CS/IT/EC

3E1103

Roll No. _____

Total No of Pages: 3

3E1103

B. Tech. IV - Sem. (Main) Exam., May - 2019

HSMC

Managerial Economics & Financial Accounting

All Branches

Time: 2 Hours

Maximum Marks: 80

Instructions to Candidates:

Attempt all five questions from Part A, four questions out of six questions from Part B and two questions out of three from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL

2. NIL

PART – A

(Answer should be given up to 25 words only) **[5×2=10]**

All questions are compulsory

Q.1 GDP

Q.2 Giffen Goods

Q.3 Marginal Cost

Q.4 Perfect Competition

Q.5 Capital Budgeting

PART – B

(Analytical/Problem solving questions) **[4×10=40]**

Attempt any four questions

Q.1 What is circular flow of economic activity? Explain the circular flow in four sector model.

Q.2 Following table exhibits demand and supply condition of a commodity at different price levels –

Price (₹)	Demand ('000/month)	Supply ('000/month)
110	-	1000
100	40	900
90	80	800
80	120	700
70	160	600
60	200	500
50	240	400
40	280	300
30	320	200
20	360	100
10	400	-

(a) Draw the demand and supply curves.

(b) What is the equilibrium price and quantity?

Q.3 "In perfect competition a firm is price taker". Explain the statement with the help of a suitable illustration.

Q.4 What is Elasticity of Demand? What are the factors affecting the Elasticity of Demand?

Q.5 What is Isoquant? Explain with the help of diagram.

Q.6 Compute the Net Present Value of a project if it requires an initial investment of ₹ 2,25,000 and is expected to generate the following net cash inflows.

Year 1	Year 2	Year 3	Year 4
₹ 95,000	₹ 80,000	₹ 60,000	₹ 55,000

The minimum desired rate of return is 12%.

PART – C

(Descriptive/Analytical/Problem Solving/Design Question) **[2×15=30]**

Attempt any two questions

Q.1 Explain the various methods of measuring Nation Income.

Q.2 What is meant by production function? Explain the 3 stages of production with the help of diagram.

Q.3 Prepare the Trading and Profit and Loss account and a balance sheet from the following particulars for ABC firm as on 31 March 2018.

Account Title	Amount (₹)	Account Title	Amount (₹)
Sundry debtors	200000	Bills payable	86500
Bad debts	6000	Sundry creditors	48000
Trade expenses	2500	Provision for bad debt	7200
Printing and Stationary	7400	Return outwards	5500
Rent, Rates and Taxes	8600	Capital	500000
Freight	5000	Discount received	11540
Sales return	11200	Interest received	20000
Vehicle	30000	Sales	123000
Opening stock	100000		
Furniture and Fixture	22000		
Purchases	71000		
Drawings	34900		
Investments	92000		
Cash in hand	75000		
	136140		
	801740		801740

Adjustments:

(1) Closing stock was valued ₹ 45000.

(2) Depreciation charged on Furniture and Fixture @ 5%.

(3) Depreciation charged on vehicle @ 10%.

4E1218

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4E1218

B. Tech. IV - Sem. (Main) Exam., May - 2019
BSC Electronics & Communication Engineering
4EC2 – 01 Advanced Engineering Mathematics - II
EC, EI

Time: 3 Hours **Maximum Marks: 120**

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and four questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[10×2=20]**

All questions are compulsory

Q.1 Define Analytic function?

Q.2 Write C – R (Cauchy – Riemann Equations).

Q.3 Define Mobius Transformations.

Q.4 State Cauchy Integral Formula.

Q.5 State Maximum – Modulus theorem.

Q.6 Write Rodrigues formula for Legendre's Functions.

Q.7 Show that $J_{1/2}(x) = \sqrt{\frac{2}{\pi x}} \cos x$.

Q.8 Define basis and dimension for vector spaces.

Q.9 Define canonical forms.

Q.10 Define orthogonal property for Bessel's functions.

PART – B

(Analytical/Problem solving questions) **[5×8=40]**

Attempt any five questions

Q.1 Evaluate $\int_C \frac{(1-2z)}{z(z-1)(z-2)}dz$ where C is the circle $|z| = 1.5$ [8]

Q.2 The intersection of two subspaces W_1 and W_2 of a vector space V(F) is also a subspace of V(F). [8]

Q.3 Examine the nature of the function $f(z) = \frac{x^2y^5(x+iy)}{x^4+y^{10}}$, $z \neq 0$, $f(0) = 0$ in the region including the origin. [8]

Q.4 Show that the transformation $w = \frac{2z+3}{z-4}$ maps the circle $x^2 + y^2 - 4x = 0$ onto the straight line $4u + 3 = 0$ and explain why the curve obtained is not a circle. [8]

