(U, V)$

10 Find the Eigen values of the matrix $\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.

Find the partial differential equation by eliminating the arbitrary function 'f' from $z = f\left(\frac{xy}{z}\right)$

OR

b.

Find the partial differential equation by eliminating the arbitrary function 'f' from $z = f(x^2 + y^2 + z^2)$

12 a.

(i) Solve $z = p^2 + q^2$

(ii) Solve $p^2 + q^2 = x^2 + y^2$

OR

b.

A string is stretched and fastened to two points l apart. Motion is started by displacing the string into the form $y = k \sin\left(\frac{\pi x}{l}\right)$ from which it is released at time $t=0$. Determine the displacement of the point of the string at a distance x from one end at time t .

13 a.

A taut string of length 20 cms fastened at both ends is displaced from its position of equilibrium, by imparting to each of its points an initial velocity given by

$$v = \begin{cases} x & \text{in } 0 < x < 10 \\ 20 - x & \text{in } 10 < x < 20 \end{cases}$$

Determine the displacement function $y(x, t)$

OR

b.

A square plate is bounded by the lines $x=0$, $y=0$, $x=l$ and $y=l$. Its faces are insulated and $u(l, y) = ly - y^2$, $0 < y < l$ while the other three edges are kept at $0^\circ C$. Determine the steady state temperature distribution in the plate.

14 a.

Show that the vector $(1, 2, 1)$, $(2, 1, 0)$ and $(1, -1, 2)$ form a basis for \mathbb{R}^3

OR

- b. Prove that the intersection of any number of subspaces of a vector space $V(F)$ is a subspace $V(F)$.

For each of the following lists of vectors in \mathbb{R}^3 , determine whether the first vector can be expressed as a linear combination of the other two

- 15 a. (i) $(-2, 0, 3), (1, 3, 0), (2, 4, -1)$
 (ii) $(3, 4, 1), (1, -2, 1), (-2, -1, 1)$

OR

- b. Suppose T is a linear operator on an inner product space $V(F)$. Then show that adjoint T^* of T exists such that $TT^* = T^*T = I$ iff T is unitary

Let V be an inner product space. Let $u, v \in V$ be an arbitrary and ' a ' any scalar. Prove that

- 16 a. (i) $\|u\| > 0$ if $u \neq 0$
 (ii) $\|au\| = |a|\|u\|$
 (iii) $|\langle u, v \rangle| \leq \|u\|\|v\|$
 (iv) $\|u + v\| \leq \|u\| + \|v\|$

OR

- b. A linear operator on \mathbb{R}^2 is defined by $T(x, y) = (x + 2y, x - y)$. Find the adjoint T^* if the inner product is standard one.

- 17 a. Show that the mapping $T: V_2(\mathbb{R}) \rightarrow V_3(\mathbb{R})$ defined as

$T(a, b) = (a+b, a-b, b)$ is a linear transformation from $V_2(\mathbb{R})$ into $V_3(\mathbb{R})$. Determine the range, rank, null space and nullity of T .

OR

- b. If A is a linear transformation on a vector space V such that $A^2 - A + I = 0$ then prove that A is invertible

18 a.

Let V be an n -dimensional vector space over the F and let T be a linear transformation from V into V such the range and null space of T are identical prove that n is even. Give an example of such a linear transformation

OR

b.

Prove that the intersection of two subspace W_1 and W_2 of a vector space $V(F)$ is also a subspace of $V(F)$.

Answer ALL questions
PART-C (2 x 15 = 30)

Determine whether the following vectors is in the span of S

$$(i) (2, -1, 1) \quad S = \{(1, 0, 2), (-1, 1, 1)\}$$

19 a.

$$(ii) 2x^3 - x^2 + x + 3 \quad S = \{x^3 + x^2 + x + 1, x^2 + x + 1, x + 1\}$$

$$(iii) \begin{pmatrix} 1 & 2 \\ -3 & 4 \end{pmatrix} \quad S = \left\{ \begin{pmatrix} 1 & 0 \\ -1 & 0 \end{pmatrix}, \begin{pmatrix} 0 & 1 \\ 0 & 1 \end{pmatrix}, \begin{pmatrix} 1 & 1 \\ 0 & 0 \end{pmatrix} \right\}$$

OR

b.

A rod of length l has its ends A and B kept at $0^\circ C$ and $100^\circ C$ until steady state conditions prevail. If the temperature at B is reduced suddenly to $0^\circ C$ and kept so while that of A is maintained, Determine the temperature $u(x, t)$ at a distance x from A and at time t .

20 a.

Solve the system of equations $x + 3y = 80$, $2x + 5y = 100$,
 $5x - 2y = 60$, $-x + 8y = 130$, $10x - y = 150$ by using least square method

OR

b.

Identify the Eigen values of the matrix $\begin{bmatrix} 1 & 1 & 1 \\ 0 & 1 & 1 \\ 0 & 0 & 1 \end{bmatrix}$ and also find

eigen vectors

SL.NO:1362

SUBJECT CODE:17ECCC15

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING
ANALOG & DIGITAL COMMUNICATION

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 List out the advantages of VSB-AM
- 2 List out the advantages of FM over AM
- 3 Recall the function of AGC in receiver circuit.
- 4 List out the advantages of Delta modulation
- 5 Define bite rate .
- 6 Tell the reasons for the use of spread spectrum systems
- 7 What are the advantages of TRF receiver?
- 8 Differentiate between FM and PM
- 9 A source is emitting symbols X_1 , X_2 and X_3 with probabilities respectively 0.6,0.3 and 0.1.
What is the entropy of the source?
- 10 Interpret the necessary bandwidth equation for error-free transmission information at very low SNR.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Apply Square law principle for generating Amplitude Modulated signal.
OR
b. Demonstrate the operation of Envelope detector circuit for demodulating an AM wave with neat sketch.
- 12 a. Illustrate the operation of Low level AM transmitter
OR
b. Derive the expression for Frequency Modulated Wave and also draw its graphical waveform.
- 13 a. A 107.6 MHz carrier signal is frequency modulated by a 7 KHz Sine wave. The resultant FM signal has frequency deviation of 50 KHz. Measure the following
(i) Carrier swing of FM signal (ii) Highest and Lowest frequencies attained by modulated signal (iii) Modulation index of FM signal.

OR

(P.T.O)

- b. A Source generates four messages M_0, M_1, M_2, M_3 with probabilities $1/3, 1/6, 1/4$ and $1/4$ respectively. The successive messages emitted by the source are statistically independent. Calculate the Entropy of the source.

- 14 a. Illustrate the generation of Amplitude Shift keying signals with neat diagram.

OR

- b. Illustrate the principles behind the Transmission and Reception of FHSS system

- 15 a. Discuss in detail about the Filter method of SSB generation

OR

- b. Discuss in detail about Indirect method (Armstrong) of FM generation with block diagram.

- 16 a. Compare the following Amplitude Modulation and Frequency Modulation Frequency Modulation and Phase Modulation

OR

- b. Summarize about different Sampling techniques with neat sketch

- 17 a. Discuss in detail about Inter Symbol Interference (ISI) in baseband binary systems

OR

- b. Compare and contrast Digital carrier transmission system over Baseband signal transmission.

- 18 a. Differentiate between TDMA and FDMA

OR

- b. Summarize the advantages and applications of FHSS

Answer ALL questions

PART-C (2 x 15 = 30)

- 19 a. A Pseudo noise sequence generated using Feedback shift register of length 4 (4 stage). Find the generated PN sequence if the initial contents of shift register are 1000. If chip rate is 10^7 chips/sec. Calculate chip duration and PN sequence duration as well as output sequence.

OR

- b. A Discrete Memory less source has five symbols X_1, X_2, X_3, X_4 & X_5 with probabilities 0.4, 0.19, 0.16, 0.15 and 0.15 respectively attached to every symbol. Construct a Shannon-Fano coding for the source and calculate Code efficiency.

- 20 a. Illustrate the principle behind the generation of PN sequence with neat diagram

OR

- b. Summarize the principle and operation of Super heterodyne receiver with relevant diagram.

SL.NO:1350

SUBJECT CODE:17ECEC29

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING
ELECTIVE - DATA COMMUNICATION NETWORKS

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Examine the steps followed is checksum checker side
- 2 Examine how the routers get the information about neighbor?
- 3 Summarize data communication.
- 4 Discuss the disadvantages of optical fiber as a transmission medium.
- 5 Discuss the advantage and disadvantage of stop and wait flow control
- 6 Summarize router.
- 7 Paraphrase out the user related attributes
- 8 Discuss the responsibilities of Application Layer.
- 9 Discuss about DNS
- 10 Compare digital signature and e-signature

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Summarize TCP/IP reference model

OR

b. Analyze about Stop & wait ARQ with neat diagram.
- 12 a. Illustrate packet switching with neat diagram.

OR

b. (i) With neat sketches, explain in detail about the retransmission techniques
- 13 a. Examine in detail about TCP connection Management using neat diagrams

OR

b. Contrast the two categories of QoS attributes, explain each in detail

(P.T.O)

14 a. List the type of encryption/decryption method and analyze with examples

OR

b. Demonstrate the types of analog to digital conversion

15 a. Illustrate categories of networks

OR

b. Demonstrate Error correction with examples.

16 a. Illustrate about the features of IPv6

OR

b. Demonstrate about datagram

17 a. Explain in detail about Wireless transmission media

OR

b. Illustrate about Ethernet

18 a. Differentiate IPv6 and IPv4.

OR

b. Summarize about the following terms: (i) PGP (ii) SSH

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Illustrate authentication in PPP with neat diagram.

OR

b. Analyze the class of each of the following addresses? Write of each of the following in dotted decimal notation.

i. 10011101 10001111 11111100 11001111

ii. 11011101 10001111 11111101 00001111

iii. 01011101 00011111 00000001 11110101

iv. 11111101 10001010 00001111 00111111

v. 11111110 10000001 01111110 00000001

20 a. Sketch the operation of packet switched network.

OR

b. Demonstrate Link State Algorithm

SL.NO:1345

SUBJECT CODE:17ECCC20

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING
SEMICONDUCTOR DEVICES AND CIRCUITS

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Compare JFET with BJT.
- 2 Name the types of rectifiers.
- 3 Why an ordinary transistor is called bipolar?
- 4 List some applications of JFETs.
- 5 Define negative feedback.
- 6 What are the factors affecting the Stability of Oscillator?
- 7 What is depletion region in PN junction?
- 8 Draw the hybrid mode for CE configuration of BJT.
- 9 What is the meant by operating point Q?
- 10 What is node sampling?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. (i) Calculate the Stability factor for a fixed bias circuit. (8) (ii) Derive the expression of Stability factor for Collector Feedback amplifier. (8)
OR
b. Derive the current equation of PN junction diode.
- 12 a. Draw the crystalline structure of Germanium semiconductor and explain how free electron is generated.
OR
b. Draw and explain in detail the input and output characteristics of a transistor in CE configuration with neat diagram.
- 13 a. Draw and explain in detail the input and output characteristics of a transistor in CC configuration with neat diagram.
OR
b. Explain Emitter Follower Bias Configuration.

(p.t.o)

14 a. Derive the expression for the Stability factor and compare the Stability factors of BJT biasing

OR

b. Draw and explain the block diagram and circuit diagram voltage and current series feedback amplifier.

15 a. Draw & explain crystal oscillator.

OR

b. With neat circuit diagram of voltage shunt feedback amplifier & derive the expressions for R_{if} , R_{of}

16 a. Draw a circuit for Class C- amplifier and discuss its working

OR

b. With neat sketch explain the single tuned amplifier with its gain and frequency response.

17 a. Describe the energy band structures of conductors, semiconductors and insulators with neat sketch.

OR

b. Describe in detail Clipper and Clamper circuits.

18 a. Describe in detail the Voltage Divider Bias in FET configuration.

OR

b. i) Elucidate the class C tuned amplifier and derive its efficiency. (8)
ii) Write a detail notes on Hazeltine neutralization techniques (8)

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. What are the biasing schemes available to achieve the required bias in a JFET? Explain any two of the biasing schemes in detail.

OR

b. Design a clipper and clamper circuits for the given $V_{bias}=15$ Volts and 10Volts, and draw its necessary diagrams.

20 a. Explain Emitter Bias configuration in detail.

OR

b. Describe in detail Synchronous tuned amplifiers.

SL.NO:1344

SUBJECT CODE:17ECCC11

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING
DATA COMMUNICATION NETWORKS

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Examine the steps followed in checksum generator.
- 2 Discuss headers and trailers and examine how do they get added and removed?
- 3 Discuss the advantages of distributed processing.
- 4 Summarize the available detection methods
- 5 Summarize the categories of flow control
- 6 Discuss time-to-live or packet lifetime.
- 7 Summarize quality of service.
- 8 Discuss the responsibilities of Application Layer.
- 9 Discuss about DNS
- 10 Compare secret key and public key.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Illustrate about any three layers of OSI reference model.
OR
b. Analyze about Stop & wait ARQ with neat diagram.
- 12 a. Illustrate packet switching with neat diagram.
OR
b. (i) Discriminate the message format, message transfer and the underlying protocol involved in the working of the electronic mail
- 13 a. (ii) Explain in detail the events and transitions about the TCP state transition diagrams

OR

(p.t.o)

2

b. Examine the application requirements in Quality of Service (QoS), with a clear example

14 a. Examine in detail about the framework of a firewall

OR

b. Illustrate about Guided transmission media

15 a. Illustrate categories of networks

OR

b. Illustrate about Link Control Protocol

16 a. Demonstrate about multicast routing

OR

b. Apply RSA algorithm in network security.

17 a. Apply secret key encryption algorithm

OR

b. Illustrate about Ethernet

18 a. Summarize about the following terms: (i) PGP (ii) SSH

OR

b. (ii) Illustrate about WSDL in web services

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Illustrate about Selective repeat ARQ with neat diagram.

OR

b. Analyze the class of each of the following addresses? Write of each of the following in dotted decimal notation.

i. 10011101 10001111 11111100 11001111

ii. 11011101 10001111 11111101 00001111

iii. 01011101 00011111 00000001 11110101

iv. 11111101 10001010 00001111 00111111

v. 11111110 10000001 01111110 00000001

20 a. Sketch the operation of packet switched network.

OR

b. Demonstrate the principle of flow control mechanism with an example

SL.NO:1344

SL.NO:1340

SUBJECT CODE:17ECCC06

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING
ELECTRONICS MEASUREMENT AND INSTRUMENTATION

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Interpret the various requirements of a multiplier.
- 2 Distinguish between analog and digital data acquisition systems.
- 3 Mention the errors in Moving iron instruments.
- 4 List the characteristics of sampling oscilloscope.
- 5 Define harmonic distortion.
- 6 List the advantages of LVDT.
- 7 Mention the factors that decide the configuration of DAS.
- 8 Define electronic counter.
- 9 Restate Automation in digital instruments.
- 10 List the use of photo electric transducer.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. With a neat diagram explain in detail the Construction of a PMMC instrument.
OR
b. Elucidate the construction, working principle and applications of True RMS reading voltmeter with neat sketch.
- 12 a. Vindicate the different techniques used for extending frequency measurement range
OR
b. With neat diagram explain the operation of magneto-strictive transducer
- 13 a. Elaborate the working principle of IEEE 488 bus
OR
b. Write note on measurement errors in frequency counter.
- 14 a. Demonstrate the functional elements of generalized instrumentation systems.

