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# T.E. (Electronics and Telecommunication) (Semester - VI)

## Examination, May - 2019

## MICROPROCESSOR & MICROCONTROLLER

### Sub. Code: 66918

**Day and Date : Friday, 17- 05 - 2019** **Total Marks : 100**

**Time : 10.00 a.m. to 1.00 p.m.**

**Instructions :** 1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**
3) **Assume suitable data if necessary.**

**Q1)** Attempt any two of the following : **[2×8=16]**

a) Draw and Explain interrupt structure of 8085.

b) Explain various addressing modes of 8085 with two examples each.

c) Draw and Explain Functional Pin diagram of 8085.

**Q2)** Attempt any two of the following : **[2×8=16]**

a) Differentiate between Memory mapped I/O and I/O Mapped I/O.

b) Interface ADC 0809 to 8085 using 8255 and write a program to convert analog voltage to digital value which is connected to channel 5.

c) Draw and Explain Block Diagram of 8255.

**Q3)** Attempt any two of the following : **[2×9=18]**

a) Draw and Explain PSW of 8051 and also explain Reset circuit and oscillator circuit of 8051.

b) Explain various Bit Manipulation Instructions with examples in 8051.

c) Draw and Explain Functional Pin out diagram of 8051.



***P.T.O.***

**Q4)** Attempt any two of the following : **[2×8=16]**

a) Draw and Explain block diagram of mode 0 of timer I in 8051. Draw the format of TMOD SFR.

b) Explain various modes of operation of serial por 1 in 8051. Explain PCON register in detail.

c) Explain in detail the alternate functions of port 3. Draw the internal structure of any port of 8051.

**Q5)** Attempt any two of the following : **[2×8=16]**

a) Draw the interfacing diagram of DAC 0808 to 8051. Write a program to generate trapezoidal waveform.

b) Interface 8k×8 ROM to 8051 using memory chips of 8k×4 capacity. Write the use of each pin used for interfacing. Also mention the start and end address of the memory.

c) Draw interfacing diagram of four LED interfacing in Common Cathode mode to any port. Write a program to flash all LEDs.

**Q6)** Attempt any two of the following : **[2×9=18]**

a) Write an embedded C program to generate a square wave of 1 KHz on pin P1.0 of 8051 using Timer 0.

b) Write the various data types available in embedded C along with their size. Also write an embedded C program for 8051 to generate any delay.

c) Explain how logical operations can be performed using embedded C statements with suitable example.

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# T.E.(E & TC) (Semester - V)Examination, May - 2019
## DIGITAL COMMUNICATION
## Sub. Code : 66318

**Day and Date :Wednesday, 08 - 05 - 2019.** **Total Marks :100**
**Time : 2.30 p.m. to5.30 p.m.**

Instructions :
1) All questions are compulsory.
2) Use of non programmable calculator is allowed.
3) Neat diagrams must be drawn whenever necessary.
4) Figures to the right indicate full marks.

## SECTION-I

**Q1)**Solve any three **[18]**

a) What is an Ergodic process? What is difference between Ergodic & Stationary process?

b) Define probability & properties of probability

c) Write short notes on :

i) Gaussian distribution

ii) Binomial distribution

d) The PDF of Random variable is given by $f_x(x) = e^{-3x}$ for $x \geq 0$ find the probability that X will be in the range 1 to 4.

**Q2)** Solve any two. **[16]**

a) Derive expression for Joint and conditional entropy.

b) With an example explain the Shannon Fano coding

c) Apply the Huffman coding procedure for the following message ensemble.

$[X] = [X_1 X_2 X_3 X_4 X_5 X_6 X_7]$ with respective probabilities.

[P] = [0.4 0.2 0.12 0.08 0.08 0.08 0.04]. Take M=3. Determine code efficiency.



*P.T.O.*

**Q3)** Solve any two. **[16]**

a) Explain PCM with neat block diagram? What is companding in PCM?

b) Explain Adaptive delta modulation?

c) Explain mid tread and mid rise quantizer, with suitable figure.