Q.5 Verify Cauchy's theorem for the function $z^3 - iz^2 - 5z + 2i$, if C is the circle $|z - 1| = 2$. [8]

Q.6 Prove that $\frac{1-z^2}{(1-2xz+z^2)^{3/2}} = \sum_{n=0}^{\infty}(2n+1)P_n(x)z^n$ [8]

Q.7 Prove that $\frac{d}{dx}[J_n^2 + J_{n-1}^2] = 2\left[\frac{n}{x}J_n^2 - \frac{n+1}{x}J_{n+1}^2\right]$ [8]

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[4×15=60]**

Attempt any four questions

Q.1 (A) Prove that orthonormal set of vectors in an IPS V(F) is LI. [8]

(B) If W_1 and W_2 are subspace of a vector space V(F), then their linear sum is generated by their union i.e., $W_1 + W_2 = L(W_1 \cup W_2) = \{W_1 \cup W_2\}$ [7]

Q.2 State and prove generating function for $J_n(x)$. [15]

Q.3 Prove that $\int_{-1}^{1} P_m(x)P_n(x)dx = \begin{cases} 0 & , \text{ if } m \neq n \\ \dfrac{2}{2n+1} & , \text{ if } m = n \end{cases}$ [15]

Q.4 (A) Expand $\dfrac{1}{z(z^2-3z+2)}$ in Laurent's series for the regions. [8]

(i) $0 < |z| < 1$

(ii) $1 < |z| < 2$

(iii) $|z| > 2$

(B) Expand $\dfrac{\sin z}{z-\pi}$ about $z = \pi$ [7]

Q.5 (A) Show that $\int_0^{2\pi} \dfrac{d\theta}{a + b\cos\theta} = \dfrac{2\pi}{\sqrt{a^2+b^2}}$ [7]

(B) Find the bilinear transformation which transforms the points z = 2, i, –2 into the points w = 1, i, –i respectively. [8]

4E1219

Roll No. _____ Total No of Pages: 3

4E1219

B. Tech. IV - Sem. (Main) Exam., May - 2019

PCC Electronics & Comm. Engg.

4EC4-04 Analog Circuits

EC. EI

Time: 3 Hours **Maximum Marks: 120**

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and four questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[10×2=20]**

All questions are compulsory

Q.1 Explain why is base made thin?

Q.2 Why 'transistor' is called so?

Q.3 Explain how BJT amplifier, bias stability is achieved?

Q.4 Explain Gain Margin?

Q.5 Explain common mode gain for an oscillator.

Q.6 Explain low pass active filters.

Q.7 Describe single slope of ADC.

Q.8 Design a low pass filter at a cut off frequency of 1 kHz with a pass band gain of 2.

Q.9 An operational amplifier has a slew rate of 2V/μs. If the peck output is 12V, what is the power bandwidth?

Q.10 Explain concept of stability?

PART – B

(Analytical/Problem solving questions) **[5×8=40]**

Attempt any five questions

Q.1 Explain low frequency analysis of multistage amplifiers.

Q.2 For a p-channel silicon FET with a = 2×10^{-4} cm and channel resistivity ρ = 10Ω-cm

(i) Find the pinch off voltage

(ii) Repeat (i) for a p-channel germanium FET with ρ = 2Ω - cm

Q.3 Calculate the operating frequency of a transistor Hartley oscillator if L_1=100 μH, L_2 = 1mH, mutual inductance between the coils, M = 10μH and C =10pF.

Q.4 With a neat diagram, explain the action of Hartley and Colpitts oscillators.

Q.5 Explain Schmitt trigger and its applications.

Q.6 Explain Switched Capacitor Circuits?

Q.7 Describe concept of stability and gain margin?

PART – C

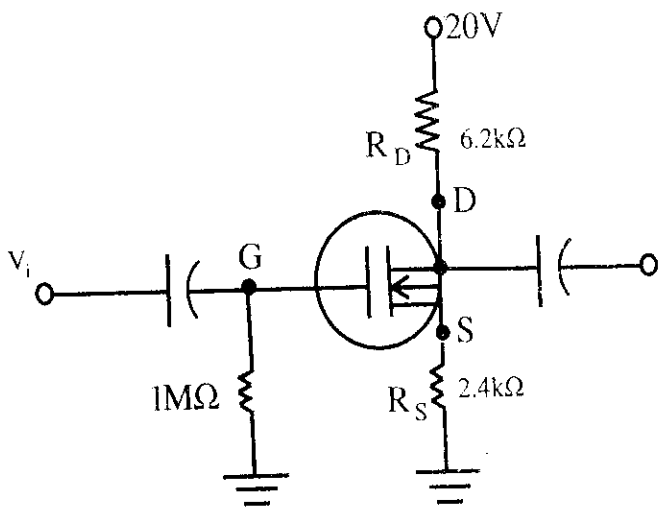
(Descriptive/Analytical/Problem Solving/Design Questions) **[4×15=60]**

Attempt any four questions

Q.1 Design and explain Digital to Analog Converters.

