Roll No.....

7438

B.E. 2nd Year EXAMINATION APRIL- 2017
BE(CBCS), E&Tc (A &B)
ETR4C2: Electrical and Electronic measurement

Duration: 3 Hours

Max Marks : 100
Min Pass Marks: 35

NOTE: Attempt any Two parts out of Three in each question. Take suitable assumption where needed.

Q.1	A	Define the terms" indicating instruments", "recording instruments and "integrating instruments". Give examples of each case.	06
	B	Explain accuracy, precision, sensitivity, resolution, dead zone and dead time. Give examples.	06
	C	0-15v voltmeter has a guaranteed accuracy of 1 percent of full scale reading. The voltage measured by this instrument is 75v. Calculate the limiting error in percent. Comment upon the result.	06
Q.2	A	Sketch and explain the working of hot-wire instrument.	06
	B	With a neat diagram explain in detail the construction of PMMC instrument.	06
	C	Which method is suitable for three phase power measurement? Explain it in (star connection or delta connection).	03×2
Q.3	A	Explain the construction and working of dry-dale polar type potentiometer.	06
	B	An AC bridge is balanced at 2KHz with the following components in each arm: Arm AB=10KΩ, Arm BC=100μF in series with 100KΩ, Arm AD=50KΩ. Find the unknown impendence R±jX in the arm DC, if the detector is between BD.	06
	C	Explain the working of Q-meter. Give its suitable application.	06
Q.4	A	Explain with neat diagram about different blocks of CRO. Also explain about different CRO probes.	06
	B	How phase, frequency, time period, voltage and current can be measured by CRO? Explain Lissajous pattern and how it is useful in measurement.	06
	C	With neat diagram explain the construction and working of CRT.	06
Q.5	A	With block diagram explains the operation of "Ramp type' digital voltmeter.	06×2
	B	With block diagram explain the operation of "function generator' digital voltmeter.	
	C	Write short notes on Signal generator.	

EXAM Roll No. 15T4048

7713

B.E. II Examination April May 2017
Electronics & Telecommunication Engineering(A&B)
ETR4G2 Signals and Systems

Duration: 3Hrs. **Max. Marks: 60**

Note: 1. Attempt all five questions. Every question has three parts attempt any two parts of each question.
2. Make suitable assumptions if necessary.
3. All parts of a question should be attempted in sequence.

Q.1(a)(i) Sketch the following signals. 3
$x_1(t) = r(t+2)-2r(t)+r(t-2)$
$x_2(t) = \pi((t-4)/2)$
$x_3(t) = r(t)u(2-t)$

Q.1(a)(ii) Evaluate the following integral 3
$\int_{-\infty}^{\infty} ((t^2 + \cos(\pi t))\, \delta(t-1) + e^{-t}\delta'(t))dt$

Q.1(b)(i) Which of following signals are power signals and which are energy signals. 2
$x_1(t) = u(t)+5u(t-1) - 6u(t-2)$
$x_2(t) = (e^{-6t} + 1)\, u(t)$

Q.1(b)(ii) A system is defined by following input-output relationship. 2
$y(t) = 15.x(t+3) +6$
Determine that system is linear or non-linear. Causal or non-causal.

Q.1(b)(iii) Sketch the single sided as well as double sided amplitude and phase spectra of following signal. 2
$x(t) = 6\sin(30\pi t - \pi/4)$

Q.1(c) Find and sketch the convolution of following two signals. 6
$x(t) = \pi[(t-1)/2]$, $h(t) = u(t-10)$

Q.2(a) (i) Determine the complex exponential Fourier series of following signal. 3

$$x(t) = A \quad 0 < t \leq T_0/2$$
$$= 0 \quad T_0/2 < t \leq T_0$$

with $x(t) = x(t+T_0)$ for all t.

Q.2(a)(ii) Determine the trigonometric Fourier series of following signal. 3

$$x(t) = A \quad -T_0/4 < t \leq T_0/4$$
$$= -A \quad -T_0/2 < t \leq -T_0/4 \text{ and } T_0/4 < t \leq T_0/2$$

with $x(t) = x(t+T_0)$ for all t.