## SECTION-II

Q4) Attempt any two. **[2×8 = 16]**

a) Draw and explain QPSK signaling scheme.

b) Draw and explain eye diagram.

c) Compare line coding techniques.

**Q5)** Attempt any two **[2×8 = 16]**

a) Draw and explain scrambler and unscramble implementation using shift register structure..

b) Explain optimum detection using ML criteria.

c) Discuss coherent detection schemes in ASK, FSK and PSK.

**Q6)** Attempt any two **[2×9 = 18]**

a) For a systematic linear bock code the three parity check digits $C_4$, $C_5$, $C_6$, are given by $C_4 = d_1+d_3$, $C_5=d_2+d_3$, $C_6=d_1+d_2+d_3$

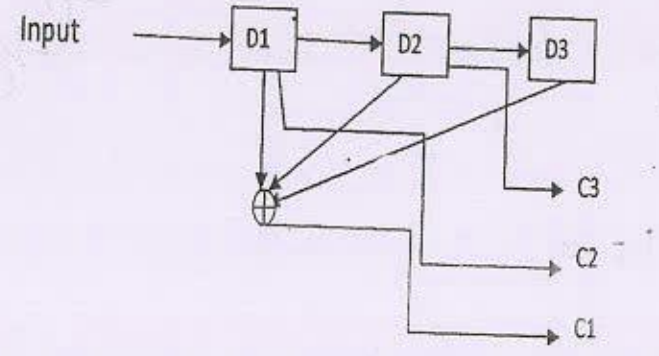
i) Construct parity check matrix.

ii) Prepare suitable decoding table.

iii) Find syndrome and decode the received words 101111 and 101110.

b) A Generator polynomial of a (7,4) cyclic code is $g(x) = 1+x+x^3$ then find systematic and non-systematic codeword for data vector (1011).

c) For convolution encoder shown in figure sketch the code tree and determine the output digit sequence for the data digits 1100.



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# T.E. (Electronics and Telecommunication) (Semester - V)
## (Revised) Examination, April -2019
## CONTROL SYSTEMS
## Sub. Code : 66315

**Day and Date : Saturday, 27 - 04 - 2019** **Total Marks : 100**

**Time : 2.30 p.m. to 5.30 p.m.**

**Instructions :**
1) **All Questions are compulsory.**
2) **Assume data wherever necessary.**
3) **Figures to the right indicate full marks.**

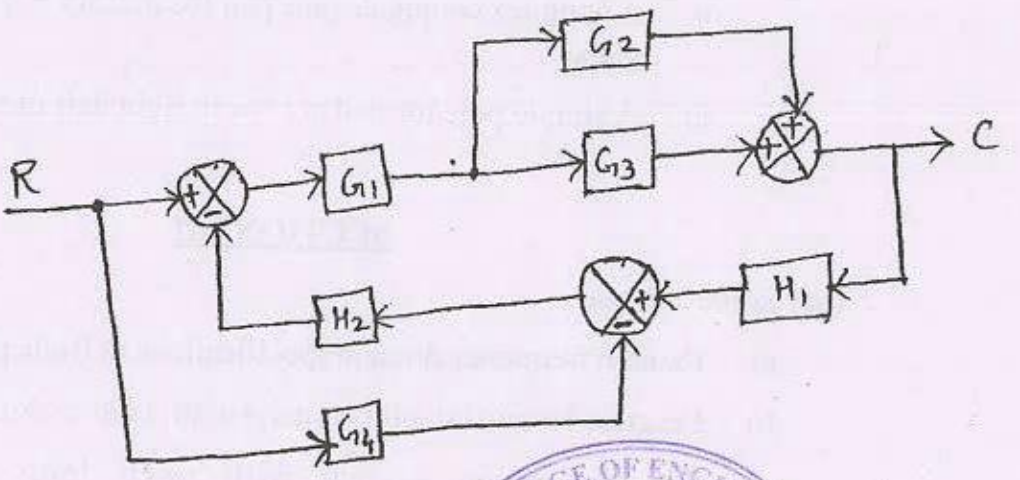
## SECTION - I

**Q1)** Solve any TWO. **[2×9=18]**

a) Derive transfer function of field controlled DC motor.

b) Define Mason's gain formula and using it explain the procedure for solving signal flow Graph.

c) Draw a signal flow graph and evalute the closed loop transfer function of a system whose block diagram is given below.