Q.2 Explain active filters with low pass, high pass, band pass and band stop.

Q.3 For the network of figure below given I_{DSS} = 8 mA and V_P = -8 volt.



Q.4 Explain differential amplifier, its basic structure and principle of operation.

Q.5 Explain current mirror, its basic topology and its variants.

4E1220

Roll No. _____ Total No of Pages: 3

4E1220

B. Tech. IV-Sem. (Main) May 2019
PCC Electronics & Comm. Engg.
4EC4-05 Microcontrollers
EC, EI

Time: 3 Hours **Maximum Marks: 120**

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and four questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[10×2=20]**

All questions are compulsory

Q.1 How many different buses are used 8085 microprocessor?

Q.2 How many hardware interrupts are used in 8085 microprocessor?

Q.3 Explain the LXI Rp, 16 bit data and DAA instructions.

Q.4 What is the use of ALE pin?

Q.5 Why AD_0 - AD_7 line are multiplexed?

Q.6 Why cache memory is required?

Q.7 How many chips are required to make 2 kB of memory with the help of 256 × 4 bit memory chip?

Q.8 What are Maskable and Non-Maskable interrupt?

Q.9 Write and explain in short one application of 8051 microcontroller and 8085 microprocessor each.

Q.10 Give names of addressing modes of 8085 microprocessors.

PART – B

(Analytical/Problem solving questions) **[5×8=40]**

Attempt any five questions

Q.1 Draw the architecture diagram of 8085 microprocessor.

Q.2 Draw the PIN diagram of 8051 microcontroller and explain the following PINS-

(i) External enable

(ii) PSEN

(iii) Read strobe ($\overline{RD}$)

Q.3 Write the program to add two 16 bit numbers with carry.

Q.4 Write a program to find out the largest number among the array of five numbers.

Q.5 Give the classification of interrupts and explain for 8085 microprocessors.

Q.6 Explain the concept of D/A converter.

Q.7 What is the timer in 8085 microprocessor?

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[4×15=60]**

Attempt any four questions

Q.1 Explain the DMA 8257 controller in detail.

Q.2 How instruction sets are classified in 8085 microprocessor? Explain with example of each classification.

Q.3 Discuss in detail RISC architecture.

Q.4 Write a program to find out the factorial of four in 8085 microprocessor.

Q.5 Explain ARM microcontroller interface design.

4E1221

Roll No. _____

Total No of Pages: 3

4E1221

B. Tech. IV - Sem. (Main) Exam., May - 2019
ESC Electronics & Communication Engineering
4EC3 – 06 Electronics Measurement & Instrumentation

Time: 3 Hours **Maximum Marks: 120**

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and four questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[10×2=20]**

All questions are compulsory

Q.1 Define Instrument Errors and Loading Error.

Q.2 What is Q-meter?

Q.3 Why the screen of a CRT is coated with phosphor?

Q.4 What is meant by harmonic distortion?

Q.5 Explain isolation probe.

Q.6 State working principle of LVDT.

Q.7 Define the term Precision.

Q.8 What are thermistor?

Q.9 State basic requirements of Signal Generators.

Q.10 Explain the need of Grounding.

PART – B

(Analytical/Problem solving questions) **[5×8=40]**

Attempt any five questions

Q.1 Prove that the algebraic sum of the deviation is equal to zero.

Q.2 What is an electronic galvanometer? Give its merits over ordinary galvanometer.

Q.3 Draw a block diagram of sampling oscilloscope and explain its principle.

Q.4 Explain the working principle of frequency selective wave analyzer with suitable diagram.

Q.5 Describe ultrasonic flow meter.

Q.6 Give comparison between RID and Thermocouple.

Q.7 Explain the types of Digital Voltmeters.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[4×15=60]**

Attempt any four questions

Q.1 Draw a block diagram of a CRO and explain the function of each block.

Q.2 Briefly state the theory of piezoelectric transducer and state its applications, advantages & disadvantages.

Q.3 Describe a Heterodyne wave analyzer with the help of its block diagram. How does a wave analyzer differ from a Harmonic distortion analyzer?

Q.4 Explain the principle of working of the digital frequency meter, with the suitable diagram.

Q.5 The following 10 observations were recorded when measuring a voltage : 41.7, 42.0, 41.8, 42.0, 41.8, 42.1, 41.9, 42.0, 41.9, 42.5 volt. Find -

(a) the mean

(b) the standard deviation

(c) the probable error of one reading

(d) the probable error of mean

(e) range

4E1222

Roll No. _____

Total No of Pages: 3

4E1222

B. Tech. IV - Sem. (Main) Exam., May - 2019
PCC Electronics & Communication Engineering
4EC4 – 07 Analog and Digital Communication
EC, EI

Time: 3 Hours **Maximum Marks: 120**

Instructions to Candidates:

PART - A** : Short answer questions (up to 25 words) 10 ×2 marks = **20 marks.