(P.T.O)

OR

b. Discuss in detail about Kelvin double bridge.

15 a. Discuss the operation of single beam oscilloscopes.

OR

b. Write in detail about Automation voltmeters

16 a. Elucidate the various applications of the spectrum analyzer

OR

b. Describe the working of conventional standard signal generator with the help of a block diagram

17 a. Explain the various types of ADC with suitable sketches

OR

b. Explain the generalized block schematic of a Digital Data Acquisition system

18 a. With a block diagram explain the automatic test system to analyze an audio amplifier and radio receiver.

OR

b. Describe various types of fiber optic measurements

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Derive and explain the procedure for measuring torque in an Electrical torsion meter and Strain gauge torsion meter.

OR

b. Illustrate the optical time domain reflectometer with a neat diagram.

20 a. Describe the working of moving iron instruments. Derive the equation for deflection if the instruments are spring controlled.

OR

b. Enumerate the term gating error in a frequency counter and mention how does it arise and can it be eliminated.

SL.NO:1333

SUBJECT CODE:17ECCC08

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING
ELECTROMAGNETICS AND TRANSMISSION LINES &
WAVEGUIDES

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Quote the expression for differential volume element in terms of spherical co-ordinates.
- 2 Describe solenoid.
- 3 Identify the equation for total EMF due to motion or transformer action.
- 4 Define Propagation constant
- 5 Define reflection coefficient
- 6 Name some applications of the smith chart.
- 7 Summarize the expression for potential between two spherical shells.
- 8 Restate vector magnetic potential.
- 9 Discuss the parameters of Transmission line.
- 10 Describe significance of a half wavelength line.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Analyze the principle of superposition based on coulombs Law.
OR
b. Analyze the power flow in Coaxial cable using Poynting vector.
- 12 a. Deliberate the inductance loading of telephone cables and hence derive the attenuation constant, phase constant and velocity of signal transmission for the uniformly loaded cable.
OR
b. Derive the condition required for distortion-less line.
- 13 a. Calculate divergence of F and curl of F, for $\vec{F} = x^2\vec{a}_x + y^2\vec{a}_y + z^2\vec{a}_z$

OR

(P.T.O)

SL.NO:1333

- b. Determine the constant 'c' such that the vector $\vec{F} = (x+ay)\vec{i} + (y+bz)\vec{j} + (x+cz)\vec{k}$ will be solenoidal.

- 14 a. Calculate H at the centre of an equivalent triangular loop of side 4m carrying current of 5A.

OR

- b. Examine the Scalar magnetic potential and derive its expression.
- 15 a. A single twin of wire in the form of a square of side 10cm carries a current of 20A. Calculate the magnetic flux density produced by this circuit at a point on the central normal to its plane distance 20cm from the plane.

OR

- b. Derive the expression for vector magnetic potential.
- 16 a. A magnetic field $H=3\cos x \vec{a}_x + z\cos x \vec{a}_y$ A/m, for $z \geq 0$, 0 for $z < 0$; is applied to a perfectly conducting surface in xy plane. Determine the current density on the conductor surface.

OR

- b. A lossy cable has $R=2.25\Omega/m$, $L=1.0\mu H/m$, $c=1\text{pf}/m$, and $G=0$ operates at $f=0.5$ GHz. Determine the attenuation constant of the transmission line.
- 17 a. For a transmission line which is terminated in a normalised impedance z_n , $VSWR=2$. Determine the normalised impedance magnitude.

Gas	a	$b \times 10^{-3}$	$C \times 10^{-6}$	$d \times 10^{-9}$
O ₂	26.0257	11.7551	-2.3426	-0.5623

OR

- b. A Transmission line of 100m long is terminated in a load $1(00-j200) \Omega$. Determine the impedance from line impedance at the 25m from the load end at a frequency of 10MHz. The characteristic impedance of the line is 100Ω . Determine the input impedance using smith chart.
- 18 a. Determine the length and impedance of a quarter wave transformer to match a load of 150Ω to a 75Ω at a frequency of 12GHZ. Derive the formula used.

OR

- b. Recite and Explain in detail Stokes theorem

Answer ALL questions

PART-C (2 x 15 = 30)

- 19 a. Analyze the magnetic field intensity on axis of solenoid.

OR

(P.T.O)

SL.NO:1333

- b. Show that the vector $E=(6xy+z^3)\bar{a}_x+(3x^2-z)\bar{a}_y+(3xz^2-y)\bar{a}_z$ is irrotational and hence find its scalar potential?

20 a. Derive the magnetic field intensity on the axis of a rectangular coil.

OR

- b. The transmission line has standing wave ratio $s=2.5$ and voltage minima exists at 0.15λ from the load. Determine the load and input impedance for a line of length 0.35λ length using smith chart.

SL.NO:1333

SL.NO:1321

SUBJECT CODE:17ECCC04

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING

SIGNALS AND SYSTEMS

(Candidates admitted under 2017 Regulations-SCBCS)

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Define Signals and System.
- 2 What is meant by time scaling?
- 3 Define Signum function.
- 4 List out the types of Fourier series.
- 5 State the condition for causality in LTI-CT system.
- 6 When is the LTI-CT system said to be stable?
- 7 Define DTFT.
- 8 List out the convolution properties of Z transform.
- 9 List out the steps involved in finding convolution sum.
- 10 Compare FFT over DFT?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Explain classification of systems.

OR

- b. Determine the classification of DT signals with examples.

- 12 a. Illustrate the odd and even components of the following signal.

$$x[n] = \{-2, 1, 2, -1, 3\}$$

OR

- b. Determine the exponential Fourier series expansion for a periodic ramp signal with unit amplitude and period = 1 sec.

- 13 a. (i) Calculate the Fourier transform of impulse function.
(ii) Calculate the Laplace transform unit step function.

OR

P.T.O

2

b. Solve the fourier transform of the signal, $x(t) = \cos(\Omega_0 t) u(t)$.

14 a. Determine the frequency response of the system having differential equation,

$$\frac{d^2 y(t)}{dt^2} + 5 \frac{dy(t)}{dt} + 6 y(t) = -\frac{dx(t)}{dt}$$

OR

b. Illustrate the signals $x(t) = e^{-3t}u(t)$ & $h(t) = u(t+3)$ and convolve

15 a. Show Direct Form I for the transfer function

$$\frac{dy(t)}{dt} + 5 y(t) = 3 x(t)$$

OR

b. Show cascade and parallel forms of a system with system function

$$H(S) = \frac{1}{(1+s)(2+s)}$$

16 a. Summarize the properties of Z transform with two examples

OR

b. Determine DFT of. $x(n) = \{1,2,3,4\}$

17 a. Determine the z transform of $x(n) = \{1,2,3,4,5,0,7\}$

OR

b. Determine the inverse z transform of $Y(z) = z/(z-1)^3$

18 a. Convolve $x(n) = (\frac{1}{2})^{n-2}u(n-2)$ and $h(n) = u(n+2)$

OR

b. Find the 4 point DFT of the sequence $x(n) = \cos n \frac{\pi}{4}$

P.T.O
SL.NO:1321

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Show the waveforms represented by following functions.

(i) $F_1(t) = 2u(t-1)$

(ii) $F_2(t) = -2u(t-2)$

(iii) $F_3(t) = F_1(t) + F_2(t)$

(iv) $F_3(t) = F_1(t) - F_2(t)$

OR

b. Determine Trigonometric Fourier series for the full wave rectified Sine wave.

20 a. Determine the inverse Z transform of the following function

$$X(z) = \frac{(1/4)Z^{-1}}{(1-(1/2)Z^{-1})(1-(1/4)Z^{-1})}$$

OR

b. Compute the DFT of a sequence $x(n) = \{1, 2, 3, 4, 4, 3, 2, 1\}$ using DIF algorithm.

SL.NO:1321

SL.NO:1313

SUBJECT CODE:17ECCC17

VINAYAKA MISSIONS RESEARCH FOUNDATION
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B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING

FPGA SYSTEM DESIGN

(Candidates admitted under 2017 Regulations-SCBCS)

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Describe Mealy machine.
- 2 List out the types of sequential logic circuits
- 3 List the advantages of PAL.
- 4 List the types of logic devices.
- 5 List the advantages of CPLD over PLA.
- 6 Recite LB in CPLDs.
- 7 Recall Distributive law.
- 8 Explain what is meant by CLB.
- 9 Recall the term package in VHDL.
- 10 Explain the use of portmap function.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Explain briefly about state diagram and state assignments.

OR

 - b. Illustrate the difference between state table, state diagram, characteristics stable and an excitation table.
- 12 a. Outline about Mealy Machine.

OR

 - b. Summarize the advantages of PLA, PAL and FPGAs.
- 13 a. Differentiate CPLDs and FPGAs in detail.

OR

 - b. Analyze the overall block diagram of Programmable Logic Array.
- 14 a. Explain the architecture of CPLD with relevant diagrams.

OR

 - b. Explain in detail about the I/O blocks of CPLD.

P.T.O

2

15 a. Illustrate the differences between SPLD, CPLD and FPGA.

OR

b. Explain in detail the architecture of FPGA.

16 a. Write short notes on wires and registers.

OR

b. Describe each of these functions in truth table format: (a) $a \& b$ (b) $a \bar{I} \sim b$ (c) $(a \& b) \bar{I} \sim c$ (d) $w \bar{I}(x \& \sim y)$

17 a. Discuss in detail of VHDL design flow

OR

b. Model a VHDL entity and Architecture for the following function.
 $F = (a + b) (c d)$ with the relevant logic diagram.

18 a. Classify between Signal and Variable.

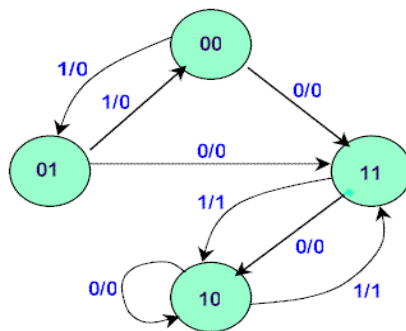
OR

b. Obtain hazard free circuit for the given function $F(A,B,C,D) = \sum m(0,2,4,6,7,9,13,15)$

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. A Sequential circuit has one input and one output. The state diagram is shown below. Design a synchronous sequential circuit using T-Flip flop.



OR

b. Analyze the following Boolean functions using Programmable Array Logic.

$$W(A,B,C,D) = \sum m(2,12,13)$$

$$X(A,B,C,D) = \sum m(7,8,9,10,11,12,13,14,15)$$

$$Y(A,B,C,D) = \sum m(0,2,3,4,5,6,7,8,10,11,15)$$

$$Z(A,B,C,D) = \sum m(1,2,8,12,13)$$

20 a. Classify the programming technologies utilized for Complex PLDs.

OR

b. Illustrate the worst case delay for a carry skip adder.

SL.NO:1313

SL.NO:1303A

SUBJECT CODE:17MABS17

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING
NUMERICAL METHODS, RANDOM PROCESSES & OPTIMIZATION

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1 What is the difference between Interpolation and Extrapolation?

Form the Newton's difference table for the following data.

2

x	4	6	8	10
y	1	3	8	16

3 State the disadvantage of Taylor series method.

4 What is the error term in Milne's corrector formula?

5 Differentiate Single step and Multistep methods.

6 Using Euler's method find $y(0.2)$ from $\frac{dy}{dx} = x + y$, $y(0) = 1$ with
 $h = 0.2$

7 Given X and Y are independent random variables with variance 2 and 3, find the variance of $(3X + 4Y)$.

8 Define first order stationary process.

9 Write the Standard form of L.P.P.

10 Define surplus variable.

p.t.o
SI.NO
1303 A

Answer Any FIVE questions

Part-B (5 x10 =50 Marks)

11 a.

Find $f(1)$, $f(5)$ and $f(9)$ using Newton's divided difference formula from the following data.

x	0	2	3	4	7	8
$y = f(x)$	4	26	58	112	466	668

OR

b.

From the following data, find ' θ ' at $x = 43$

x	40	50	60	70	80	90
θ	184	204	226	250	276	304

12 a.

Using Modified Euler method, find $y(0.1)$, $y(0.2)$, given $\frac{dy}{dx} = x^2 + y^2$,
 $y(0) = 1$.

OR

b.

Find y for $x = 0.2$ correct to 4 decimal places, given $\frac{d^2y}{dx^2} - x \left(\frac{dy}{dx}\right)^2 + y^2 = 0$
using Runge - Kutta method, initial conditions are $x = 0$, $y = 1$, $y' = 0$.

13 a.

A random variable X has the following probability distribution

Values of X	-2	-1	0	1	2	3
$P(X)$	0.1	k	0.2	$2k$	0.3	$3k$

- Determine ' k '
- Calculate $P(X < 2)$ and $P(-2 < X < 2)$.
- Determine the CDF of X .
- Calculate the mean of X .

OR

b.

A continuous random variable X has the P.D.F $f(x) = kx^2e^{-x}$, $x \geq 0$
Calculate the r^{th} moment of X about the origin. Hence determine the mean and variance of X .

14 a.

The density function of a random variable ' X ' is given by
 $f(x) = Kx(2-x)$, $0 \leq x \leq 2$. Calculate ' K ', Mean and variance.

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OR

- b. Suppose that customers arrive at a bank according to a Poisson process with mean rate of 3 per minute. Find the probability that during a time interval of two minutes
- Exactly 4 customers arrive
 - More than 4 customers arrive
 - Fewer than 4 customers arrive.

- 15 a. Consider the process $X(t) = A \cos \omega t + B \sin \omega t$ where A and B are random variables with $E(A) = 0 = E(B)$ and $E(AB) = 0$. Prove that $\{X(t)\}$ is mean ergodic.

OR

- b. Solve the following LPP by the graphical method:
 $Max Z = 45x_1 + 80x_2$
 Subject to
 $5x_1 + 20x_2 \leq 400$
 $10x_1 + 15x_2 \leq 450$
 $x_1, x_2 \geq 0$

- 16 a. Use simplex method to solve the following LPP
 Maximize $z = 4x_1 + 10x_2$
 Subject to
 $2x_1 + x_2 \leq 50$
 $2x_1 + 5x_2 \leq 100$
 $2x_1 + 3x_2 \leq 90$
 $x_1, x_2 \geq 0$

OR

- b. Calculate the initial basic feasible solution for the following transportation problem by using Vogel's Approximation method.

		Distribution centers				Availability
Origin	S_1	11	13	17	14	250
	S_2	16	18	14	10	300
	S_3	21	24	13	10	400
Requirements		200	225	275	250	

p.t.o
 SI.NO
 1303 A

17 a.

The processing time, in hours for the jobs when allocated to the different machines are indicated below. Assign the machines for the jobs so that the total processing time is minimum.