Q.2(b) (i) Find the Fourier transform of rectangular pulse defined by 3

$$p_a(t) = 1 \quad |t| < a$$
$$= 0 \quad |t| > a$$

Q.2 (b)(ii) Find the Fourier transform of following signal. First determine the Fourier transform of $e^{-a|t|}$ for a>0. Then use appropriate theorem. 3
$x(t) = 1 / (a^2 + t^2)$

P.T.O.

Q.2 (c) Consider a continuous-time LTI system described by 6

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

Determine the output y(t) using Fourier transform for $x(t) = e^{-2t}u(t)$

Q.3(a) Determine the Laplace transform of u(t). Then using different properties and transform of u(t) determine the Laplace transform of following signals. 6

(i) $te^{-at}u(t)$ (ii) $e^{-at}\cos(\omega_0 t)u(t)$

Q.3(b) Find the inverse Laplace transform of following: 6

(i) $X(s) = (5s+13)/[s(s^2+4s+13)]$

(ii) $X(s) = (7s^2+15s+10)/[(s+1)^2(s+3)]$

Q.3(c) For a given system $h(t) = (1/RC)e^{-t/RC}u(t)$ and input $x(t) = u(t)$ 6 determine the output of the system in time domain using Laplace transform.

Q. 4 (a) Explain the time domain solution of state equations using recursive relation. 6

Q. 4 (b) Compute state transition matrix (e^{At}) for the following matrix A using Laplace transform method. 6

$$A = \begin{bmatrix} -2 & 0 \\ 0 & -5 \end{bmatrix}$$

Q.4 (c) Compute state transition matrix (e^{At}) for the following matrix A using Caley-Hamilton approach. 6

$$A = \begin{bmatrix} 0 & 1 \\ -4 & -5 \end{bmatrix}$$

Q.5 (a) Find the z-transform of following signals. 6

(i) $(nT)e^{-anT}$ (ii) $e^{-anT}\cos(bnT)$ for $n \geq 0$

Q.5 (b)(i) Find the Inverse z-transform of following 3

$X(z) = z / (2z^2-3z+1)$

Use any method.

Q.5(b) (ii) A causal discrete-time LTI system is described by 3

$y[n] - (3/4)y[n-1] + (1/8)y[n-2] = x[n]$

where x[n] and y[n] are input and output of the system respectively.

Q.5 (c) Determine the system function H(z) = y(z)/x(z) 6

Determine the convolution of following two sequences:

$x(nT) = \{1,2,2,1,1\}$, $h(nT) = \{3,2,1\}$

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Institute of Engineering & Technology, DAVV Indore

B.E. IInd Year (E&TC A&B)

Analog Electronics (ETR4C3)

TIME-3 Hr **MM-60**

Note: All questions are Compulsory and carry equal marks. Attempt any two from each question.

Q.1 a) Explain r_e transistor model for common Emmiter configuration & derive the expression for Av, Zo & Zi. (4)

b) Explain hybrid transistor model for common Emitter configuration & derive the expression for Av, Zo & Zi.

c) Explain Emitter follower & Darlington connection of transistor. (5)

Q.2 (a) Explain working principle of JFET & draw its drain & transfer Characteristics . (6)

b) Explain working principle of Enhancement type MOSFET with its drain and transfer Characteristics . (6)

c) Draw fixed bias & self bias configuration of FET & derive the expression for V_{GSQ} & I_{DQ}.

Q.3 a) Derive the expression for different cut off frequencies with respect to C_s , C_e & C_c for BJT. (4)

b) Derive the expression for different cut off frequencies with respect to parasitic & stray capacitance for BJT.

c) What are the effects of Miller capacitance on input and output region of BJT. (6)

Q.4 a) What is meant by negative feedback & write down its advantages. Explain voltage series feedback connection. (6)

b) Explain working of colpitts oscillator with circuit diagram. (5)

c) Draw circuit diagram & explain wein's bridge oscillator.