*All **ten** questions are compulsory.*

PART - B** : Analytical/Problem Solving questions (up to 100 words) 5×8 marks=**40 marks.

*Candidates have to answer **five** questions out of **seven***

PART - C** : Descriptive/Analytical/Problem Solving questions 4×15 marks =**60 marks.

*Candidates have to answer **four** questions out of **five.***

1. NIL 2. NIL

PART – A

Q.1 Differentiate between 'bit interleaving' and 'word interleaving'.

Q.2 What is quantization in PCM system?

Q.3 Write the important properties of line codes.

Q.4 What is sampling theorem?

Q.5 Draw the circuit diagram of envelope detector.

Q.6 Sketch the signal constellation of QPSK modulation technique.

Q.7 What is the transmission rate of T1 carrier system?

Q.8 What is correlator?

Q.9 What is minimum shift keying?

Q.10 Discuss the advantages and disadvantages of pulse modulation as compared to continuous wave modulation.

PART – B

Q.1 Sketch the frequency domain representation of DSB-SC and SSB- SC signals, draw and explain the principle of balance modulator.

Q.2 Determine the probabilities of errors of ASK, PSK and FSK systems and required bandwidth of each system.

Q.3 Determine the signal to quantization ratio of a delta modulator for a sinusoid signal with a bit rate of 64 kbps and input signal bandwidth of 4 kHz.

Q.4 Explain with the help of block diagrams working of QPSK transmitter and receiver.

Q.5 Draw the block diagram of ADM and explain its working and compare with PCM.

Q.6 Explain the terms slope overload and granular noise in Delta Modulation.

Q.7 Explain optimum filter and matched filter.

PART – C

Q.1 What is Inter symbol interference? Explain the causes, effect and remedies to reduce the ISI in communication systems. Why does raised cosine spectrum provide a means for zero ISI?

Q.2 Draw the block diagram of phasing/Third method of generation of SSB-SC signals and detection of SSB-SC signals and briefly explain it. Also write the applications of SSB-SC.

Q.3 Discuss the performance of AM and FM systems in presence of noise. Why pre emphasis and de-emphasis are required? Also discuss the threshold effect in angle modulation.

Q.4 What do you mean by companding in PCM system? Why it is required? What are μ-law and A- law of companding?

Q.5 A television signal having a BW of 4.2 MHz is transmitted using binary PCM system. Given that quantization levels are 512. Determine:

(i) Code word length

(ii) Transmission BW

(iii) Final bit rate

(iv) O/P signal to quantization ratio.

4E4131

Roll No. _____

Total No of Pages: 3

4E4131

B. Tech. IV Sem. (Back) Exam., May - 2019
Electronics & Communication Engineering
4EC2A Random Variables & Stochastic Processes

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 24

Instructions to Candidates:

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. Scientific calculator

2. NIL

UNIT- I

Q.1 (a) A box contains 10 coins where 5 coins are two headed, 3 coins are two tailed and 2 are fair coins. A coin is chosen at random and tossed. [8]

(i) Find the probability that a head appears

(ii) If a head appears, find the probability that the coin is fair

(b) If P (A) = P (B) = P (AB). Show that $P(\overline{A}\overline{B} + \overline{A}B) = 0$ [$AB \cong A \cap B$] [8]

OR

Q.1 (a) Explain the Baye's Theorem in detail. [8]

(b) A factory uses three machines x, y, z to produce certain items. Suppose that [8]

(i) Machine X produces 50% of the items of which 3% are defective.

(ii) Machine Y produces 30% of the items of which 4% are defective.

(iii) Machine Z produces 20% of the items of which 5% are defective.

Find the probability p that a randomly selected item is defective. Suppose a defective item is found among the output. Also find the probability that it came from each of the machine and find P (X|Δ), P (Y|Δ) and P (Z|Δ).

UNIT- II

Q.2 (a) Write a short notes on- [8]

(i) Probability density function and cumulative distribution function.

(ii) Poisson distribution function

(b) If $f(x) = \begin{cases} \frac{x}{6} + k & , \quad 0 \le x \le 3 \\ 0 & \text{else where} \end{cases}$ is a valid probability density function, find the value of k. Also find P ($1 \le x \le 2$). [8]

OR

Q.2 (a) If the probability that an individual suffers a bad reaction from an injection of a given serum is 0.001. Determine the probability that out of 2000 individuals exactly 3 individuals suffer a bad reaction. Use poison distribution. [8]

(b) Explain normal (Gaussian) distribution function in detail. [8]

UNIT- III

Q.3 (a) Explain central limit theorem by using suitable example. [8]

(b) Two random variable X and Y are having joint probability density function.

$$f(x, y) = \begin{cases} 2 - x - y & ; \quad 0 \le x \le 3, \ 0 \le y \le 3 \\ 0 & ; \quad \text{otherwise} \end{cases}$$

Find (i) Marginal Probability density functions of X and Y.