		Machines				
		M_1	M_2	M_3	M_4	M_5
Jobs	J_1	9	22	58	11	19
	J_2	43	78	72	50	63
	J_3	41	28	91	37	45
	J_4	74	42	27	49	39
	J_5	36	11	57	22	25

OR

b.

The assignment cost of assigning any one operator to any one machine is given in the following table

		Operators			
		I	II	III	IV
Machine	A	10	5	13	15
	B	3	9	18	3
	C	10	7	3	2
	D	5	11	9	7

Determine the optimal assignment by Hungarian Method.

18 a.

Define a random process. Explain the classification of random processes with suitable examples.

OR

b.

Find $y(1.1)$ and $y(1.2)$ by Taylor's series method, for $\frac{dy}{dx} = x + y$ given $y(1) = 0$.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a.

Use Lagrange's formula to fit a polynomial to the data

x	-1	0	1	2
y	-8	3	1	12

and hence find $y(x = 0.5)$.

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OR

b.

A random variable X has the following probability function.

Values of X	0	1	2	3	4	5	6	7
$P(x)$	0	k	$2k$	$2k$	$3k$	k^2	$2k^2$	$7k^2 + k$

- (i) Determine the value of 'k'
- (ii) Calculate $P(X < 6)$, $P(X \geq 6)$ and $P(0 < X < 5)$.
- (iii) Determine the distribution function of X.
- (iv) If $P(X \leq K) > \frac{1}{2}$, Find the minimum value of k.

20 a.

The transition probability matrix of a Markov chain $\{X_n\}$, having states 1,

2, and 3 is $P = \begin{bmatrix} 0.1 & 0.5 & 0.4 \\ 0.6 & 0.2 & 0.2 \\ 0.3 & 0.4 & 0.3 \end{bmatrix}$ and the initial distribution is

$P^{(0)} = (0.7, 0.2, 0.1)$. Calculate (i) $P\{X_2 = 3 / X_0 = 1\}$ (ii) $P\{X_2 = 3\}$ and (iii) $P\{X_3 = 2, X_2 = 3, X_1 = 3, X_0 = 1\}$

OR

b.

Analyse the starting solution of the following transportation model

1	2	6	7
0	4	2	12
3	1	5	11
10	10	10	

Using (a) North-west corner rule (b) Least cost method (iii) Vogel's approximation method.

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1303 A

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING
PASSIVE NETWORK ANALYSIS AND SYNTHESIS

Time : Three Hours

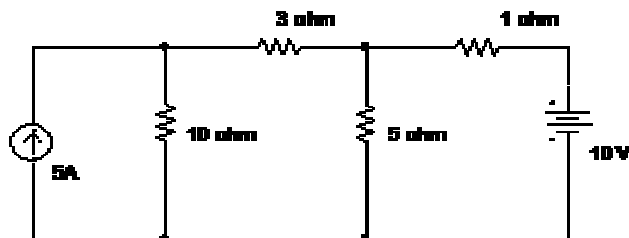
Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Define Instantaneous value.
- 2 State open circuit.
- 3 Where and why maximum power transfer theorem is used?
- 4 State Norton's Theorem.
- 5 Write the expressions for resonant frequency and current at resonance of RLC series circuits?
- 6 Write the expressions for quality of parallel RLC circuit.
- 7 How RC circuit behaves for the step input?
- 8 Restate what is Transient
- 9 Classify the parameter sets, which are used to model a two port network.
- 10 Design a constant-K high pass filter having cut off frequency of 1 KHz with a load resistance of 600Ω .

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Write the node voltage equation and determine the current in each branch for the network shown in figure.

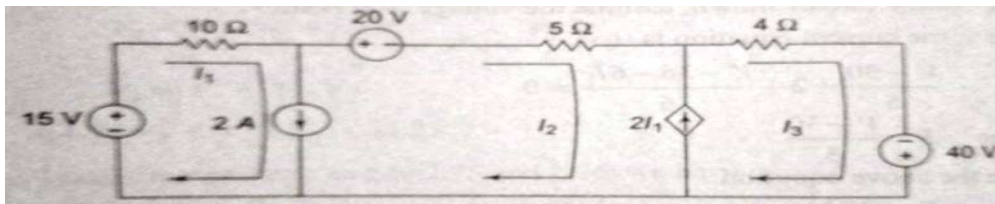


OR

(p.t.o)

b. For the given graph shown in figure, draw the number of possible trees.

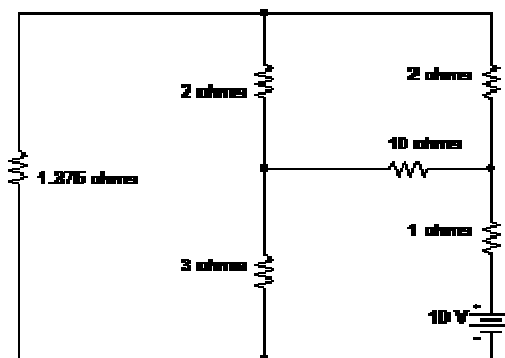
12 a. For the circuit shown in figure, determine the current through the 10 ohm resistor using mesh analysis.



OR

- b. (a) A star connected network consists of three resistance 3Ω , 6Ω & 10Ω . Convert the star connected network to equivalent delta connected network.
- (b) A Delta connected network consists of three resistance 5Ω , 6Ω & 9Ω . Convert the delta connected network star connected network.

13 a. Verify the reciprocity theorem in the circuit shown in the figure and also calculate the transfer current.



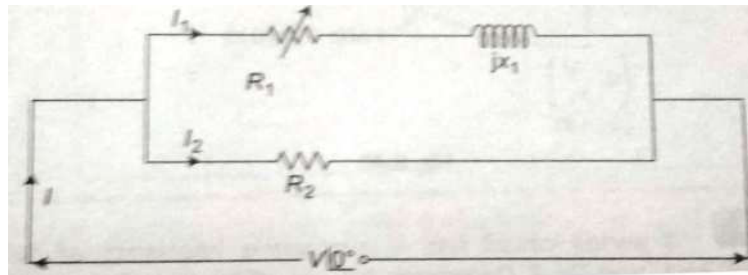
OR

- b. Using the Compensation theorem, determine the ammeter reading where it is connected to the 6 ohm resistor as shown in figure. The internal resistance of the ammeter is 2 ohm.

- 14 a. Two impedances $Z_1 = 20 + j10$ and $Z_2 = 10 - j30$ are connected in parallel and this combination is connected in series with $Z_3 = 30 + jX$. Calculate the value of X which will produce resonance.

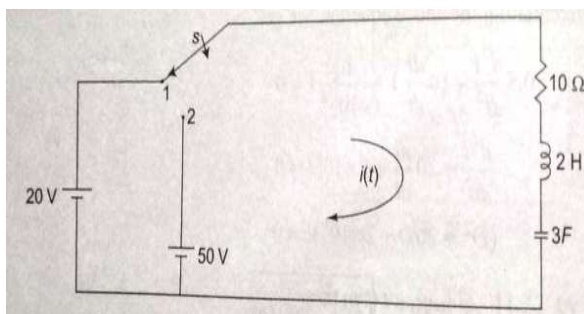
OR

- b. A RLC circuits consists of $R=16\Omega$, $L=5\text{mH}$ and $C=2\mu\text{F}$. Calculate the quality factor, bandwidth and half-power frequencies.
- 15 a. For a parallel circuit shown in figure, $V=200\text{ V}$, $R_2 = 50\ \Omega$; $X_1 = 25\ \Omega$, R_1 is varied from $10\ \Omega$ to $50\ \Omega$, draw the locus diagram. Calculate the maximum and minimum values of locus current.

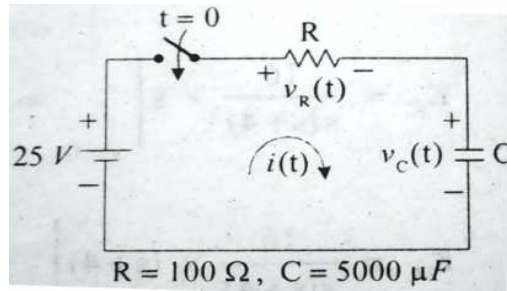


OR

- b. In a network shown in figure, the switch is moved from position 1 to position 2 at $t = 0$. The switch is in position 1 for a long time. Determine the current expression $i(t)$.

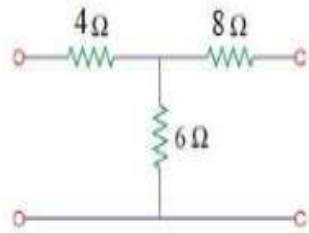


- 16 a. In the RC circuit shown in figure, the switch is closed at $t=0$. Calculate the current $i(t)$, and the voltage across the resistance and capacitance.



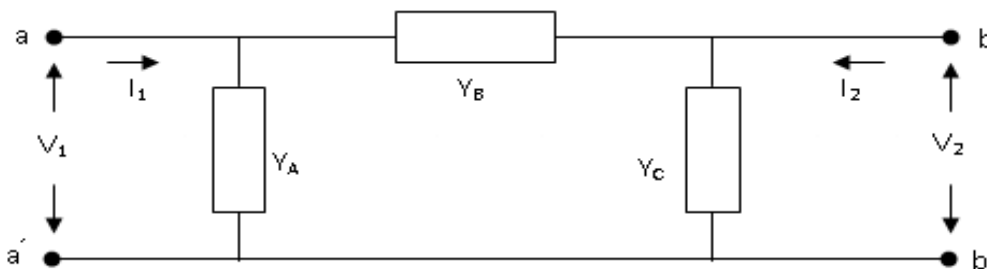
OR

- b. (a) What is a filter? Explain about various types of filters.
 (b) Demonstrate the classification of pass band and stop band in detail.
- 17 a. (a) Correlate the relationship between Z and h parameters.
 (b) Calculate the h- parameters for the following circuit.



OR

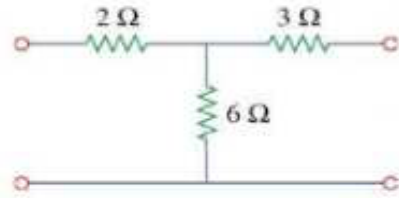
- b. Calculate the short circuit admittance parameters for the circuit shown in figure.



- 18 a. Determine the Transmission (ABCD) parameters of two port networks.

OR

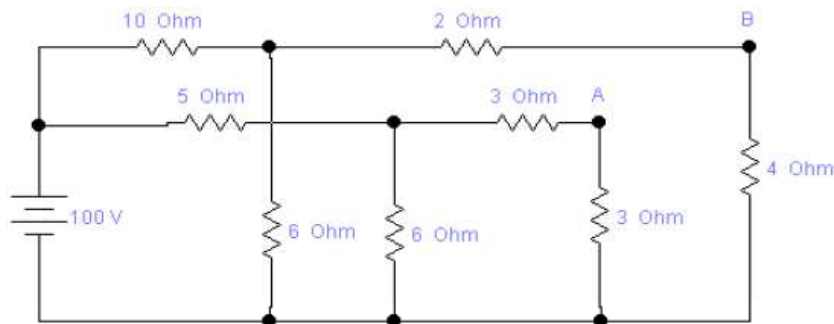
- b. (a) Correlate Y parameters in terms of h parameters.
 (b) Calculate the ABCD parameters for the following circuit.



Answer ALL questions

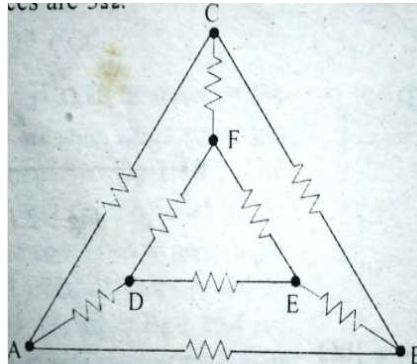
PART-C (2 x 15 = 30)

- 19 a. Determine the voltage across the node AB (V_{AB}) in the circuit shown in figure.



OR

- b. Find the equivalent resistance across terminals AB, in the network shown in fig. All the resistance is 3Ω .



- 20 a. A Series Circuit with $R = 10 \text{ Ohm}$, $L = 0.1 \text{ H}$, and $C = 50 \mu\text{F}$ has an applied voltage $V = 50\angle 0^\circ$ with a variable frequency. Calculate the resonant Frequency, the value of frequency at which maximum voltage occurs across the inductor and the value of the frequency at which maximum voltage occurs across the capacitor.

OR

- b. Write the step response of RL and RC circuits and State their performances.

SL.NO: 1283

SUBJECT CODE:17ECPI03

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING
ADVANCED MICROPROCESSOR

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Compare MIPS R8000 and MIPS R10000
- 2 Define instruction pipelining.
- 3 What are procedure call instructions?
- 4 What is machine state registers?
- 5 Define primary memory and secondary memory.
- 6 Define INTEL XEON chipset.
- 7 What does EU do?
- 8 What are the functions of interrupt flags?
- 9 Mention the function of system status signals.
- 10 Write the reset logic of 286.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Compare different Pentium Processors

OR

- b. Discuss the levels of PowerPC architecture.
- 12 a. Discuss about instruction timing.

OR

- b. Discuss about the features of i960.
- 13 a. Discuss about the bus structure of personal computer.

OR

- b. Discuss about the layout of motherboard 386.

(p.t.o)

14 a. Discuss about the physical memory organization of 8086 microprocessor.

OR

b. Discuss about EFLAG register of Pentium processors

15 a. Explain Logical instructions of Pentium processors with example.

OR

b. Explain Segment instructions of Pentium processors with example.

16 a. Explain the signals of PC620.

OR

b. Explain in detail about Instruction Level Parallelism.

17 a. Discuss about translation lookaside buffer.

OR

b. Explain about VESA bus.

18 a. Explain data conversion logic and bus arbitration logic of 286

OR

b. Describe the branching instruction set of 8086 with examples.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Discuss in detail about the programming model of PC620.

OR

b. Explain about Pentium II architecture

20 a. Explain in detail about the architecture of PC620.

OR

b. Discuss in detail about the performance of personal computer

SL.NO: 1286

SUBJECT CODE:17ECEC27

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING
ELECTIVE - MICROCONTROLLER AND ITS APPLICATIONS

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Why do we use XRA A instruction?
- 2 What is the position of the Stack Pointer after the PUSH instruction?
- 3 Mention the functions of RS1 and RS0 bits in the flag register of Intel 8051 microcontroller.
- 4 What is the function of SM2 bit present in SCON register in 8051?
- 5 What are the data transfer instructions present in 8051 microcontroller?
- 6 How to perform multiplication using 8051 microcontroller?
- 7 Differentiate between LED & LCD displays.
- 8 Define Relay.
- 9 List the use of Watchdog timer in PIC micro controller.
- 10 List the advantages of using segment registers in 8086.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Distinguish between Microprocessor & Microcontroller.
OR
b. Write an assembly language program for two 8 bit multiplication and division in 8051.
- 12 a. Write an assembly language program Square waveform generation at DAC1 output using 8051 microcontroller.
OR
b. Write an assembly language program Saw-tooth waveform generation at DAC2 output using 8051 microcontroller.
- 13 a. Describe the Arithmetic instruction set of 8086 with examples.
OR
b. Elucidate the modes of operation of 8255 in detail.