Q.5 a) Explain class A amplifier .

b) Explain class B amplifier with their push pull, center tap & complementary symmetry arrangement. (6)

c) Draw & explain voltage regulator with their types. (6)

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BE. II Examination April-May'2017
E&TC Engg.
ETR4C4: Analog Communication

Duration 3hrs **Max.Marks:60**

Note: All questions are compulsory. Attempt any two parts from each question

Q.1 (a) State and prove the following properties of Fourier transform- 6
(i) Time Shifting property
(ii) Frequency Shifting Property

(b) (i) State and prove the time convolution theorem. 6
(ii) prove the following relations:
(a) $f(t) \otimes \delta(t-b) = f(t-b)$
(b) $f(t-b) \otimes \delta(t-c) = f(t-b-c)$

(c) Show that the power density spectrum of a periodic function $f(t)$ with period T is given by 6

$$S_f(\omega) = 2\pi \sum_{n=-\infty}^{\infty} |F_n|^2 \, \delta(\omega - n\omega_0);\ \omega_0 = \frac{2\pi}{T}$$

Q.2 (a) Show that if every frequency component of a signal $f(t)$ is shifted by (-π/2) the resultant signal $f_h(t)$ is the Hilbert transform of $f(t)$. 6

(b) Explain Amplitude modulation with large carrier (AM) on the following points- 6
(i) Equation and waveforms
(ii) Bandwidth
(iii) Modulation index
(iv) Power content in AM signal

(c) Compare the various AM Systems on the basis of **transmitter, receiver, generation, bandwidth , transmission efficiency** and **noise performance**. 6

Q.3 (a) Write the difference between – 6
(i) Phase modulation and frequency modulation.
(ii) Narrowband FM and wideband FM.

(b) Design (only the block diagram) an Armstrong indirect FM modulator to generate an FM carrier with a carrier frequency of 96 MHz and Δf = 20 kHz. A narrow-band FM generator with f_c=200 kHz and adjustable Δf in the range of 9 to 10 Hz is available. The stock room also has an oscillator with an adjustable frequency in the range of 9 to 10 MHz. There is a bandpass filter with any center frequency, and only frequency doublers are available. 6

(c) A single tone FM signal is given by 6

$$e_{FM} = 10 \sin (16\pi \times 10^6 t + 20 \sin 2\pi \times 10^3 t)\ V$$

Find the **modulation index, modulating frequency, deviation, carrier frequency** and the **power** of the FM signal.

Q.4 (a) Explain High power level modulation AM transmitter with the help of block diagram and explain each block in detail. 6

(b) Explain Superheterodyne AM receiver with the help of block diagram and explain each block in detail. 6

(c) Consider a super heterodyne receiver designed to receive the frequency band of 1 to 30 MHz with IF frequency 8 MHz. what is the range of frequency generated by the local oscillator for this receiver? An incoming signal with carrier frequency 10 MHz is received at the 10 MHz setting. At this setting of the receiver we also get interference from a signal with some other frequency if the receiver RF stage bandpass filter has poor selectivity. What is the carrier frequency of the interfering signal? 6

P.T.O.

Q.5 (a) Write short notes on (any two) 6

i) Noise Bandwidth

ii) Shot Noise

iii) White Noise

(b) Determine figure of merit of frequency modulation system (for low noise case only). 6

(c) What are FDM and TDM? Compare the two. 6

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B.E. II YEAR EXAMINATION , April 2017
Electronics & Telecommunication/ Instrumentation
ETR4C1/ EIR4C1 : Computer Organization and Architecture

Time: 3 hours **Max. Marks: 60**

Note: All questions are compulsory. Attempt any two parts from each question.