(ii) Conditional density function [8]

OR

Q.3 (a) Explain all the properties of joint pdf and joint cdf. [8]

(b) Suppose X and Y are independent standard normal random variable. Find the PDF $Z = X + Y$. [8]

UNIT- IV

Q.4 (a) Consider the sinusoidal random process $X(t) = A \sin(w_0 t)$ where A is uniform random variable over [0, 1]. Find the mean and autocorrelation of the process. [8]

(b) Write short notes on:- [8]

(i) Autocorrelation and its correlation coefficient

(ii) Cross correlation and its coefficient

OR

Q.4 (a) Explain Ergodicity in detail [8]

(b) If the wss process $\{x(t)\}$ is given by $X(t) = 10 \cos(100t + \theta)$ where θ is uniformly distributed over $(-\pi, \pi)$. Prove that $\{\times (t)\}$ is correlation egrodic.

UNIT- V

Q.5 Write short notes on: (any two) [8×2=16]

(i) Power spectral density of system response

(ii) Gaussian random process

(iii) Cross power spectral density

(iv) While noise

4E4132

Roll No. _____

Total No of Pages: 3

4E4132

B. Tech. IV Sem. (Back) Exam., May - 2019
Electronics & Communication Engineering
4EC3A Electronic Measurement & Instrumentation

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 24

Instructions to Candidates:

*Attempt any **five questions,** selecting **one question** from **each unit.** All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL

2. NIL

UNIT - I

Q.1 (a) The resistance of a circuit is found by measuring current flowing and the power fed into the circuit. Find the limiting error in the measurement of resistance when the limiting errors in the measurement of power and current are respectively ± 1.8% and ± 1.0%. [8]

(b) Explain the following with suitable examples - [4]

(i) Systematic errors [4]

(ii) Random errors

OR

Q.1 (a) Three resistors have the following ratings - [8]

$R_1 = 43\Omega \pm 5\%$, $R_2 = 78\Omega \pm 5\%$, $R_3 = 54\Omega \pm 5\%$,

Determine the magnitude and limiting errors in ohm and in percent of these resistances connected in parallel.

(b) Define the following with suitable examples –

(i) Resolution [2]

(ii) Sensitivity [2]

(iii) Offset [2]

(iv) Precision [2]

UNIT- II

Q.2 (a) Explain the working of successive approximate type digital voltmeter with neat diagram. [8]

(b) Explain the working of electronic voltmeters which use rectifiers. Explain its d.c. and a.c. modes of operation. [8]

OR

Q.2 (a) Explain the ohmmeter part of an electronic multimeter. Describe how R×1, R ×10, and R × 100 ranges are obtained in this instrument. [8]

(b) Explain the working principle of Q – meter. Also outline the factors that cause, errors during a Q measurements. How we measure the characteristic impedance of a transmission line using Q – meter. [8]

UNIT- III

Q.3 (a) Explain the importance of CRO probes. Explain the applications of CRO probes during measurements. [8]

(b) Explain the following terms of CRO –

(i) Astigmation control [4]

(ii) Sources of synchronization [4]

OR

Q.3 (a) Explain the different types of sweeps used in CRO. Explain their application also. [8]

(b) An electrically deflected CRT has a final anode voltage 2000V and parallel deflecting plates 1.4cm long and 6 mm apart. The screen is 55 cm from the centre of deflecting plates, find if mass of electron = 9.1×10^{-31} kg. [8]

(i) Beam speed

(ii) deflection sensitivity of tube

(iii) deflection factor of the tube

UNIT- IV

Q.4 (a) Draw & explain the block diagram of a function generator and explain the method of producing sine waves. [8]

(b) Explain the working of heterodyne wave analyzer with suitable diagram. [8]

OR

Q.4 (a) What is mean by distortion factor? How can distortion factor be measured? [8]

(b) Explain the phenomenon of synchronization of vertical input signal to its sweep generator. Explain the need of it. [8]

UNIT- V

Q.5 (a) Explain the different techniques used to eliminate the lead wire effect of RTD connection in a bridge circuit. [8]

(b) Explain the calibration techniques and protective coatings used in strain gauge. [8]

OR

Q.5 (a) Explain the working principle and applications of seismic accelerometers. [8]

(b) Explain the following for Transducers - [8]

(i) Input characteristics

(ii) Output characteristics

(iii) Transfer characteristics

4E4133

Roll No. _____

Total No of Pages: 3

4E4133

B. Tech. IV Sem. (Back) Exam., May - 2019
Electronics & Communication Engineering
4EC4A Electromagnetic Field Theory

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 26

Instructions to Candidates:

*Attempt any **five questions,** selecting **one question** from **each unit.** All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL

2. NIL

UNIT- I

Q.1 (a) Give physical interpretation of gradient; divergence and curl. Derive mathematical expression for gradient in Cartesian coordinate systems. [8]

(b) Write and state the Green's theorems. [8]

OR

Q.1 (a) Express the vector field $\vec{A} = xy^2z\vec{a}_x + x^2yz\vec{a}_y + xyz^2\vec{a}_z$ in cylindrical and spherical coordinates at (3,-4, 5). [8]

(b) Determine the divergence and curl of vector -

$\vec{A} = \rho z \sin\phi \, \vec{a}\, p + 3pz^2 \cos\phi \, \vec{a}_\phi$ at $\left(s, \frac{\pi}{2}, 1\right)$ [8]

UNIT- II

Q.2 (a) State and explain Gauss's Law of electrostatics in integral form. [8]

(b) Write short note on – [8]

(i) Uniqueness theorem and its use

(ii) Method of images

OR

Q.2 (a) Write the Poisson's law and derive the Laplace equation from it. [8]

(b) Derive the expression of energy density in electrostatic fields. [8]

UNIT- III

Q.3 (a) Using Biot – Savart's law, determine the magnetic field intensity due to an infinitely long steady straight line current. [8]

(b) In the region $0 < \rho < 0.5$m, in cylindrical coordinates. The current density is - $\vec{J} = 4.5e^{-2P}\hat{a}_z$ A/m^2 and $\vec{J} = 0$ elsewhere. Use Amperes circuital law to find $\vec{H}$. [8]

OR

Q.3 (a) Show that the displacement current through the capacitor is equal to conduction current. [8]

(b) Derive the formula for energy density stored in magnetic field. [8]

UNIT- IV

Q.4 (a) Explain the Poynting vector and Poynting theorem and find the average power density. [8]

(b) What is uniform plane? Find the expression for intrinsic impedance for – [8]

(i) Perfect dielectric

(ii) Lossy dielectric

OR

Q.4 (a) Write short note on - [8]

(i) Displacement current

(ii) Equation of continuity

(b) Show that $\bar{E}_y = E_O \sin(wt - \beta z)$ and $H_x = \frac{-\beta E_O}{\mu_o w} \sin(wt - \beta z)$, travels with velocity of light in free space. Also find $\frac{E}{H}$ ratio. [8]

UNIT- V

Q.5 (a) Discuss radiation from a small current element (Hertzian dipole) and hence calculate value of radiated power and radiation resistance. [8]

(b) Explain the retarded potentials. [8]

OR

Q.5 (a) What do you understand by EMI and EMC? Discuss different methods to eliminate EMI. [8]

(b) Write short note on - [8]

(i) Shielding grounding

(ii) EMI testing

4E4134

Roll No. _____ Total No of Pages: 4

4E4134

B. Tech. IV Sem. (Back) Exam., May - 2019

Electronics & Comm.

4EC5A Optimization Techniques

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 26

Instructions to Candidates:

*Attempt any **five questions,** selecting **one question** from **each unit.** All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

UNIT- I

Q.1 (a) Write 12 application of optimization technique in engineering. [10]

(b) A firm manufacturing two types of electric items A and B, can make a profit of ₹ 20 per unit of A and ₹ 30 per unit of B. Each unit of A requires 3 motors and 2 transformers and each unit of B requires 2 motors and 4 transformers. The total supply of these per month is restricted to 210 motors and 300 transformers. Type B is an export model requiring a voltage stabilizer which has a supply restricted to 65 units per month. Formulate the LPP for maximum profit. [6]

OR

Q.1 (a) Discuss the importance of operation research in decision making process. [10]

(b) Solve the following problem graphically: [6]

$$\min \quad z = 2x_1 - 10x_2$$

$$\text{s.t} \quad x_1 - x_2 \geq 0$$

$$x_1 - 5x_2 \leq -5$$

$$\text{and} \quad x_1 \geq 0,\ x_2 \geq 0$$

UNIT- II

Q.2 (a) Solve the following LPP: [8]

max $z = 2x_1+x_2$

s.t $3x_1+5x_2 \leq 15$, $6x_1+2x_2 \leq 24$

and $x_1, x_2 \geq 0$

(b) Use duality to solve the following LPP: [8]

min $z = 2x_1+9x_2+x_3$

s.t $x_1+4x_2+2x_3 \geq 5$

$3x_1+x_2+2x_3 \geq 4$

and $x_1, x_2, x_3 \geq 0$

OR

Q.2 (a) Solve the following LPP using revised simplex method: [8]

max $z = x_1+2x_2$

s.t $x_1+x_2 \leq 3$, $x_1+2x_2 \leq 5$

$3x_1+x_2 \leq 6$, $x_1, x_2 \geq 0$

(b) Solve the following LPP by big - M method: [8]

min $z = x_1+x_2$

s.t $2x_1+x_2 \geq 4$

$x_1+7x_2 \geq 7$, and $x_1, x_2 \geq 0$

UNIT- III

Q.3 (a) There are five jobs to be assigned, one each to five machines and the associated cost matrix is as follows, solve the following assignment problem: [8]