(p.t.o)

14 a. Elaborate the function of Interrupt Priority Register in 8051.

OR

b. Elucidate the TCON with neat diagram.

15 a. Write Short notes on:

Interrupt Priority Register (IP) b. Alternate Function of Port 3

OR

b. Describe the function of port in 8051 microcontroller.

16 a. Write an assembly language program for Interrupt Operations in 8051.

OR

b. Elaborate the Rotate & Conditional instruction set of 8085 with examples.

17 a. With illustration explain Keyboard interfacing with a microcontroller.

OR

b. Explain the data communication protocol of I²C bus

18 a. Explain the pin configuration of ARM7 LPC(2148) Microcontrollers

OR

b. In accordance to ARM processor , write in detail about

(i)The exceptions and its associated modes

(ii)Exception Priorities

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Discuss in detail about the architecture of 8086 with a neat diagram.

OR

b. Elucidate the SCON with a neat sketch.

20 a. Describe the various addressing modes in 8051.

OR

b. Elucidate the ADC interfacing with a neat diagram.

SL.NO:1270

SUBJECT CODE:17ECCC14

VINAYAKA MISSIONS RESEARCH FOUNDATION

(Deemed to be University)

B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022

ELECTRONICS AND COMMUNICATION ENGINEERING

DIGITAL IMAGE PROCESSING

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions

Part-A (10 x 2 =20 Marks)

- 1 Define Blind spot.
- 2 List out the applications of Digital Image Processing.
- 3 Quote Frequency domain filtering.
- 4 Show the 3 x 3 Box Filter.
- 5 Define Color Image Compression.
- 6 Contrast Color Complements.
- 7 Recite the matrix form of Haar Transform.
- 8 Differentiate Lossy and Lossless Image Compression.
- 9 Define Hit Transformation.
- 10 Name few Boundary descriptors.

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

- 11 a. Discuss about the any 3 Nonlinear Gray level transformation.
OR
b. Describe some common membership functions in Fuzzy set theory.
- 12 a. Illustrate Color Image Smoothing and Sharpening in detail.
OR
b. Examine the Image Degradation model /Restoration process.
- 13 a. Demonstrate Run Length coding with suitable example.
OR
b. Illustrate about two-band Sub band coding and decoding in 1D with suitable diagrams.
- 14 a. Illustrate about Opening & Closing in Morphological Image Processing.

(P.T.O)

2
OR

- b. Use various approaches to describe the Boundary descriptors.
15 a. Paraphrase about estimating the Degradation function.

OR

- b. Demonstrate Intensity slicing in Pseudo Color Image Processing.
16 a. Summarize about Wavelet packets.

OR

- b. Illustrate the efficiency of Huffman Code for the word "COMMITTEE"
17 a. Summarize the concepts of Region based Segmentation.

OR

- b. Interpret Image Segmentation using Morphological Watersheds.
18 a. Paraphrase on LZW coding.

OR

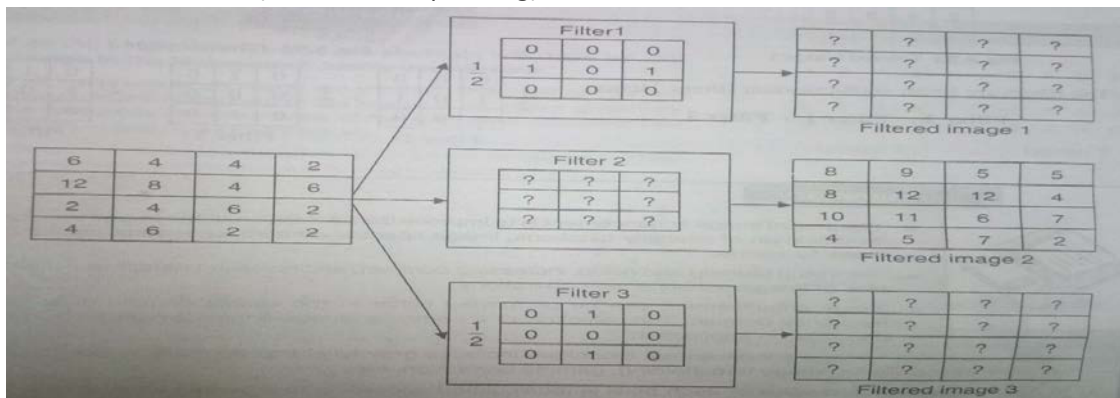
- b. Calculate when a Source emits four symbols {a,b,c,d} with the probabilities {0.2,0.2,0.4,0.2}.
Apply Arithmetic coding to encode the word 'dad'.

Answer ALL questions
PART-C (2 x 15 = 30)

- 19 a. Illustrate Image Smoothing linear filters & nonlinear filters in Spatial domain.

OR

- b. A 4 X 4 passes through three spatial linear shift-invariant filters, resulting in three filtered images. Compute the filtered image 1 & filtered image 3. Based on the relationship between Filtered image 1, Filtered image 2 & Filtered image 3, Derive the filter coefficients in the shift invariant linear filter 2 (Assume zero padding).



- 20 a. Determine the concept of Wiener Filter with necessary derivations.

OR

- b. Explain about Lossless and Lossy Predictive coding with necessary diagrams.

SL.NO:1270

SL.NO:1257

SUBJECT CODE:17ECCC02

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING

ANALOG CIRCUITS

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Show CC amplifier with its hybrid equivalent circuit.
- 2 Restate the reason for gain fall at higher frequencies.
- 3 Define oscillator.
- 4 Recall the working principle of multi-vibrator.
- 5 List the applications of Darlington connection.
- 6 Show the Darlington connection using complementary transistors.
- 7 Identify the use of bypass capacitor in CS amplifier.
- 8 Quote the value of gain requirement in the Wein bridge oscillator
- 9 Recall the fixed bias circuit is not used in practice.
- 10 Tell the various components of coil losses

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Illustrate Voltage divider bias circuit and derive the necessary expression.
OR
b. Determine h-parameters for linear devices in general.
- 12 a. Categorize the applications and limitations of various compound configuration amplifiers.
OR
b. Demonstrate the FET Hybrid Equivalent circuit and drive the equation.
- 13 a. Calculate h parameters of a CE transistor. A transistor has the following parameters $h_{ie} = 800\Omega$, $h_{re} = 10^{-4}$, $h_{fe} = 80$, $h_{oe} = 10^{-7}$, for a load of $3 K\Omega$.
OR
b. Determine the input impedance R_{if} and output impedance R_{of} of a voltage series feedback amplifier.
- 14 a. Determine the expression for frequency of oscillation for RC Phase Shift oscillator using BJT p.t.o with neat sketch.

2

OR

- b. Determine that the maximum efficiency of Class A transformer coupled power amplifier is 50% and that of class B type is 78.5%.

- 15 a. Use circuit diagram and transfer characteristics to justify the operation of a Schmitt trigger.

OR

- b. Demonstrate the type of feedback is employed in a common emitter circuit with unbiased emitter resistance.

- 16 a. Describe the operation of Class A power amplifier with circuit diagram.

OR

- b. Explain the operation synchronously tuned amplifier with frequency response.

- 17 a. Discuss the operation of class C power amplifier with circuit diagram.

OR

- b. Summarize the biasing schemes available to achieve the required bias in a JFET with example.

- 18 a. Explain the Operation of Common Emitter amplifier and explain the effect of bypass capacitor.

OR

- b. Explain the operation of a Common Source FET amplifier with necessary circuit diagram.

Answer ALL questions

PART-C (2 x 15 = 30)

- 19 a. Illustrate Class B push pull amplifier with its efficiency and working with circuit diagram.

OR

- b. Analyze general transistor amplifier circuit using h-parameter model. Derive the expressions for A_I , A_V , R_I , R_O , A_{VS} , A_{IS} .

- 20 a. Illustrate a FET amplifier using self bias with the necessary derivations.

OR

- b. Calculate the expression for the 3dB bandwidth of an inductive coupled double tuned amplifier.

SL.NO:1257

SL.NO:1244

SUB CODE: 17ECCC09

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING

SIGNAL PROCESSING

(Candidates admitted under 2017 Regulations-SCBCS)

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 What is the relation between DTFT and DFT.?
- 2 Delineate twiddle factor.
- 3 Define an IIR filter.
- 4 What is bilinear transformation?
- 5 List the disadvantages of FIR filters
- 6 List the techniques of designing FIR filters.
- 7 What are zero input limit cycle?
- 8 Define product quantization error.
- 9 What are the factors that influence the selection of DSPs?
- 10 List out the addressing modes of TMS320 processors?

Answer **Any FIVE** questions

Part-B (5 x10 =50 Marks)

- 11 a. An 8 point sequence is given by $x(n)=(2,1,1,2,1,1,1,1)$ compute 8 point DFT of $x(n)$ by Radix-2 DIT-FFT.

OR

 - b. State and prove any four properties of DFT.
- 12 a. Find the IDFT of $Y(k) = \{1,0,1,0\}$.

OR

 - b. Describe the steps involved in the design of an analog Butterworth low pass filter.
- 13 a. Explicate Cascade form of realization of IIR filters.

OR

 - b. Design a FIR low pass filter with cutoff frequency 1 KHz and sampling rate of 4 KHz with 11 samples using Fourier series method
- 14 a. Design a linear phase FIR Highpass filter using hamming window, with cutoff frequency $\omega_c = 0.8\pi$ rad/sec and $N= 7$

P.T.O

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OR

- b. Design a FIR low pass filter with cutoff frequency 2 kHz and sampling rate of 5 kHz with 9 samples using Fourier series method

- 15 a. Brief on product quantization error.

OR

- b. Explain quantization effects in the computation of the DFT.

- 16 a. Explain briefly about the analytical model of sample and hold operations.

OR

- b. Elucidate the Von Neuman architecture.

- 17 a. Write detailed notes on various functional units of CPU of TMS320C5x processors.

OR

- b. Demonstrate the decimation by an integer factor D.

- 18 a. An 8 point sequence is given by $x(n)=(2,2,0,2,1,1,0,1)$ compute 8 point DFT of $x(n)$ by Radix-4 DIT-FFT.

OR

- b. Convert the analog filter with system transfer function

$$H(s) = \frac{(s+0.1)}{(s+0.1)^2 + 9}$$

into a digital IIR filter by means of the impulse invariance technique

Answer ALL questions

PART-C (2 x 15 = 30)

- 19 a. Computing the DFT for $x(n)=\{0,1,2,1\}$, and sketch the magnitude and phase spectrum.

OR

- b. Design an analog Butterworth filter that has a -2dB pass band attenuation at a frequency of 20 rad/sec and atleast -10dB stop band attenuation at 30 rad/sec.

- 20 a. Design a Bandpass filter to pass frequencies in the range 1 to 2 rad/sec using Hanning window with $N=5$

OR

- b. Explain the characterization of a limit cycle oscillation with respect to the system described by the equation $y(n) = 0.95 y(n-1) + x(n)$. Determine the dead band of the filter

SL.NO:1244

SL.NO:1238

SUBJECT CODE:17ECSE32

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING

ELECTIVE-MEMS ANS SENSORS

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Give some mechanisms for the fundamental mechanism used for micro fluid actuation.
- 2 What is dry etching?
- 3 What is lab on a chip?
- 4 What is thermo capillary effect?
- 5 What is magnetostrictive transducer? Mention its types.
- 6 What is mean by micro actuation?
- 7 What is the natural frequency of the mechanical vibration system?
- 8 Mention the different techniques of surface bonding.
- 9 Give the classification of Micro Fluidic Flow.
- 10 Give the classification of secondary sensors.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Give the reasons for quantitative assessment cannot be done in thin films.
OR
b. Discuss in detail about the design consideration for micro fluidic systems.
- 12 a. With necessary diagrams and expressions explain the operations of ferromagnetic plunger type transduces.
OR
b. Discuss about Biomedical sensors and Biosensors with neat diagram.
- 13 a. With illustration detail about Silicon Piezoresistors with neat diagram.
OR
b. Discuss about sealing process of MEMS packaging.
- 14 a. Discuss in detail about resonant vibration.
OR
b. Write about damping coefficients of micro mechanical systems.

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15 a. Brief about creep formation in microsystems.

OR

b. Explain about the micro pattern production through photolithography.

16 a. Explain about micro needle used for biological fluids delivery.

OR

b. Illustrate inductive type sensors.

17 a. Write about electromagnetic transducers.

OR

b. Illustrate Actuation using Thermal forces.

18 a. Briefly explain about magnet diodes.

OR

b. Explain the design of feedback circuit integrated magnetic actuator.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Discuss about the general structure of CAD for micro system product design.

OR

b. With necessary diagrams explain LIGA process of MEMS manufacturing.

20 a. Explain in detail about optoelectro wetting?

OR

b. Explain in detail about bidirectional micro actuator.

SL.NO:1238

SL.NO:1237

SUBJECT CODE:17ECEC06

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING

ELECTIVE-MEMS ANS SENSORS

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 What is surface micromachining?
- 2 What is damping?
- 3 Define control surface.
- 4 What is Dielectrophoresis?
- 5 What are the types of strain gauges?
- 6 What is mean by micro actuation?
- 7 Define micro grippers.
- 8 What is creep deformation?
- 9 How the sensors are classified?
- 10 Write the principle of optical sensor.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Briefly discuss about deep Reactive Ion Etching (DRIE) process.
OR
b. Discuss in detail about the design consideration for micro fluidic systems.
- 12 a. Summarize magnetic sensing and detection with necessary block diagram.
OR
b. Identify the general process of surface micromachining.
- 13 a. Discuss about plasma etching techniques.
OR
b. Discuss about sealing process of MEMS packaging.
- 14 a. Discuss in detail about resonant vibration.
OR
b. Discuss with necessary representation about Micro accelerometers.
- 15 a. Brief about creep formation in microsystems.

p.t.o

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OR

b. Discuss about the selection of material for microsystem design.

16 a. Explain about construction and working of MEMS based micro pumps continuous flow systems.

OR

b. Explain about resistive potentiometer.

17 a. Explain the about magnetostrictive transducers.

OR

b. Illustrate Actuation using Thermal forces.

18 a. Illustrate Actuation using Piezoelectric crystals

OR

b. Elaborate about Czochralskyi method of growing single crystals.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. With necessary diagrams explain about the characterization of sensors.

OR

b. Explain the three levels of microsystem packaging.

20 a. Explain in detail about capillary electrophoresis network systems.

OR

b. Explain in detail about capacitive type sensors.

