Enrollment No……

Master of Technology
First Semester Main Examination, Dec-2020
Advanced Mathematics [MTDC101]

Time: 3:00 Hrs **Max Marks 70**

Note : Attempt any five questions out of eight.
All questions carry equal marks.
Assume suitable data if necessary and state them clearly.

Q.1 Show that the geodesics on a plane are straight lines.

Q.2 Express $f(x) = x^4 + 3x^3 - x^2 + 5x-2$ in terms of Legendre polynomials.

Q.3 Solve in series the equation $9x(1-x)\frac{d^2-1}{dx^2} - \frac{12dy}{dx} + 4y = 0$

Q.4 A tightly stretched string of length *1* with fixed ends is initially in equilibrium position. It is set vibrating by giving each point a velocity $v_o \sin^{3217c}$. Find the displacement y(x,t)

Q.5 A covariant tensor has components $2x - z, x^2 y, yz$ in Cartesian co-ordinate system find its components in spherical co-ordinates.

Q.6 Explain Markov Chain.

Q.7 Define Rank and Nullity of a Linear Transformation.

Q.8 Show that the Velocity of a Fluid at any point is Covariant Tensor of order 1.

Enrollment No……

Master of Technology
First Semester Main Examination, Dec-2020
Mobile and Wireless Communication [MTDC102]

Time: 3:00 Hrs **Max Marks 70**

Note: Attempt any five questions out of eight.
All questions carry equal marks.
Assume suitable data if necessary and state them clearly.

Q.1 (a) Explain the features of IS-136 the North American TDMA.

(b) Explain different types of digital cellular system.

Q.2 (a) Explain the features of PDC the Japanese TDMA

(b) Differentiate between 2G and 3G in details.

Q.3 (a) Explain briefly about EDGE technology and its application.

(b) Explain the features of W-CDMA with diagram and its uses.

Q.4 (a) Explain the features of TD-SCDMA with diagram and its uses.

(b) Explain different types of cellular technology.

Q.5 (a) Explain fundamental of equalization? Describe algorithm for adaptive equalization?

(b) Explain RAKE receivers. Explain fundamentals of channel coding

Q.6 (a) Define intelligent cell concept and its application.

(b) Explain features of microcell system

Q.7 (a) Explain CDMA cellular radio network.

(b) Define antenna and explain its characteristic. Explain types of antenna used cellular mobile communication.

Q.8 (a) Explain steps of designing of directional antenna in cellular system. Design Omni directional antenna.

(b) Define the following term

(i)Mobile switching center

(ii)TDM

(iii)COMA

Enrollment No……

Master of Technology
First Semester Main Examination, Dec-2020
Microcontroller System Design [MTDC103]

Time: 3:00 Hrs **Max Marks 70**

Note: Attempt any five questions. All questions carry equal marks. Assume suitable data if necessary and state them clearly.

Q.1 **(a)** What is microcontroller based embedded system? Elaborate with example.

(b) How can interface a 4 X 4 keypad with single port of microcontroller.

Q.2 **(a)** What is compiler and cross compiler, differentiate with example.

(b) Explain the working of vending machine and uses of microcontroller in it.

Q.3 **(a)** How analog and digital signals work together in DSP.

(b) Explain the single chip microcontroller architecture.

Q.4 **(a)** What should be the criteria for selecting an appropriate microcontroller?

(b) What do you mean by integrated software development environment?

Q.5 **(a)** How we can interface ADC with 8051? Write the handshaking sequence for Establishing connection between 8051 and ADC.

(b) Write down the application and types of microprocessor.

Q.6 **(a)** Explain SCON SBUF, TCON and TMOD register of microcontroller.

(b) Elaborate memory architecture of 8051 microcontroller. Also elaborate the uses of bit addressable of RAM.

Q.7 **(a)** What is the initialization command for 16X2 LCD with microcontroller?

(b) Explain in detail architecture of 16 bit microprocessor.

Q.8 Write short note on – (any three)

(i) Need of Digital signal processor

(ii) Interfacing I/O using decoders

(iii) Shared RAM

(iv) Files with extension '.asm' '.obj' '.

Enrollment No……

Master of Technology
First Semester Main Examination, Dec-2020
Digital Signal Processing & Its Application (MTDC-104)

Time: 3:00 Hrs **Max Marks 70**

Note: Attempt any five questions.
All questions carry equal marks.
Assume suitable data if necessary and state them clearly.

Q.1 Discuss about Blackman window function and give all the steps of design of FIR filter using Blackman window.

Q.2 Find the DFT of the following discreate time sequence.
S(n)={1, -1, -1, -1, 1, 1, 1, -1}
Using Radix-2 Decirmation In time (DIT) FFT algorithm

Q.3 (a) Estimate power density spectrum. Explain.
(b) Write the difference between recursive and non recursive system.

Q.4 (a) State and prove the Time shifting properties of Z transform.
(b) How do you linear filtering by FFT using save odd method.

Q.5 (a) State and prove shifting properties of DFT.
(b) Discuss the round off effect in digital filter.

Q.6 (a) Write a short notes on quantization of filter coefficients.
(b) Discuss wavelet transform.

Q.7 (a) Discuss the designing the butter worth HR filter.
(b) Write the difference between Auto Covariance and cross covariance.

Q.8 (a) Determine the Z transform and ROC of the
$x(n) = n a^n u(n)$
(b) Convert the analog filter $H(s)=\frac{0.5(s+4)}{(s+1)(s+2)}$ using impulse invariant transform T=0.314165

Enrollment No……

Master of Technology
First Semester Main Examination, Dec-2020
Data Communication and Network Design (MTDC-105)

Time: 3:00 Hrs **Max Marks 70**

Note: Attempt any five questions. All questions carry equal marks. Assume suitable data if necessary and state them clearly.

Q.1 **(a) Differentiate between packet, circuit and message switching in brief.**
(b) Explain the difference between repeater, bridge, router and gateway.

Q.2 **(a) Explain different means of flow control.**
(b) What are the various ARQ retrains mission strategies?

Q.3 **(a) Explain go – back – n sliding window flow technique.**
(b) List out various features on HDLC. Clearly explain various response modes.

Q.4 **(a) What do you mean by virtual circuit and diagram? Explain in detail.**
(b) What is Routing? Explain any one routing algorithm briefly.

Q.5 **(a) Discuss various network topologies in detail.**
(b) What do you mean by FDDI? Explain in detail.

Q.6 **(a) Draw and explain TCP header format.**
(b) Describe ATM and Frame relay with suitable diagram and description.

Q.7 **(a) What is Null Mode?**
(b) Explain the different type of switching technique?