Jobs	Machines				
	I	II	III	IV	V
A	11	17	8	16	20
B	9	7	12	6	15
C	13	16	15	12	16
D	21	24	17	28	26
E	14	10	12	11	15

(b) Solve the following transportation problem: [8]

	D_1	D_2	D_3	D_4	
O_1	1	2	1	4	30
O_2	3	3	2	1	50
O_3	4	2	5	9	20
	20	40	30	10	100

OR

Q.3 (a) Given below the unit cost array with supplies a_i, i = 1,2,3 and demands bj, j = 1, 2, 3, 4. Find the optimal solution of the following transportation problem: [8]

Sources	Sinks				Supply(a_i)
	1	2	3	4	
1	8	10	7	6	50
2	12	9	4	7	40
3	9	11	10	8	30
Demand (b_j)	25	32	40	23	120

(b) Five jobs are to be assigned to 4-machines, subject to the cost matrix as shown below. Make a min. cost. assignment: [8]

Jobs	Machines			
	A	B	C	D
I	9	7	6	2
II	6	6	7	6
III	5	3	4	4
IV	4	2	5	9
V	2	8	3	9

UNIT- IV

Q.4 (a) Find the minimum of the function $F(x) = (x_1-1)^3 + (x_2-5)^2$ [8]

Subject to $-x_1+1 \leq 0$

$-x_2+5 \leq 0$ by interior penalty function method.

(b) Minimize $f(x) = 2x_1^2+2x_1x_2+x_2^2+x_1-x_2$ by taking steepest descent method starting from $x_1 = \begin{pmatrix}0\\0\end{pmatrix}$. [8]

OR

Q.4 (a) Minimize $f(x,y) = 8x^2+y^2+4xy+2x-y$ by Hook and Treves method, starting from the point (0,0) and taking $\Delta x = \Delta y = 0.8$. [8]

(b) Solve by univariate search method: [8]

minimum $f = 2x_1^2-2x_1x_2+5x_2^2-6x_1+6x_2+5$

UNIT- V

Q.5 (a) Discuss the application of dynamic programming. [8]

(b) Use dynamic programming to solve the L.P.P [8]

max $z = x_1+9x2$, s.t : $2x_1+x_2 \leq 25$, $x_2 \leq 11$: $x_1x_2 \geq 0$

OR

Q.5 (a) Use Bellman's principle of optimality to minimize $z = y_1+y_2+.....+y_n$, subject to the constraints: [8]

$y_1y_2.....y_n = d$, $y_j \geq 0$ for $j = 1,2,.....n$.

(b) Solve the following problem using dynamic programming: [8]

min. $z = y_1^2+y_2^2+.....+y_n^2$

Subject to the constraints $y_1y_2y_3.....y_n = b$ and

$y_1, y_2.....y_n \geq 0$.

4E4135

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4E4135

B. Tech. IV Sem. (Back) Exam., May - 2019
Petrochemical Engineering
4PC1 Advanced Engineering Mathematics - II

Time: 3 Hours **Maximum Marks: 80**
Min. Passing Marks: 26

Instructions to Candidates:

*Attempt any **five questions,** selecting **one question** from **each unit.** All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

UNIT- I

Q.1 (a) Prove that $u_0 + \frac{xu_1}{\lfloor 1} + \frac{x^2u_2}{\lfloor 2} + \frac{x^3u_3}{\lfloor 3} + \ldots\ldots = e^x\left[u_0 + \frac{x\Delta u_0}{\lfloor 1} + \frac{x^2\Delta^2 u_0}{\lfloor 2} + \ldots\ldots\right]$ [6]

(b) The ordinates of the normal curve are given by the following table-

x:	0.0	0.2	0.4	0.6	0.8
y:	0.3989	0.3910	0.3683	0.3332	0.2897

Evaluate- [10]

(i) y (0.25)

(ii) y (0.43)

(iii) y (0.62)

OR

Q.1 (a) Find the missing values in the following table- [8]

x:	0	5	10	15	20	25
y:	0	10	Y_1	17	Y_2	31

(b) Find the polynomial f(x) and the valve of f(x) at x = 3 by Lagrange's interpolation formula for the data- [8]

x:	0	1	2	4	5
f(x):	0	16	48	88	0

UNIT- II

Q.2 (a) Find $y'(0)$ and $y''(0)$ from the data- [8]

x:	0	1	2	3	4	5
y:	4	8	15	7	6	2

(b) Use Picard's method to solve $\frac{dy}{dx} = 1 + xy$; with $x_0 = 2$; $y_0 = 0$. [8]