SL.NO:1237

SL.NO:1229

SUBJECT CODE:17ECCC05

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING

DIGITAL LOGIC CIRCUITS AND DESIGN

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Define Digital Systems.
- 2 Tell which is the most commonly used code for representing Alphanumeric information.
- 3 Recall the principle of Duality Property.
- 4 Define Multiplexer.
- 5 Define State Assignment.
- 6 Show the decision box of ASM chart.
- 7 List the needs of libraries in HDL.
- 8 Paraphrase Hexadecimal Number System.
- 9 Describe Half Adder circuit using logic gates.
- 10 Contrast the HDL and VHDL.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Determine the 1's and 2's complement of the following binary numbers :
i) (11101010) ii) (01101110) iii) (001000) iv) (1010001011)

OR

- b. a) Modify the following numbers with their indicated bases:
i) $(10110001101.1111001)_2 = (?)_8$, ii) $(173.124)_8 = (?)_2$,
iii) $(CAD)_{16} = (?)_8$
b) i) $(10110001101011.1111001)_2 = (?)_{16}$ ii) $(306.D)_{16} = (?)_2$

- 12 a. Determine the following expression in Canonical SOP

a) $Y=AB'C+A'C+AB'C'$ b) $F=AB+BC'$

OR

- b. Show the logic circuit and truth table for the given equations.
i) $Y= AB(B+C+D')$ ii) $Y= (A+B+C)A'B$ iii) $Y= ABC(C+D')$

13 a. Use K-map method to simplify the following expressions.

i). $F(A,B,C,D) = \Sigma(1,3,4,5,6,7,9,12,13)$

ii). $F(w,x,y,z) = \Sigma(1,5,6,7,11,12,13,15)$

OR

b. Show a Code converter circuit which converts gray code to binary code.

14 a. Illustrate how decoders are designed.

OR

b. Demonstrate how D flip flop can be realized from T flip flop.

15 a. Examine the operation of T Flip- Flop with necessary diagram.

OR

b. Discuss in detail about the control logic design applied in sequential circuit.

16 a. Determine a HDL code for BCD to decimal decoder.

OR

b. Paraphrase Demorgan's theorems.

17 a. Explain the terms i) Prime Implicant ii) Input variable iii) Minterm iv) Maxterm

OR

b. Explain the working of Decimal Adder with suitable diagram.

18 a. Discuss about synchronous counter design.

OR

b. Paraphrase about Frequency Counters.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Illustrate the HDL design of multiplexer.

OR

b. a) Show the following Binary codes as Excess-3 code

i) 0110 1011 1100 0111 ii) 0011 0101 1010 0100

iii) 0100 1000 1001 iv) 1001 0111 1100

b) Add $(3C4F)_{16}$ & $(5AC2)_{16}$

20 a. Illustrate 2-to-4-line and 3-to-8 line Decoder circuits.

OR

b. Describe about the clocked sequential circuit design.

SL.NO:1220

SUBJECT CODE:17ECCC16

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING
MICROWAVE & OPTICAL COMMUNICATION SYSTEMS

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Define microwaves.
- 2 Identify some uses of waveguide tees.
- 3 Define Klystron.
- 4 Paraphrase the advantages of TWT.
- 5 Define slotted line.
- 6 Define Insertion loss.
- 7 Define core and cladding .
- 8 Name the requirements for a preamplifier.
- 9 Define Brillouin Fiber amplifier
- 10 Differentiate PIN and APD device

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Summarize the working principle of Magic Tee with suitable diagram.
OR
b. Determine the S-matrix of a Magic Tee.
- 12 a. Discuss the construction and working of a basic magnetron.
OR
b. Illustrate photo resist fabrication technique used in MMIC fabrication with a suitable example.
- 13 a. Discuss in detail about spectrum analyzers.
OR
b. Examine the noise in microwave signal.
- 14 a. Discuss three laws of Refraction.

OR

(p.t.o)

- b. Demonstrate the principal of LASER diode. What are the pumping techniques of LASER diode?

- 15 a. Discuss the significance of intrinsic layer in PIN diode? What is the principle of working of PIN diode?

OR

- b. Illustrate the mechanism of light from an LED and its use in optical source for communication.

- 16 a. Determine the ac equivalent circuit of APD. Explain Avalanche photo diode in detail

OR

- b. Explain in detail the measurement of S-Parameters.

- 17 a. Examine the various structure of LED.

OR

- b. Explain in detail the measurement of impedance using microwave bench.

- 18 a. Differentiate TRAPATT and IMPATT diode.

OR

- b. a) Demonstrate the electrical equivalent circuit of fiber optic receiver. b) Draw the diagram of digital optical fiber transmission system

Answer ALL questions

PART-C (2 x 15 = 30)

- 19 a. Analyze the S-matrix for Isolator, Circulator, and Hybrid Ring.

OR

- b. A two cavity klystron amplifier has the following parameters:
 $V_0=1000\text{ V}$; $R_0=35\text{K}\Omega$; $I_0=20\text{mA}$; $f=3\text{GHz}$
 Gap spacing in either cavity, $d=1\text{mm}$; spacing between the two cavities, $L = 4\text{cm}$;
 Effective shunt impedance, excluding beam loading, $R_{sh}=30\text{K}\Omega$.
 a). Calculate the input gap voltage to give maximum voltage V_2 .
 b). Determine the voltage gain, neglecting the beam loading in the output cavity.
 c). Determine the efficiency of the amplifier, neglecting beam loading.

- 20 a. Examine how the frequency of a given microwave source can be measured. Also Explain how low VSWR can be measured using microwave bench

OR

- b. Discuss the following terms for optical fiber: (i) Absorption (ii) Scattering losses.

SL.NO:1218

SUBJECT CODE:17ECEC16

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING
ELECTIVE - WIRELESS AD-HOC AND SENSOR NETWORKS

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 State system capacity
- 2 What is the format of frame control field of 802.11 MAC packet structure?
- 3 Differentiate between active and passive sensors.
- 4 Mention the challenges involved in security provisioning.
- 5 What are the limitations of MANET?
- 6 What are the advantages of Ad hoc network?
- 7 Define self-organization of network.
- 8 What are the performance requirements for a MAC protocol?
- 9 Mention the impact of black hole attack in routing protocols.
- 10 Mention the use of TOSSIM simulator in modelling wireless network.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Explain the design approaches and performance of S-MAC protocol

OR

- b. Illustrate the fidelity systems in sensor Networks

- 12 a. Illustrate the various operating platform for wireless sensor Network

OR

- b. Explain challenges in Wireless sensor networks.

- 13 a. Briefly explain the characteristics of WSN.

OR

(p.t.o)

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b. Briefly explain the current approaches of sensors.

14 a. Explain the system architecture of IEEE 802.11.

OR

b. Describe the features of HiperLAN.

15 a. Explain how power management is done in IEEE 802.11 infrastructure architecture.

OR

b. Discuss the advantages and disadvantages of WLAN and WPAN

16 a. Discuss the PAMAS protocol in detail.

OR

b. Explain the important classes of MAC protocols.

17 a. Explain the Cooperation process of MANET

OR

b. Generalize the concept of hidden terminal problem.

18 a. Discuss the various key management approaches in Sensor Networks

OR

b. Discuss about the Node level simulators.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Inspect the functions of MAC & physical layer of IEEE 802.16 in detail.

OR

b. Elaborate the design Issues of a Wireless Sensor Network

20 a. Elaborate the node level software platforms.

OR

b. What are the advantages and disadvantages of DSDV routing protocols in an ad hoc wireless network

SL.NO:1218

SL.NO:1206

SUBJECT CODE:17ECEC02

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING

ELECTIVE- PCB & PLC

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 List the Applications of PCB board.
- 2 Define Double-Sided Boards.
- 3 Define Artwork.
- 4 Define Leadless Ceramic Chip Carriers (LCCC).
- 5 Recall the PLC size.
- 6 Tabulate the XIC &XIO status of the instruction.
- 7 Define ladder diagram.
- 8 Differentiate discrete and integrated circuit.
- 9 Recite the process involves in soldering.
- 10 Restate the RTO.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Illustrate Packaging density.

OR

b. Illustrate the facilities for Etching Area and Electrochemical etching.
- 12 a. Illustrate the requirement of solar pastes.

OR

b. Demonstrate Special I/O module.
- 13 a. Show the control of traffic lights in one direction with ladder diagram.

OR

b. Show the typical PLC installation.
- 14 a. Demonstrate connecting PC and PLC.

OR

b. Describe Double Sided PCB
- 15 a. Interpret Rigid and Flexible Printed Circuit boards.

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OR

b. Explain surface mounting semiconductor packages.

16 a. Summarize Artwork generation guidelines.

OR

b. Describe the basic CAD operations.

17 a. Describe the Soldering Variables.

OR

b. Explain solar paste application and how to handling of solder paste.

18 a. Describe PLC Workstation.

OR

b. Describe electrical noise.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Illustrate the following:

(i) Semiconductor memories (ii) Heat sinks (iii) Transformers (iv) Relays (v) Connectors

OR

b. Illustrate the major components of CPU

20 a. Demonstrate 24-h clock program.

OR

b. Describe the basic principle of operation in PLC.

SL.NO:1206

SL.NO:1200

SUBJECT CODE:17ECCC10

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING

LINEAR INTEGRATED CIRCUITS

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 List out the steps used in the preparation of Si – wafers.
- 2 Define Diffusion.
- 3 Define Input Offset Current. State the reasons for the offset.
- 4 List the features of instrumentation amplifier.
- 5 List the applications of analog multipliers.
- 6 What is a Schmitt trigger?
- 7 What are the major components of Series Op Amp Regulator?
- 8 Define Resolution in ADC.
- 9 Mention the frequency compensation methods.
- 10 State Astable Multivibrator.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Explain the Inverting Amplifier and the Non Inverting Amplifier using Op-amp.
OR
b. Derive the expression for lock in range.
- 12 a. Draw and explain integrator circuit using Op-amp.
OR
b. Explain the operation of Half wave rectifier circuits using op-amp.
- 13 a. Explain the analog and digital phase detector used in PLL system.
OR
b. Explain how a monolithic capacitor can be fabricated.
- 14 a. Demonstrate the process of photolithography with a neat diagram.
OR
b. With a neat diagram explain epitaxial growth process.
- 15 a. Draw and explain the internal block diagram of IC 741.

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OR

b. Write a brief notes on: (i) Input Bias Current (ii) Input offset voltage.

16 a. Explain the working of Clipper and Clamper using Op-amp with a neat diagram.

OR

b. Write notes on PSPICE simulation tool.

17 a. Explain the working of a Triangular Wave Generator with a neat diagram.

OR

b. Discuss the current limit protection circuit.

18 a. Classify DACs on the basis of their output.

OR

b. Explain the Servo tracking A/D converter with a neat diagram.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Examine the behavior of a sample and hold circuit using op-amp.

OR

b. Draw the block diagram of monostable multivibrator using IC555 timer and derive an expression for its frequency of oscillation.

20 a. Discuss the various processes involved in fabricating monolithic IC using silicon planar technology.

OR

b. What output voltage would be produced by a D/A converter whose output range is 0 to 10 V and whose binary number is
i) 10 (for a 2 bit DAC)
ii) 0110 (for a 4 bit DAC)
iii) 10111100 (for a 8 bit DAC)

SL.NO:1200

SL.NO:1193

SUBJECT CODE:17ECCC23

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING
SENSORS AND ELECTRONIC MEASUREMENTS

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Define Sensitivity
- 2 What is meant by the deflection sensitivity of a CRO?
- 3 Define gauge factor
- 4 What is an Multimeter?
- 5 Explain basic block diagram of DAC
- 6 Define I²C bus.
- 7 Draw the temperature –resistance characteristics of an Thermistor.
- 8 List out the advantages of digital storage oscilloscope.
- 9 Why is successive approximation method of A/D converters widely used?
- 10 Draw the block diagram of A/D multiplexing.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. An emitting diode of numerical aperture 0.3 is coupled to a fiber of numerical aperture of 0.22.What is the loss in decibels between coupling?
OR
b. Discuss in detail about the dynamic characteristics of an instruments.
- 12 a. Write short notes on
a) Fundamental units b) Supplementary units c) Derived units.
OR
b. Elucidate the Basic Q Meter circuit and its measurement methods with necessary diagram.
- 13 a. Discuss in detail about calibration of instrument.
OR
b. What are different types of temperature sensors? List their advantages, limitations and application.
- 14 a. Classify and explain about different pressure sensors.

OR

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b. Explain the use of synchro as an error detector.

15 a. Draw and explain the function of Cathode Ray Tube (CRT).

OR

b. Write short notes on Mesh and Phosphor storage techniques used in DSO.

16 a. With the help of schematic block, explain the principle and operation of strip chart recorders.

OR

b. Briefly explain about various performance parameters of D/A converters.

17 a. Draw and explain about single slope ADC

OR

b. Explain how Multimeter can be used to measure DC and AC voltages.

18 a. Explain the Instruments used in Computer controlled Instrumentation

OR

b. Discuss in detail about total internal reflection in glass fibers.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Draw and explain the functional elements of an measuring instrument.

OR

b. Explain the operation of strain gauges for torque measurement with suitable sketch.

20 a. Explain the principle and operation of AF signal generator with neat sketch.

OR

b. With the help of block diagram explain about fiber optic power meter.

SL.NO:1193

SL.NO:1192

SUBJECT CODE:17ECCC12

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING

DIGITAL CMOS SYSTEMS

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 State the different types of CMOS process.
- 2 Identify applications arithmetic circuits in VLSI design.
- 3 Define Parity Generator.
- 4 Define setup time and hold time.
- 5 List five Verilog Gate Primitives.
- 6 Define reduction operators with an example.
- 7 Brief on saturated and non-saturated regions in MOSFET.
- 8 Describe the circuit for inverter type super buffer.
- 9 Show the characteristic curve of Meta stable state in static latch.
- 10 Describe arbiters.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Show the relation between drain to source current I_{ds} verses drain to source voltage V_{ds} in non-saturated and saturated region.

OR

b. Illustrate the lambda-based design rules with neat sketches.
- 12 a. Show the layout diagram for 2 input NAND and NOR gates.

OR

b. Implement an 'n-bit' shift register and explain its operation over one clock cycle.
- 13 a. Demonstrate the operation of Ripple carry adders, with neat diagram.

OR

b. Demonstrate a Verilog program for 4-to-1 Multiplexer in gate Level Modeling and Behavioral modeling
- 14 a. Discuss the Ideal Characteristics of MOS Device, with neat diagrams.

OR

b. Explain in detail about the C-V Characteristics of MOS Device.

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15 a. Demonstrate clearly about the wires and vias used in VLSI design.

OR

b. Describe the domino logic with neat diagram.

16 a. Describe a Bi-CMOS inverter with a neat sketch.

OR

b. Discuss in detail about:

i) Synchronizers ii) Metastability

17 a. Discuss the operation of priority encoders, with necessary diagrams.

OR

b. Describe with neat diagram of Multiplexers.

18 a. Describe the concept of gate delay in VERILOG with example.

OR

b. Describe Behavioral modeling with Examples.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Show the construction of CMOS inverter using SOI process using relevant diagrams.

OR

b. Analyze the clocking disciplines and power optimization in sequential systems.

20 a. Examine a 4-bit subtractor using dataflow and behavioural modelling.

OR

b. Discuss about the effects of scaling down the dimensions of MOS circuits and Systems.