*P.T.O.*

**2)** Solve any two. **[2×8=16]**

a) Derive steady state error constant for type 0 and type 1 system.

b) For unity feedback system $G(s)=\frac{60}{s(s+10)}$

Determine

i) Type of system.

ii) Steady state error constant.

iii) Steady state error if input is r(t) = 8t

c) Derive relation for impulse response of unit step and ramp for first order system.

**3)** Solve any two. **[2×8=16]**

a) State and explain Hurwitz and Routh Criteria.

b) For unity feedback system $G(s)=\frac{K}{(s+1)^3(s+4)}$

i) Find range of K for stability.

ii) Find frequency of oscillations when system is marginally stable.

c) Explain the effect of location of poles on stability in case of

i) A complex conjugate pole pair located at s = -a ± jb in left half of S plane.

ii) A simple pole located at s = a in right half of S plane.

## SECTION - II

**Q4)** Solve any two **[2×9]**

a) Explain frequency domain specifications in Bode plot.

b) Describe Nyquist stability criteria with suitable example.

c) For the given system with open loop transfer function $G(s)H(s)=\frac{10}{s(s+1)(s+10}$ determine stability of the system by Bode plot.



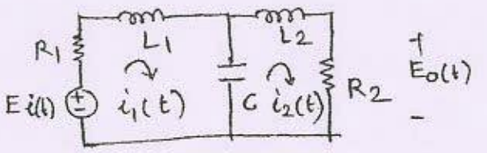


**5)** Solve any two. **[2×8]**

a) Derive state model of linear system.

b) Derive state equations from transfer function of linear continuous time system.

c) Derive state model for the given RLC ciruit.




**)6)** Solve any two. **[2×8]**

a) Explain lag compensator with advantages and limitations.

b) Write short note on PID controller.

c) Define polar plot and sketch plot for unity feedback with open loop system below $G(s)H(s)=\frac{1}{s(s+2)}$.

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# T.E. (Electronics & Telecommunication)(Semester -V)(Revised) Examination, May - 2019
## SIGNALS AND SYSTEMS
## Sub. Code : 66316

**Day and Date : Friday, 3 - 05 - 2019.** **Total Marks : 100**
**Time : 2.30 p.m. to 5.30 p.m.**

**Instructions :**
1) **All questions are compulsory.**
2) **Figures to right indicates full marks.**
3) **Assume suitable data if required.**

**Q1)** Attempt any two. **[16]**

a) Explain classification of signals.

b) Plot following signals x [n]={1, 1, 1, 1, 1, 1/2}

i) x[4-n]

ii) x[2n+1]

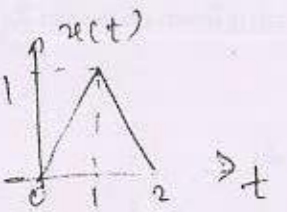
iii) x[n] u[2-n]

iv) x[n-1] $\delta$ [n-3]

c) Determine even and odd part of following signals.

i) x [n]={-1, 2, 2, 1, 1, 2, 1, -1,}

ii) x(t) =




*Q2)* Attempt any two. **[18]**

a) i) Check whether the following systems are invertible?

1) y(t) = x(t-4)

2) y[n]= nx[n]



*P.T.O.*

ii) Check the following systems for linearity?

1) $Y(t) = x(t/2)$

2) $Y[n] = x[n] + x[n-1]$

b) Find convolution of two sequences.

$x[n] = 2$ for $-2 \le n \le 2$ $\quad$ $Y[n] = 4$ for $0 \le n \le 2$

$= 0$ Elsewhere $\quad$ $= 0$ Elsewhere

c) Find convolution of two sequences.