Q.1	(a)	Differentiate between the terms computer 'Organization' and ' Architecture'. Describe different functional units of an IAS computer structure.	6	
	(b)	Describe processor operation after arrival of an interrupt. What are different strategies to deal with multiple interrupts ?	6	
	(c)	What is the benefit of using multiple bus hierarchy over single bus architecture ? Sketch a multiple bus architecture and describe the impact on computer system performance.	6	
Q.2	(a)	Which attributes of Memory components lead to form Memory Hierarchy in a computer system? Describe different ways of data access in Memories.	6	
	(b)	Discuss the impact of increasing Cache levels on computer system performance. Describe about Cache write policies used in computer system.	6	
	(c)	Describe with diagram HardDisk organization in computer system.	6	
Q.3	(a)	Draw an I/O module structure and describe its functions.	6	
	(b)	Draw the diagram for Daisy chain architecture and explain how an I/O is identified and served in such system. List its merit- demerits.	6	
	(c)	Describe in steps how data transfer takes place (i) without DMA and (ii) with DMA in a computer system.	6	
Q.4	(a)	What is the function of control unit ? Draw model of Hardwired control unit and describe its operational flow.	6	
	(b)	Write down the functions of the following signals used in 8085 microprocessor: ALE, HOLD, READY, RESET-OUT ,TRAP and IO/M.	6	
	(c)	Interface the 1024 byte RAM memory chip with 8085 processor. Sketch the diagram and give its memory address range (start to end address).	6	
Q.5	(a)	List the different addressing modes of 8085. Give explanation with examples.	6	
	(b)	Write a program to count continuously in hexadecimal from FFH to 00H with clock frequency of 2MHz. Use register C to set up a one millisecond delay between each count and display the numbers at output port 2.	6	
	(c)	For what purpose interrupt pins are used ? List the 8085 vectored interrupts with their call locations. Give the interpretation of accumulator bit pattern for SIM instruction and explain it.	6	

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B.E. II EXAMINATION APRIL-MAY 2017
E&TC/ E&I/ Mechanical Engineering
STR4S4/SER4S4/SMR4S4: Engineering Economics

Time: 3 Hrs.] **[Max. Marks:** 60

Note: Attempt any **TWO** parts from each Question. Each carries equal marks.

Q.1. (a) Explain the importance of microeconomics and describe the fields of economics in which it has been usefully applied. (06)

(b) Define demand for a commodity. Explain the various factors which determine demand for a commodity. (06)

(c) Colgate sells its standard size toothpaste for Rs. 25. Its sales have been on an average 8000 units per month over the past year. Recently, its close competitor Close-up reduced the price of its same standard size toothpaste from Rs. 35 to Rs. 30. As a result, Colgate sales declined by 1500 units per month. (06)

i. Calculate the cross elasticity between the two products.

ii. What does your estimate indicate about the relationship between the two.

Q.2. (a) What is law of supply? Why does supply curve generally slope upward to the right? *(06)*

(b) Explain how price is determined by demand for and supply of a commodity. Illustrate it with a diagram. *(06)*

(c) Initial supply of a commodity X at price Rs.25 is 10000 kgs. At price Rs. 30, the seller offered to sale 12 percent more. Is the supply highly elastic? *(06)*

Q.3. (a) Explain the laws of returns to scale. Show the three kinds of returns to scale and why do we get increasing returns to scale? (06)

(b) i. What is meant by opportunity cost? Is there any economic significance of it? (06)

ii. Explain the concepts of average cost, average variable cost and marginal cost. How are they related to each other? Illustrate them through curves.

(c) Given the following total cost and total revenue functions, determine the break-even output and price. (06)

$TC = 40 + 5Q + Q^2$

$TR = 65Q - Q^2$

Q.4. (a) Differentiate between following concepts of national income & relate each other. (06)

i) Gross National Product and Gross Domestic Product

ii) Disposable Income and Personal Income

(b) What is national income? Explain Income method to measure national income. (06)

(c) Below are the data from Indian economy, calculate (06)

i) Net National Product at market price

ii) Net National Product at factor cost

iii) Gross Domestic Product at factor cost

(PTO)

	(Rs. in Crore)
Gross National Product at factor cost	36,452
Indirect taxes	3,864
Subsidies	337
Depreciation	2,217
Net factor income from abroad	(-)1,805

Q.5. (a) What is meant by discretionary fiscal policy? How does it differ from the fiscal policy of automatic stabilizers? (06)

(b) Explain the role of fiscal policy in overcoming recession. (06)

(c) What is meant by monetary policy? Briefly explain the instruments of monetary policy. (06)

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