SL.NO:1192

SL.NO:1182

SUBJECT CODE:17ECEC03

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING

ELECTIVE - SATELLITE COMMUNICATION

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Mention the segments of basic satellite communication.
- 2 Delineate Satellite.
- 3 Delineate payload.
- 4 Define EIRP.
- 5 Define Yaw.
- 6 List the functions carried out in TT&C
- 7 Define thin route service.
- 8 What is meant by decoding quenching?
- 9 List the types of applications with respect to satellite systems.
- 10 Write the features of VSAT.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Explain about frequency allocations for satellite services.
OR
b. Explicate about Geo-stationary orbit.
- 12 a. Describe about the combined uplink and downlink C/N ratio.
OR
b. Elaborate about terrestrial interface.
- 13 a. Enlighten about antenna system used in earth station with diagram.
OR
b. Discuss about pre assigned & demand assigned FDMA.
- 14 a. Summarize the important feature of Intelsat SCPC system.
OR
b. Explicate about MPEG compression standards.
- 15 a. Write detail notes on VSAT.

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OR

b. Describe Bit rates for digital television.

16 a. Elaborate about inclined orbits.

OR

b. Elucidate about satellite uplink with saturation flux density and input back off.

17 a. Explicate the earth station transmitter and receiver with necessary block diagram.

OR

b. Elucidate and draw the block diagram of MATV system.

18 a. Illustrate about satellite mobile services.

OR

b. Elucidate on Forward Error Correction.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Elaborate on Noise temperature of absorptive networks.

OR

b. Point out the comment on pros and cons of satellite system based on TDMA. Also explain the TDMA frame format in detail with relevant diagrams.

20 a. Discuss on the following

a) Orbital Spacing.

b) Transponder Capacity.

OR

b. Explain the circuit operation of Transponder with diagram.

SL.NO:1182

SL.NO:1175

SUBJECT CODE:17ECEC28

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING
ELECTIVE - INTERNET OF THINGS FOR ELECTRONICS

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Draw IoT Generation road map.
- 2 Articulate on Z-Wave.
- 3 Write about HTTP in IoT.
- 4 Write a brief overview of IoT.
- 5 Summarize the use of sensor in IoT.
- 6 Summarize M2M.
- 7 Paraphrase power management module in IoT.
- 8 Summarize NEST sensor.
- 9 Summarize Actuator.
- 10 Paraphrase UART.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Illustrate about the sensors in IoT.

OR

b. Illustrate the difference between Arduino Duo & Raspberry Pi Model B.
- 12 a. Illustrate briefly about the IoT map device.

OR

b. Discuss about the advanced generation of IoT sensors.
- 13 a. Write a note on: 1) Trust for IoT 2) Security and Privacy for IoT
3) Physical IoT Security.

OR

b. Discuss the advantages and features of IoT-based Remote Camera Control System.
- 14 a. Explain the scope of IoT.

OR

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b. Define Internet Of Things (IOT). Explain any 3 Flavors of IOT.

15 a. Demonstrate IoT Generation Roadmap

OR

b. Explain about energy storage module in IoT.

16 a. Explain Near Field Communication (NFC) and RFID.

OR

b. Explain the concept of MQTT Protocol in detail.

17 a. Explain IoT Smart X Applications

OR

b. Discuss issues in IoT security.

18 a. Explain about the features and applications of Raspberry Pi.

OR

b. Explain any one of the Raspberry Pi projects.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Illustrate how to create a sensor project using Raspberry pi.

OR

b. Explain about IoT based surveillance camera.

20 a. Explain about Internet of Things (IoT) with examples.

OR

b. Explain about NEST Sensor.

SL.NO:1175

SL.NO:1169

SUBJECT CODE:17ECCC25

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING
ROBOTICS AND AUTOMATION

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Why it is used in Cubic polynomial,type robot.
- 2 Mention the use of Mobile robot workspace
- 3 What is the use of Degrees of freedom
- 4 State coordinate frames in robot
- 5 What is ment by two link planar robot arm
- 6 What is the definition of robot given by ISO?
- 7 State Asimov's third law of robotics
- 8 Mention the use of Lagrangian formulation
- 9 What is the function of the Joint space techniques
- 10 Why it is used in planning tasks type robot.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Derive the expressions for two torques (T_{g1} & T_{g2}) developed by a two link arm.

OR

b. Explain the block digram of Mobile manipulators and its applications
- 12 a. Discuss about the robots for nuclear power plant.

OR

b. Distinguish between first generation and second generation robot languages. Discuss the various instructions used in programming
- 13 a. Explain the static model of link planar robot.

OR

b. Explain the fuction of Graph search and potential field path planning

(p.t.o)

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14 a. Explain the various Performance characteristics of industrial Robots. Mobile robot locomotion with neat sketch.

OR

b. Write a short note on wheel design, geometry, stability, manoeuvrability and controllability

15 a. Discuss the relative merits and demerits of different textual robot languages. Explain the different program instructions

OR

b. Write short notes on any about the following Hill climbing techniques Jacobian work envelope.

16 a. What is Velocity analysis? Write the homogenous transformation matrix for Velocity analysis.

OR

b. Discuss the relative merits and demerits –Lagrangian formulation

17 a. Distinguish between first generation and second generation robot model. Discuss the various instructions used in static model.

OR

b. Discuss the various inputs to an Cartesian space techniques

18 a. Describe about the Specific Programming Language.

OR

b. Explain about the robots for assembly.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. What is homogenous transformation of coordinates? Write the homogenous

OR

b. Define the terms accuracy and cycle time in relation to a robot. Sketch and define the terms accuracy and cycle time in relation to a robot. Sketch and explain the joints and degree of freedom of a jointed arm robot.

20 a. Define a robot. With help of sketch describe pitch, yaw and roll motion of a robot wrist.

OR

b. What is the work envelope of a robot, Sketch and explain two views to indicate the work envelope of a i) Cartesian robot. ii) Polar robot.

SL.NO:1169

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
HUMANITIES & SCIENCES

ENGINEERING MATHEMATICS

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1

Obtain the characteristic equation of $\begin{pmatrix} 2 & -3 & 1 \\ 3 & 1 & 3 \\ -5 & 2 & -4 \end{pmatrix}$

2

Define orthogonal matrices.

3

Define evolute.

4

Find the centre of curvature of the curve $y = x^2$ at the origin.

5

If $u = x^2y^3$ where $x = \log t$ and $y = e^t$ Find $\frac{du}{dt}$

6

Examine the maximum and minimum values of $3x^2 - y^2 + x^3$

7

Integrate $\int_0^1 \int_1^2 x(x+y) dy dx$.

8

Integrate $\int_0^{\pi/2} \int_0^{\pi/2} \sin(\theta + \phi) d\theta d\phi$

9

Prove that $\nabla(r^n) = nr^{n-2} \vec{r}$

10

State Stoke's theorem

(p.t.o)

Answer Any FIVE questions
Part-B (5 x10 =50 Marks)

11 a.

Find the Eigen values and Eigenvectors of the matrix $\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 1 \\ 0 & 1 & 1 \end{pmatrix}$.

OR

b.

Obtain the Eigen values and Eigenvector of the matrix $\begin{pmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{pmatrix}$

12 a.

Obtain the equation to the circle of curvature of the curve $xy = c^2$ at (c, c) .

OR

b.

Prove that the radius of curvature at any point of the cycloid $x = a(\theta + \sin \theta); y = a(1 - \cos \theta)$ is $4a \cos \frac{\theta}{2}$

13 a.

Find the maximum and minimum values of the function $x^3 y^2 (1 - x - y)$

OR

b.

(i) If $u = \sin^{-1} \frac{x}{y} + \tan^{-1} \frac{x}{y}$, then find the value of $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y}$

(ii) Find $\frac{du}{dt}$ as a total derivative and verify the result by the direct substitution of $u = x^2 + y^2 + z^2$ when $x = e^{2t}, y = e^{2t} \cos 3t$, and $z = e^{2t} \sin 3t$

14 a.

Integrate $\int_0^a \int_0^{\sqrt{a^2-x^2}} \int_0^{\sqrt{a^2-x^2-y^2}} \frac{dz dy dx}{\sqrt{a^2-x^2-y^2-z^2}}$

OR

(p.t.o)

Sl.No.17MABS01

- b. Obtain the area enclosed by the parabola $y^2 = 4ax$, x -axis and the latus rectum of the parabola.

15 a.

If $\vec{F} = x^2\vec{i} + xy\vec{j}$ evaluate $\int \vec{F} \cdot d\vec{r}$ from $(0, 0)$ to $(1, 1)$ along the line $y=x$

OR

b.

Obtain the values of a and b so that the surfaces $ax^3 - by^2z = (a+3)x^2$ and $4x^2y - z^3 = 11$ may cut orthogonally at $(2, -1, -3)$

16 a.

Find the volume bounded by the cylinder $x^2 + y^2 = 4$ and the planes $y + z = 4$ and $z = 0$.

OR

b.

For the given curve $x = a \cos \theta, y = b \sin \theta$ Find ρ at $\left(\frac{a}{\sqrt{2}}, \frac{b}{\sqrt{2}}\right)$

17 a.

Obtain the equation to the circle of curvature of the curve $xy = c^2$ at (c, c) .

OR

b.

Prove that the radius of curvature at any point of the cycloid

$$x = a(\theta + \sin \theta); y = a(1 - \cos \theta) \text{ is } 4a \cos \frac{\theta}{2}$$

18 a.

Prove that $\nabla^2 (r^n) = n(n+1)r^{n-2}$ where $\vec{r} = x\vec{i} + y\vec{j} + z\vec{k}$ and $r = |\vec{r}|$

OR

(p.t.o)

Sl.No.17MABS01

- b. For the curve $x^3 + y^3 = 2$ find the co-ordinates of the centre of curvature at the point (1, 1)

Answer ALL questions
PART-C (2 x 15 = 30)

19 a.

Diagonalise the matrix $A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$ and hence find A^5

OR

- b. Obtain the equation of the evolute of the curve $x^{2/3} + y^{2/3} = a^{2/3}$

20 a.

Determine the value of $\int_0^1 \int_0^{\sqrt{x^2}} (x^2 + y^2) dy dx$

OR

- b. Change the order of integration in $\int_0^a \int_y^a \frac{x^2}{\sqrt{x^2 + y^2}} dx dy$ and then evaluate it.

SL.NO:1165

SL.NO:1158

SUBJECT CODE:17ECPI04

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING

VIRTUAL INSTRUMENTATION FOR ELECTRONICS

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Mention the two ways used to access data previous iteration outputs of a loop.
- 2 How assigning priority in timed loops?
- 3 What are the various techniques adapted for LABVIEW program?
- 4 State the purpose of DAQ cards.
- 5 What is RS-232 interface?
- 6 What is SCADA instrumentation?
- 7 What is DCS HMI?
- 8 Define virtual laboratory.
- 9 What is the need for USB?
- 10 Give examples real time control used in VI

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Differentiate with one example ON/OFF controller with Proportional Controller
OR
b. Write brief notes on dataflow programming and G-programming.
- 12 a. What are the various modes of waveform chart? Explain.
OR
b. Explain how timers and counters used in DAQ in VI
- 13 a. How we are developing remote front panel in lab view applications?
OR
b. How timed loop used in different applications in lab view environment?
- 14 a. Design Temperature Controller using NI Lab view
OR
b. How real time signal is interfaced in Virtual Instruments for real time processing and monitoring?

p.t.o

15 a. Identify the software and hardware components and explain the operation of Virtual Instruments.

OR

b. Discuss in detail about the flash ADC architecture.

16 a. Describe about VXI interface used in Virtual Instruments with neat diagram

OR

b. Draw the layout of virtual factory, explain each component

17 a. Explain how DAQ Assistant is used to acquire and generate signals with procedure for creating, configuring, Test and generate Lab VIEW code using DAQ Assistant.

OR

b. Enumerate various types of sensors with diagram.

18 a. Describe in detail about Process control applications of LabVIEW.

OR

b. Discuss any two types of transducers used in VI with neat diagram.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Design Traffic Light Controller using LABVIEW

OR

b. Elaborate organization of DAQ in VI systems

20 a. Explain in detail how Ethernet and TCP/ IP Protocols used in VI

OR

b. Explain briefly data acquisition modules with serial communication in VI

SL.NO:1119

SUBJECT CODE:17PHBS05

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
COMMON TO ALL
SMART MATERIALS

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Demonstrate, how the Metallic glasses can be used for transformer core materials?
- 2 Explain briefly about transformation temperature in SMA.
- 3 Distinguish between Type I and Type II Superconductors.
- 4 Interpret unit cell.
- 5 Demonstrate top-down and bottom-up approach for producing nanoparticles.
- 6 Interpret any two techniques for the synthesis of nanophase materials.
- 7 Explain briefly about top-down approach.
- 8 Describe coercivity and retentivity.
- 9 Explain briefly about soft magnetic materials.
- 10 Identify the reason, why the superconductor exhibits the property of diamagnetism?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Categorize metallic glasses? Give examples. Mention the properties of metallic glasses.

OR

- b. Draw the unit cells of SC, BCC, FCC and HCP structures

- 12 a. Examine the effects of temperature, magnetic field and current on the superconductivity.

OR

- b. Schedule the following for SC, BCC, FCC and HCP structures

- 13 a. Explain the properties of diamagnetic materials with neat diagram.

OR

- b. Explain two characteristics of SMA with neat diagrams.

- 14 a. Explain the properties of Ni-Ti alloy.

p.t.o

OR

- b. Express the outline of magnetic and electrical properties of metallic glasses. Mention any two applications of metallic glasses.

- 15 a. Describe the following (i) unit cell (ii) coordination number (iii) nearest neighbour distance (iv) packing factor

OR

- b. Explain the advantages, disadvantages and applications of ball milling method.

- 16 a. Explain Carbon Nano Tubes? How are they classified? Explain.

OR

- b. Explain in detail about any one of the methods of fabrication of CNT.

- 17 a. Differentiate the properties of dia, para and ferromagnetic materials

OR

- b. Discuss the properties of superconductors.

- 18 a. Describe about Type – I super conductor. Write down its characteristics.

OR

- b. Discuss Isotope Effect and Meissner effect.

Answer ALL questions

PART-C (2 x 15 = 30)

- 19 a. Categorize hard and soft magnetic materials? Mention their applications.

OR

- b. Generalize the properties of metallic glasses.

- 20 a. Illustrate sol-gel method of preparing nanophase materials and mention its advantages.

OR

- b. Illustrate hysteresis on the basis of domain theory.

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E.DEGREE EXAMINATIONS- FEB - 2022
COMMON TO ALL
PHYSICAL SCIENCES
(Candidates admitted under 2017 Regulations-SCBCS)

Time : 1 1/2 Hours

Maximum Marks:50 Marks

PART A - ENGINEERING PHYSICS

Answer **ALL** questions

Part-A (5 x 2 =10 Marks)

- 1 Tell about population inversion.
- 2 Schedule any two applications of laser in industrial field.
- 3 Report about step index fiber.
- 4 Tell about the characteristics of graded index multimode fiber.
- 5 Interpret about X-ray Fluoroscopy.

Answer **Any FIVE** questions

Part-B (2 x12 =24 Marks)

- 6 a. Predict the applications of laser in communication, military and chemical fields.
OR
- b. Recognize the following terms: population inversion, pumping process and laser action.
- 7 a. Express the various types of fibers based on refractive index profile.
OR
- b. Express the characteristics of penetrant.