$x(t) = 1$ for $0 \le t \le 1$ $\quad$ $Y(t) = t$ for $0 \le t \le 2$

$= 0$ Elsewhere $\quad$ $= 0$ Elsewhere

*Q3)* Attempt any two. **[16]**

a) Explain singularity function and construct the block diagram for the system for following Equation.

$y(t)+ady(t)/dt=b0x(t)+b1dx(t)/dt$

b) Explain interpolation techniques.

c) Explain effect of under sampling and aliasing.

*Q4)* Solve any two. **[16]**

a) Determine the Z- transform of the following signals & sketch region of convergence.

i) $x(n) = n^2u(n)$

ii) $x(n) = \left(\frac{1}{2}\right)^n \{u(n) - u(n-10)\}$

b) Determine the inverse Z-transform of given X(z), using P.F.E. method.

$$X[Z] = \frac{(4Z^2 - 2Z)}{(Z^3 - 5Z^2 + 8Z - 4)}$$

c) Determine x[n] using residue method.

$$X[z] = \frac{10Z}{(Z-1)(Z-2)}$$





*Q5)* Solve any two. **[18]**

a) Find the trigonometric Fourier series for the periodic signal m(t) shown in Fig. 5.a. $m(t) = t$ for $-1 \le t \le 1$.

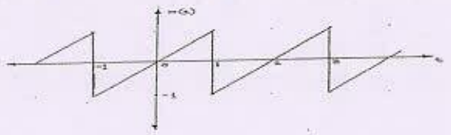


fig.5.a

b) Find the exponential Fourier series for the following signal.

$x(t) = \cos(\Omega_0 t)$ for $-\frac{\pi}{2} < t < \frac{\pi}{2}$

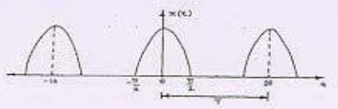


Fig. 5.b.

c) Explain properties of Fourier series.

*Q6)* Solve any two. **[16]**

a) Find the Fourier transform of the signal $x(t) = \cos(\Omega_0 t)$. Also sketch the magnitude & phase spectrum.

b) Find the Fourier transform of the signal given below. Also sketch magnitude & phase spectrum.

$m(t) = e^{-|t|}$

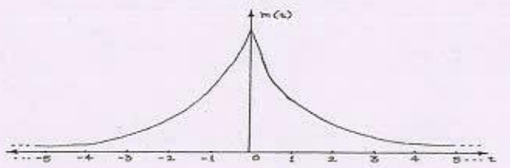


Fig. 6.b.

c) Explain properties of Fourier Transform.

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# T.E. (E & TC) (Part - III) (Semester - V)
## Examination, May -2019
## POWER ELECTRONICS
## Sub. Code : 66317

**Day and Date : Monday, 6 - 05 - 2019** **Total Marks : 100**

**Time : 2.30 p.m. to 5.30 p.m.**

**Instructions :**
1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**
3) **Assume suitable data wherever if necessary.**

## SECTION - I

**Q1)** Solve any two. **[16]**

a) Draw and explain the output characteristics of n-chanel MOSFET.

b) What is the necessity of connecting SCR's in series? What are the problems associated with series connections of SCR. How are they eliminated?

c) Draw a neat circuit diagram of TRIAC light dimmer & Draw the waveforms of $\alpha = 0°$ and $\alpha = 90°$.

**Q2)** Solve any two. **[16]**

a) Draw and explain circuit diagram for synchronised VJT triggering.

b) Describe different turn-off methods of SCR? Explain class-C commutation method with waveforms.

c) Explain in detail the power ratings of SCR.



*P.T.O.*

Q3) Write notes on any three. [18]

a) $\frac{dv}{dt}$ & $\frac{dI}{dt}$ protections:

b) IGBT

c) PUT

d) Comparism between 1-ϕ ϕ 3-ϕ Rectifiers

e) Resonant Turn-off

## SECTION - II

Q4) Solve any two. [16]

a) With the help of neat circuit diagram and waveforms explain briefly the operation of 3-ϕ bridge inverter.

b) List different voltage control and prism techniques used in 1- θ inverter.

c) A step down chopper has resistive load of R=10-Ω & input voltage v=200v. The chopper frequency is 1KHz if the duty cycle is 50% calculate.

i) Average output voltage

ii) RMS output voltage

iii) Chopper efficiency

iv) Effective input resistance

Q5) Solve any two. [16]

a) With the circuit diagram and output waveforms, explain the principle of operation of step-down chopper.

b) With block diagram, explain operation of PLC.

c) With block schematic, explain operation & applications of Induction heating.