Answer **ALL** questions

PART-C (1 x 16 = 16)

- 8 a. Demonstrate the construction and working of semiconductor laser with necessary diagram.
OR
- b. Illustrate the working of X-ray radiography.

PART A - ENGINEERING CHEMISTRY
(Candidates admitted under 2017 Regulations-SCBCS)

Time : 1 1/2 Hours

Maximum Marks:50 Marks

Answer **ALL** questions**Part-A (5 x 2 =10 Marks)**

- 1 Brief the terms electrolytic and electrochemical cell.
- 2 What is helmholtz's electrical double layer?
- 3 Show the structure of EDTA and Ca-EDTA complex.
- 4 Mention the causes of boiler corrosion
- 5 Write a note on solar energy

Answer **Any FIVE** questions**Part-B (2 x12 =24 Marks)**

- 6 a. Explain standard electrode potential in detail.
OR
- b. Calculate the emf of the cell $\text{Mg}/\text{Mg}^{2+} // \text{Cd}^{2+} (\text{aq}) / \text{Cd}(\text{s})$ at 25°C where, $[\text{Cd}^{2+}] = 0.7\text{M}$, $[\text{Mg}^{2+}] = 1.0\text{M}$ and $E^{\circ}_{\text{cell}} = 1.97 \text{ V}$.
- 7 a. Discuss in detail dry corrosion with mechanism.
OR
- b. Describe producer gas in detail.

Answer **ALL** questions**PART-C (1 x 16 = 16)**

- 8 a. Explain the working principle of $\text{H}_2\text{-O}_2$ fuel cell with reactions.
OR
- b. Elaborate the non-conventional energy sources.

S.No.1118

SL.NO:1112

SUBJECT CODE:17ECCC19

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING
WIRELESS COMMUNICATION SYSTEMS

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 List the devices which operates in ISM band
- 2 Define Doppler shift.
- 3 List the characteristics based on which the transceiver is selected for a wireless sensor node.
- 4 Define Mutual coupling in Angle Diversity.
- 5 Define Spreading factor.
- 6 List the functions of Base Station Subsystem.
- 7 Discuss the factors influencing Small-scale Fading.
- 8 Identify the Multipath wave.
- 9 Explain the criteria for selection of Equalizer.
- 10 Classify any 3 Control messages transmitted in Traffic Channels during Uplink in IS-95.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Explain and the Free space propagation model to determine the received power at a distance 'd'. with Free Space Attenuation.

OR

 - b. Discuss and explain about Time-Invariant Two-Path Model. Draw with neat sketch.
- 12 a. Locate and Explain Fading effects due to Multipath Time Delay Spread. Temporal Variations in Fixed Wireless Systems

OR

 - b. Elaborate on Wideband Channel Models with neat sketch.
- 13 a. Discuss on
(a) Spatial Diversity (6)
(b) Temporal Diversity (4)

P.T.O

OR

- b. Explain how a Cellular telephone call is made between the Landline and the Mobile user with suitable Timing diagrams.
- 14 a. Explain in detail about :-
 a. Cordless Telephone Systems. (5)
 b. Ad hoc Networks (5)

OR

- b. Elucidate on Frequency ranges assigned to different communications services & Frequency reuse in Regulated and Unregulated Spectrum.
- 15 a. Explain and compare Modulation & Demodulation with neat sketch

OR

- b. Explain & Elaborate on Offset Quadrature-Phase Shift Keying.
- 16 a. Discuss and Elaborate on Selection Diversity in Combination of Signals.

OR

- b. Discuss about Taxonomy of Equalizer structures.
- 17 a. Discuss about principles of Convolutional Codes.

OR

- b. Discuss on Effects of Multipath Propagation on CDMA
- 18 a. Elaborate on the architecture of GSM with block diagram.

OR

- b. Discuss about Parameters of Mobile Multipath Channel with diagram.

Answer ALL questions**PART-C (2 x 15 = 30)**

- 19 a. Compare and Elaborate about the Macro diversity, Micro diversity

OR

- b. Explain about the Window Parameters Relationships between system functions, correlation functions, and condensed parameters for ergodic channel impulse responses.
- 20 a. Execute and derive the Multipath channels CDMA and Elaborate with Application

OR

- b. Discuss on transmission & reception of MSK technique with neat diagram.

SL.NO:1102

SUBJECT CODE:17ECCC13

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING
ANTENNA AND WAVE PROPAGATION

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Recall antenna temperature
- 2 Recite collinear array
- 3 List the applications and limitation of horn antenna.
- 4 Name the two modes of radiation of helical antenna.
- 5 List out the factors that affect the propagation of radio waves.
- 6 Restate Polarization.
- 7 Draw the radiation pattern of Broad side array.
- 8 Restate uniqueness theorem.
- 9 Identify the requirements of an Anechoic Chamber.
- 10 Restate diversity reception.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Analyze the various modes of Propagation in different levels

OR

b. Determine the expression for the gain of half wave dipole.
- 12 a. Illustrate the antenna efficiency and Power gain with relevant expression

OR

b. Predict the expression for the far field component of a half wave dipole of an antenna.
- 13 a. Derive the path difference and total far field for equal amplitude and same phase

OR

b. Illustrate the antenna arrangement and radiation pattern for binomial array

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14 a. Illustrate the line sources feed for parabolic cylinder and pill box in reflector antenna

OR

b. Demonstrate the field equivalence of slot radiators and complementary dipole.

15 a. Illustrate the construction and characteristics features of frequency independent antennas.

OR

b. Illustrate the various layers of Ionosphere

16 a. Determine the Effective Earth's Radius in Space Wave Propagation.

OR

b. Discuss the classification of radiation pattern and their lobes

17 a. Illustrate the antenna arrangement of Broad side array and End fire array.

OR

b. Describe the special features of various types of Horn antennas

18 a. Demonstrate the measurement of antenna gain.

OR

b. Describe the Structure of Atmosphere

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Justify how ducts can be used for microwave propagation.

OR

b. Show the direction of pattern maxima and beam width of major lobe for the array of 'N'- point sources of equal amplitude and spacing- End fire case.

20 a. Determine the total far field pattern for linear n isotropic point sources with equal amplitude and linear phase.

OR

b. Explain in detail about inverted V antenna with its radiation characteristics .

SL.NO:1091

SUBJECT CODE:17ECCC01

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING

SEMICONDUCTOR DEVICES

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Recite the Law of electrical neutrality.
- 2 Recite collector current in terms of base current of transistor.
- 3 Define drain-source saturation current I_{DSS} .
- 4 Define an electrical filter.
- 5 Define Piezo electric effect.
- 6 Show the symbol and structure of TRIAC.
- 7 Paraphrase voltage regulator.
- 8 Summarize applications of BJT.
- 9 Paraphrase unipolar device.
- 10 Contrast intrinsic standoff ratio of UJT.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Illustrate the crystalline structure of Germanium semiconductor and explain how free electron is generated.

OR

b. Examine the clipper and clamper circuits.
 - 12 a. Examine the construction and operation of PNP transistor, with necessary diagrams.

OR

b. Examine the various methods to test the transistor.
 - 13 a. Show the drain characteristics of both n-channel and p-channel JFET.

OR

b. Demonstrate the operation of high pass RC filter
 - 14 a. Illustrate with a neat diagram the operation of MESFETs.

OR

b. Examine the operation of MISFETs.
-

15 a. Interpret the operation of PN junction under forward and reverse bias conditions with its characteristics.

OR

b. Differentiate between intrinsic and extrinsic semiconductors.

16 a. Describe the input and output characteristics of CB configuration of NPN transistor.

OR

b. Explain the operation of N-channel JFET and derive its drain characteristics.

17 a. Explain the construction and operation of DE- MOSFET.

OR

b. Explain the salient features of Enhancement MOSFET and Depletion MOSFET.

18 a. Describe the construction of TRIAC with neat diagram.

OR

b. Contrast the function of HEMT in communication circuit.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Determine the values of I_B , I_C , I_E , V_E , V_B and V_C for the given NPN circuit with $\beta = 150$ in active mode.

OR

b. Demonstrate a voltage variable resistance circuit using Field Effect Transistor.

20 a. Illustrate the various applications of SCR

OR

b. Paraphrase the various applications of Switched Capacitor filter circuit.

SL.NO:1090

SUBJECT CODE:17MBHS01

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
COMMON TO ECE, EEE,BME ,CSE & MECH

ENGINEERING STARTUPS AND ENTREPRENEURIAL MANAGEMENT

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Point out any two features of Risk- reward scale for starttup.
- 2 List any three purpose of Stock Ownership Plan.
- 3 Write on a“ Long Term Disability Insurance”.
- 4 Write any two roles of management in a company?
- 5 Define buyer and seller.
- 6 What is Self-funding?
- 7 What is a contract?
- 8 Write on Preferred Stock?
- 9 Mention any four difficulties faced by the entrepreneur.
- 10 Point out the factors that affecting Entrepreneurship growth.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. What is the difference between authorized shares and outstanding shares?
OR
b. Explain in detail the violation of intellectual property with few examples.
- 12 a. Elucidate the sole trader business form of organisation.
OR
b. Enumerate the ten commandments for the beginning entrepreneur.
- 13 a. “ A clear business plan is key to startup success” comment.
OR
b. Determine how equity form of incentives help motivate employees in a startup?
- 14 a. How can a business protect its trade secrets?
OR
b. “Successful startups have great management team” Justify.
- 15 a. Assess the safest investment with highest return in startup employment.

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OR

b. Explain in detail the roles of entrepreneurship.

16 a. Define market segmentation and discuss its importance.

OR

b. Briefly discuss the steps involved in developing a new product or service.

17 a. Briefly explain the levels of funding for startups with a diagram.

OR

b. Briefly discuss the importance of identifying target customers for a startup.

18 a. Explain in detail the importance and characteristics of entrepreneurship.

OR

b. Explain the importance of intellectual property in start-ups.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Discuss the imperative factors of Social Entrepreneurship.

OR

b. Role of Entrepreneurship in Economic Development – Discuss

20 a. Write an essay on different kinds of partnership.

OR

b. Examine the employees and employers should know about restricted stock awards and taxes.

SL.NO:1090

SL.NO:1084

SUBJECT CODE:17ECCC07

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING

MICROCONTROLLERS & ITS APPLICATIONS

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Mention the use of ALE.
- 2 What are the features used in mode 2 in 8255?
- 3 What are the alternate functions of Port 3 in 8051 microcontroller?
- 4 What is the function of SM2 bit present in SCON register in 8051?
- 5 Name the addressing mode of 8051 microcontroller.
- 6 Define ADC.
- 7 Draw the block diagram of 8-bit DAC.
- 8 Tell the role of INDF register in PIC micro controller.
- 9 Write a PIC microcontroller program for decrementing a 16 bit counter.
- 10 List the advantages of using segment registers in 8086

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Write an assembly language program for two 16 bit addition and subtraction using 8086.
OR
b. Write an assembly language program for UART Operations in 8051.
- 12 a. Write an assembly language program Square waveform generation at DAC1 output using 8051 microcontroller.
OR
b. Write an assembly language program Triangular waveform generation at DAC1 output using 8051 microcontroller.
- 13 a. Describe the logical instruction set of 8086 with examples.
OR
b. Illustrate the Programmable interrupt controller 8259A with neat sketch.
- 14 a. Elaborate the function of Interrupt Priority Register in 8051.
OR
b. Describe the function of Interrupt Enable Register in 8051.

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15 a. With illustration explain in detail about bank register & bit addressable area in internal RAM.

OR

b. Describe the function of port in 8051 microcontroller.

16 a. Elaborate the Control transfer instruction set of 8051 with examples.

OR

b. Describe the Unconditional Jump & CALL instruction set of 8051.

17 a. Write short notes on:

a. ADC b. DAC

OR

b. Explain the data communication protocol of I²C bus

18 a. Explain interrupts handling in PIC microcontroller.

OR

b. Enumerate on

(i) Interrupt service routine in PIC. (ii) I/O port expansion in PIC

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Sketch the architecture of IC 8255 and explain its function.

OR

b. With a neat sketch, clarify the functional block diagram of 8051 microcontroller.

20 a. Discuss about Logical & control transfer instruction set of 8051 with examples.

OR

b. Describe how the timers are used as event counters in PIC microcontroller

SL.NO:1076

SUBJECT CODE:17ECSE19

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING

ELECTIVE VI –RFID & FLEXIBLE SENSORS

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 State the use of Optical Character Recognition.
- 2 Define Fading.
- 3 Define Span.
- 4 Tabulate the kinds of Materials with respect to Electric Charges.
- 5 Define Capacitor.
- 6 List the main Characteristics of Current Generators.
- 7 List the Characteristics of Chemical Sensor.
- 8 Tabulate the Characteristics of a Smart Sensor.
- 9 Contrast Sensor from Transducer.
- 10 Contrast on Position, Velocity & Acceleration.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Demonstrate Acoustic Temperature Sensors with a suitable Example.
OR
b. Demonstrate on the working of Tactile Sensors with its Types & Applications.
- 12 a. Paraphrase about Passive, Semipassive & Active Tag.
OR
b. Discuss about Backscatter Signaling.
- 13 a. Discuss about Early UHF Passive Tag System.
OR
b. Discuss about Thermal Radiation (IR) Sensing Module for Mobile Communication Device (MCD).
- 14 a. Summarize on Span, Saturation & Output Impedance.
OR
b. Paraphrase on Functional Approximation of Transfer Function.

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15 a. Explain the concepts of Parallel Plate Capacitor & Cylindrical Capacitor.

OR

b. Explain about Moisture Sensitivity of a Resistor.

16 a. Explain Thermal Conduction.

OR

b. Summarize on Transmitted Noise.

17 a. Discuss about Optical Force Sensors & its Types.

OR

b. Explain CMOS Image Sensor with suitable diagrams

18 a. Discuss about Piezoelectric Accelerometer.

OR

b. Explain Typical ingredients for Electro Rheological Fluids & its Principal Characteristics.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Analyse on Mathematical Models of a Transfer Function of a Sensor.

OR

b. Justify Shape Memory Alloy as “*Elephants of Material Science*” with its Utilization in any 3 Sectors with a Real-time Example.

20 a. Discuss about UHF RFID Receivers.

OR

b. Summarize on Electric Fields, Charges, Fields and Potentials.

SL.NO:1076

SL.NO:1063

SUBJECT CODE:17ECEC10

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
ELECTRONICS AND COMMUNICATION ENGINEERING
ELECTIVE - DATA COMPRESSION

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 List out the techniques for lossy compression.
- 2 Define Non Binary Huffman code.
- 3 Define Sibling property.
- 4 Identify the adaptive dictionary techniques.
- 5 Quote the need for image compression.
- 6 List the different Video Compression methods.
- 7 Define H.261.
- 8 Interpret –Adaptive Huffman coding.
- 9 State the Golomb Code.
- 10 Summarize few applications of Audio compression.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Contrast between JPEG and JBIG image compression.
OR
b. Examine WAVE Audio Format.
- 12 a. Determine measures of performance in detail.
OR
b. Examine Rice Codes.
- 13 a. Demonstrate on JBIG progressive image compression.
OR
b. Illustrate about Speech Compression.

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14 a. Demonstrate H.264 with necessary diagrams.

OR

b. Demonstrate Run Length coding with suitable example.

15 a. Describe Markov models with suitable diagram.

OR

b. Explain update procedure for Adaptive Huffman Coding.

16 a. Explain Decoding procedure for Adaptive Huffman Coding.

OR

b. What are the advantages of minimum variance Huffman codes over normal Huffman codes?

17 a. Interpret the JBIG standard.

OR

b. Describe Graphics Interchange Format.

18 a. Interpret Digital Audio Compression.

OR

b. Summarize ADPCM Audio Compression with suitable diagrams.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Examine JBIG compression with necessary diagram.

OR

b. Consider the below triplets and decode them using LZ1 compression algorithm, given that $W=13, S=7, L=6$ and triplets are $\langle 0,0,c(c) \rangle, \langle 0,0,c(a) \rangle, \langle 0,0,c(b) \rangle, \langle 0,0,c(r) \rangle, \langle 3,1,c(c) \rangle, \langle 2,1,c(d) \rangle, \langle 7,4,c(r) \rangle, \langle 3,5,c(d) \rangle$

20 a. Illustrate ADPCM Audio Compression.

OR

b. Describe the Encoding procedure of Huffman coding.

SL.NO:1063

SL.NO: 1051

SUBJECT CODE:17ECCC18

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB-2022
ELECTRONICS AND COMMUNICATION ENGINEERING
INTERNET OF THINGS FOR ELECTRONICS

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Write the purpose of IoT.
- 2 Write the examples of IoT devices.
- 3 Write about HTTP in IoT.
- 4 Write the challenges of Wearable Technology.
- 5 Summarize about Sensors in IOT
- 6 Summarize sensor swarm.
- 7 Summarize Sensing module in IoT.
- 8 Summarize NFC.
- 9 Paraphrase Humidity sensor.
- 10 Summarize Temperature sensor.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Illustrate the wireless sensor structure of IoT.
OR
b. Illustrate about the four Pillars of IoT and how they are inter-connected with each other.
- 12 a. Discuss about IoT global market structure.
OR
b. Illustrate Printed Electronics.
- 13 a. Demonstrate Two Pillars of the Web.
OR
b. Write a note on : CoAP, REST, XMPP.
- 14 a. Explain the advantages & disadvantages of an IOT.
OR

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b. Explain about first generation in IoT sensors.

15 a. Demonstrate IoT Generation Roadmap

OR

b. Explain about energy storage module in IoT.

16 a. Explain what are the components and Communication media required for making smart building.

OR

b. Explain about IoT sensing module.

17 a. Discuss some of the applications of wearable electronics.

OR

b. Explain WoT with example.

18 a. Discuss in details IoT Architecture layers.

OR

b. Discuss features, advantages and disadvantages of actuator.

**Answer ALL questions
PART-C (2 x 15 = 30)**

19 a. Illustrate how to create the actuator project.

OR

b. Illustrate power management techniques in IoT.

20 a. Describe Polytronics Systems with their characteristics.

OR

b. Explain about NEST Sensor.

SL.NO:1043

SUBJECT CODE:17ECSE30

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB 2022
ELECTRONICS AND COMMUNICATION ENGINEERING
ELECTIVE - MICRO ELECTRO MECHANICAL SYSTEMS

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Label the components of a Microsystem
- 2 Write the applications of microsystems in telecommunication fields.
- 3 Define Micro sensor.
- 4 Define magneto resistive sensor.
- 5 Give the definition of fluid mechanics
- 6 What are the Two oxidation methods
- 7 What are the different MEMS micromachining methods?
- 8 What are Essential packaging technologies.
- 9 Draw the diagram of piezoelectric effect.
- 10 Point out the types of three dimensional profiles for anisotropic wet etching of silicon.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Discuss about the applications of micro systems in automotive, health care fields.
OR
b. Explain the principle of working of a MEMS based on microelectronics
- 12 a. Explain the different Essential packaging technologies
OR
b. Explain the construction and principle of MEMS magnetic sensor.
- 13 a. Explain the process of lithography etching with its merits.
OR
b. Explain about Evolution of micro-fabrication

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14 a. How did MEMS technology have an impact on this application in performance, cost, or volume production with example

OR

b. Illustrate Actuation using Shape memory alloys.

15 a. Explain scaling of MEMS devices.

OR

b. Explain with a neat sketch Scaling in Electrostatic Forces

16 a. Explain with a neat sketch crystal structural of silicon

OR

b. Explain the Miller Indices

17 a. Explain various fabrication techniques in detail.

OR

b. Discuss Surface Micro machining with suitable example.

18 a. Discuss Bulk Micro machining with suitable example

OR

b. Differentiate Microelectronics packaging, Microsystem packaging

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Explain the Silicon Piezoresistors

OR

b. Summarize the applications of microsystems in aerospace

20 a. Explain in detail about bidirectional micro actuator.

OR

b. Explain with a neat sketch LIGA process

SL.NO:1023

SUBJECT CODE:17ECSE06

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB - 2022
ELECTRONICS AND COMMUNICATION ENGINEERING

ELE-SYSTEM ON CHIP

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Differentiate virtual address and real address
- 2 Mention two processor with an example.
- 3 What is meant by run on delays?
- 4 Define spatial locality
- 5 Define test generation
- 6 Define Mix columns
- 7 What is meant by Prototyping?
- 8 Define branch prediction
- 9 Define solo miss rate
- 10 Mention the various benchmarks with latency

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. How custom instructions are automatically identified? Explain in detail
OR
b. Draw and explain the block diagram of sequential processor model
- 12 a. Draw and explain the block diagram of superscalar processor model
OR
b. Explain in detail about memory and addressing
- 13 a. Explain the steps involved in processor core selection.
OR
b. Explain in detail about interrupts and exceptions
- 14 a. Explain the concept of mean request rate buffers
OR
b. Explain the various types of parameters affecting processor performance.
- 15 a. Explain the concept of cache data.

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OR

b. Explain the strategies for line replacement at miss rate.

16 a. Explain the various types of programmability in detail.

OR

b. Explain in detail about computations.

17 a. Briefly explain the concept of reconfigurable technologies.

OR

b. Draw the block diagram of Quick MIPS and explain in detail.

18 a. Draw the block diagram of still image camera and explain in detail.

OR

b. Explain the steps involved in motion estimation process.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Explain the concept of dealing with design complexity.

OR

b. Explain in detail about various types of designs with block diagram

20 a. Briefly explain the preserving state with out of order execution.

OR

b. Draw FPGA tool flow and explain in detail.

SL.NO:1023

SL.NO:1009

SUBJECT CODE:17ECSE02

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB - 2022
ELECTRONICS AND COMMUNICATION ENGINEERING

ELECTIVE: EMBEDDED CONTROL SYSTEM

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Define Scalable property of z- Transform
- 2 What is quantization noise?
- 3 What is Bode design approach?
- 4 Define transducer.
- 5 Mention any four types of pressure sensors.
- 6 What is DC gain?
- 7 What is describing function analysis?
- 8 Mention the differences in fixed point representation over continuous representation.

- 9 What is the use of quantization gain effects in the system?
- 10 What is an Edge triggered interrupt?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Explain how linear approximation is used to solve the non-linear control problems with examples.

OR

- b. Discuss about the control of LED intensity with PWM timer.

- 12 a. Discuss in details about determination of stability in control system using Nyquist Plot.

OR

- b. Briefly explain the different methods used to analyze Control System

- 13 a. Discuss about testing done in Embedded control system

OR

- b. Explain about fixed point representation in the controller implementation

- 14 a. Discuss about various consideration in choosing sampling period in discrete time controllers.

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OR

b. Explain how software plays an important role in Controls system.

15 a. Explain the resource issues in controller and processor in implementing control system

OR

b. Discuss about single channel data acquisition system.

16 a. Discuss about multi-channel data acquisition system.

OR

b. Explain in detail about various specification of sensor or transducer system.

17 a. Explain in detail about photo electric sensors.

OR

b. Discuss in detail about the properties of Z-Transform

18 a. Explain about the process of quantization.

OR

b. Explain about different load cells used in force sensors.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Explain the process of designing controller for complex system with suitable example.

OR

b. Discuss in details about the test involved in embedded control system whether the design is acceptable for their intended use.

20 a. With the necessary block diagram explain about microcomputer based data acquisition system

OR

b. Illustrate the anatomy of control system.

SL.NO:1009

SL.NO:1009

SUBJECT CODE:17ECEC30

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB - 2022
ELECTRONICS AND COMMUNICATION ENGINEERING

ANALOG COMMUNICATION SYSTEMS

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Recall the need for modulation
- 2 Define Phase modulation
- 3 Define mutual information and state its properties
- 4 Restate Entropy
- 5 Define QPSK.
- 6 Tell the reasons for the use of spread spectrum systems
- 7 Draw the Phasor diagram for AM with carrier wave
- 8 Draw the circuit diagram of Varactor diode modulator for FM generation
- 9 Tabulate the difference between Natural and Flat top sampling
- 10 Mention few advantages of Frequency hopping systems.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Categorize various channel characteristics in wireless communications
OR
b. Apply the Phase shift method for generating SSB-SC signal with neat sketch
- 12 a. Illustrate how message signal can be recovered by means of Synchronous detection
OR
b. Derive the expression for Frequency Modulated Wave and also draw its graphical waveform.
- 13 a. A 107.6 MHz carrier signal is frequency modulated by a 7 KHz Sine wave. The resultant FM signal has frequency deviation of 50 KHz. Measure the following
(i) Carrier swing of FM signal (ii) Highest and Lowest frequencies attained by modulated signal (iii) Modulation index of FM signal.
OR
b. Illustrate the of principles and operation of binary PCM system with neat diagram
- 14 a. Illustrate the generation of Amplitude Shift keying signals with neat diagram.

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OR

b. Illustrate the principles behind the Transmission and Reception of FHSS system

15 a. Discuss in detail about the Filter method of SSB generation

OR

b. Discuss in detail about Indirect method (Armstrong) of FM generation with block diagram.

16 a. Differentiate between PAM, PPM and PCM

OR

b. Compare and contrast various parameters of different Digital Modulation techniques

17 a. With neat diagram explain in detail about Time Division Multiplexing system.

OR

b. Compare and contrast Digital carrier transmission system over Baseband signal transmission.

18 a. Discuss in detail about properties of Maximum length sequences.

OR

b. Explain in detail about TDMA with a case study

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Derive the expression for AM & calculate its Power and Efficiency.

OR

b. With neat diagram explain about transmitter and receiver section of BPSK signals

20 a. In a FSK system following data are observed : Transmitter binary data rate = 2.5×10^6 bits/sec, PSD of zero mean AWGN = 10^{-20} watts/hertz, Amplitude of received signal in the absence of noise = 1 microvolt. Determine the average Error probability of symbol assuming coherent detection.

OR

b. Summarize the operation of Frequency Hop spread spectrum with the help of block diagram.

SL.NO:1009

SLNO:10004

SUBJECT CODE:17ECSE03

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB- 2022
ELECTRONICS AND COMMUNICATION ENGINEERING
ELECTIVE- EMBEDDED SYSTEM ARCHITECTURE

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 What are the various types of memory in embedded systems?
- 2 What are the logical components of I/O graphics on an embedded board?
- 3 List any 4 examples of embedded system
- 4 What is a Transistor?
- 5 Define Baud rate.
- 6 List the functions of a kernel.
- 7 Explain Assembler
- 8 Implement the AND logic gates using MOS
- 9 Draw the structure of 6 transistor SRAM cell
- 10 What is an interrupt?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Illustrate the process of converting an C program into ROM image
OR
b. Elucidate the construction, working principle and applications of the Diodes used in active building blocks.
- 12 a. Discuss about the BUS performance.
OR
b. Draw a timing diagram of an I²C Bus START and STOP condition in detail.
- 13 a. Elaborate the working principle of Application software and networking protocols
OR
b. Give the block diagram of Analog TV board example with controller ISA implementations.
Explain
- 14 a. Write note on bus arbitration schemes.

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OR

b. Explain the components of exemplary embedded systems

15 a. Discuss about the features of powering the hardware.

OR

b. Explain the working of the Transistors.

16 a. Describe the working of Ampro's Encore 400 board.

OR

b. Describe the working of Board example with datapath ISA implementation—digital cellphone with the help of a block diagram

17 a. Explain the concept of Internal Processor Design.

OR

b. Draw and explain the Serial I/O – RS232 & IEEE 802.11.

18 a. With a network diagram explain the SMTP.

OR

b. Elucidate the HTTP.

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Explain ROM and its various types.

OR

b. With a neat block diagram interpret each function of General OS model.

20 a. Explain about the advanced architecture.

OR

b. Explain in detail about Middleware within the Embedded Systems Model

SLNO:10004

SL NO:10003

SUBJECT CODE:17ECCC22

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB- 2022
ELECTRONICS AND COMMUNICATION ENGINEERING

EMBEDDED SYSTEMS

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

- 1 Name the classification embedded systems based on and performance requirements
- 2 Give the size of ARM flash memory
- 3 State the special features on SHARC?
- 4 What are task operations?
- 5 List the main components of an embedded system.
- 6 What are the interrupts in PIC microcontroller?
- 7 State about CAN bus? Where is it used?
- 8 Write about SHARC
- 9 Compare Parallel and Serial communication with examples
- 10 What is mean by Real time?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

- 11 a. Explain the need of IPs during a VLSI Design

OR

b. Elaborate the architecture of CAN with necessary sketches.
- 12 a. Name of the embedded hardware units and device in a system .

OR

b. Discuss the ARM Cortex M3 Processor .
- 13 a. Illustrate the main ideas and challenge of multi-tasking and real time.

OR

b. What do you mean by system on chip (soc)? How will the definition of embedded systems change with system on chip (soc)?
- 14 a. Describe design process for an Automatic chocolate vending machine .

OR

b. Explain interrupts handling in PIC microcontroller.

p.t.o

2

15 a. Explain the Instruction format in PIC microcontroller.

OR

b. Enumerate on (i) Interrupt service routine in PIC. (ii) I/O port expansion in PIC

16 a. Discuss the ARM Instruction Set

OR

b. In accordance to ARM processor , write in detail about
(i)The exceptions and its associated modes (ii)Exception Priorities

17 a. Explain how serial data communication is preferred in I2C bus and CAN bus

OR

b. Discuss the features of Parallel communication protocols

18 a. Simplified flow diagram of the Derbot light-seeking program

OR

b. Write briefly on the special features Scheduling and the scheduler

Answer ALL questions

PART-C (2 x 15 = 30)

19 a. Describe the services of The limits of sequential programming when multi-tasking

OR

b. Explain the interrupt structure of PIC(16F877) microcontrollers with neat sketch

20 a. Explain the important ARM Features

OR

b. Explain the terminologies Prioritised pre-emptive scheduling

SL NO:10003