Q6) Write notes on any three. [18]

a) Zero Voltage Switch

b) UPS

c) Jones chopper

d) Harmonic elimination in Inverter.

e) Ladder diagram with example.

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# T.E. (E & TC) (Semester - V) Examination, April - 2019
## ANTENNA AND WAVE PROPAGATION
### Sub. Code: 66314

**Day and Date : Thursday, 25 - 04 - 2019** **Total Marks : 100**

**Time : 2.30 p.m. to 5.30 p.m.**

**Instructions :**
1) **All questions are compulsory.**
2) **Figures to right indicate full marks.**
3) **Use of non programmable calculator is allowed.**
4) **Assume suitable data if necessary.**

## SECTION - I

**Q1)** Attempt any two. **[16]**

a) With the help of neat figure explain propagation of an electric field lines and its radiations from oscillating dipole.

b) Two spacecrafts are separated by 100 mm. Each has an antenna with D = 1000 operating at 2.5 GHz. If craft A's receiver required 20dB over 1pW, what transmitter power is required on craft B to achieve this signal level.

c) The normalised radiation intensity of antenna is given by

i) $U = \sin\theta \sin\phi$

ii) $U = \sin\theta \sin^2\phi$

iii) $U = \sin\theta \sin^3\phi$

iv) $U = \sin^2\theta \sin\phi$

$(0 \le \theta \le \pi;\ 0 \le \phi \le \pi)$ and zero elsewhere, consider $U = P(\theta, \phi)$

Find Directivity in dB, exact and approximate.

**Q2)** Attempt any two of the following. **[16]**

a) Derive equation for normalised electric field due to linear array of n-isotropic point sources of equal amplitude and spacing.

b) What is frequency independent antenna? Explain Rumsey's principle. Draw and explain conical spiral antenna.

c) Draw and explain infinite and finite biconical antenna.



*P.T.O.*

)3) Attempt any two of following. [18]

a) What is antenna impedance? Give experimental set up of antenna impedance measurement using.

i) Wheatstone's Bridge method.

ii) Slotted line method.

b) With neat diagram, explain construction characteristics, application and limitations of microstrip patch antenna.

c) Design a rectangular microstrip antenna to resonate at 9 GHz using a substrate with dielectric constant of 2.56 and height of 0.125 cm.

## SECTION - II

)4) Attempt any two. [16]

a) Differentiate between three different wave propagation mechanisms.

b) Explain in detail wave tilt of ground waves.

c) MTI RADAR operates at 5 $GH_2$ with PRF of 800 PPS, calculate lowest three blind speed of RADAR.

)5) Attempt any two. [16]

a) A transmitter is operating at a frequency of 1.7 $MH_2$ is required to provide a ground wave field strength of 0.5 mV/m at a distance of 10 KM. A short vertical transmitting antenna has an efficiency of 50%. The conductivity of ground is $5 \times 10^{-5}$ (mho/cm) and its relative permittivity is 10. Find transmitted power required.

b) With the help of geometry of direct and ground reflected waves, obtain the equation for reflection factor for horizontal and vertical polarization.

c) Explain following terms:

i) Vertual height.

ii) Critical frequency.

iii) MUF.





)6) Attempt any two. [18]

a) With the help of block diagram explain operation of FM-CW RADAR.

b) A communication system is tube established at a frequency of 60 MHz with transmitter power of 1kW. The field strength of directive antenna is 3 times that of a half-wave antenna. Ht = 50 m, hr = 5 m. A field strength of 80μV/m is required to give satisfactory reception. Find range of the system.

c) Explain faraday's Rotation and measurement of total electron density.

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