OR

Q.2 (a) Find the value of $\log_e 2$ from $\int_0^1 \frac{x^2}{1+x^3}\, dx$ by using Simpson's $\frac{1}{3}$ rule. [8]

(b) Using Milne's Predictor – corrector method, obtain the value of y for x = 0.4 for the following differential equation $\frac{dy}{dx} = 2e^x - y$: given that- [8]

	0	0.1	0.2	0.3
	2	2.01	2.04	2.09

UNIT- III

Q.3 (a) Prove that $J_4(x) = \left(\frac{48}{x^3} - \frac{8}{x}\right) J_1(x) + \left(1 - \frac{24}{x^2}\right) J_0(x)$ [5]

(b) Show that- [5]

(i) $\cos x = J_0 - 2J_2 + 2J_4$

(ii) $\sin x = 2J_1 - 2J_3 + 2J_5$

(c) Show that: $\int_{-1}^{1} P_n(x)\, dx = 0$; $n \neq 0$ [6]

OR

Q.3 (a) Show that $\int x J_0^2(x)\, dx = \frac{x^2}{2}\left[J_0^2(x) + J_1^2(x)\right] + c$ [8]

(b) Prove that-

(i) $(2n+1) P_n(x) = P'_{n+1}(x) - P'_{n-1}(x)$ [4]

(ii) $n P_n(x) = (2n-1)\, x\, P_{n-1}(x) - (n-1) P_{n-2}(x); n \geq 2$ [4]

UNIT- IV

Q.4 (a) An urn contains 10 white and 3 black balls. Another urn contains 3 white and 5 black balls. Two balls are drawn at random from the first urn and placed in the second urn and then one ball is taken at random from the latter. What is the probability that it is a white ball? [8]

(b) Define normal distribution. If the height of 300 students are normally distributed with mean 64.5 inches and standard heights- [8]

(i) Less than 5 feet

(ii) Between 5 feet and 5 feet 9 inches.

(iii) Also find the height between which 99% of the students lie.

OR

Q.4 (a) Find the probability of 5 or more telephone calls arriving in a 9 minute period in a college, If the telephone calls that are received at the rate of 2 every 3 minute follow a Poisson distribution. [8]

(b) Find the coefficient of correlation for the following table- [8]

x:	10	14	18	22	26	30
y:	18	12	24	6	30	36

UNIT- V

Q.5 (a) Find a function y(x) for which- [8]

$\int_0^1 [x^2 - y'^2]\, dx$ is stationary, given

that $\int_0^1 y^2\, dx = 2 ; y(0) = 0 ; y(1) = 0$

(b) Find the curve passing through the points (x_1, y_1) and (x_2, y_2) which when rotated about the x – axis gives a minimum surface area. Find also the extremal of the functional. [8]

OR

Q.5 (a) Find the extremals of the integral-

$I = \int_0^1 (y^2 + y'^2 + 2ye^x) dx$

Passing through (0, 0) and (1, e) [8]

(b) Find the path on which a particle, in the absence of friction, will slide from one fixed point to another point in the shortest time under the action of gravity. [8]

4E2090

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4E2090

B.Tech. IV - Sem (Back) Exam., May - 2019

Applied Electronics & Inst. Engg.

4AI6.1 Object Oriented Programming

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 26

Instructions to Candidates:

*Attempt any **five questions,** selecting **one question** from **each unit.** All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL

2. NIL

UNIT- I

Q.1 (a) Explain the class & object by taking example. [8]

(b) What is the role of public, private & protected members? Explain. [8]

OR

Q.1 What is Inheritance? Explain all the types of Inheritance with examples. [16]

UNIT- II

Q.2 (a) Explain various types of operators used in C++, with examples. [8]

(b) What is constructor & destructor? Explain. [8]

OR

Q.2 (a) What is the role of virtual function? Explain. [8]

(b) Why we use friend function? Explain. [8]

UNIT- III

Q.3 (a) Why we use Java? What is the variation between C++ & Java? Explain. [8]

(b) Explain various application & applets used in Java. [8]

OR

Q.3 (a) How can we declare Array in Java? Explain. [8]

(b) Explain various Data types used in Java. [8]

UNIT- IV

Q.4 Explain Arithmetic operators & bitwise operators used in Java with example. [16]

OR

Q.4 What is operator precedence in Java? Also explain the switch & loop statements with example. [16]

UNIT- V

Q.5 What are packages? How can we Import & define the packages? Explain. [16]

OR

Q.5 What is Interface? Explain defining & implementing the Interfaces with the help of example. [16]

4E2091

Roll No. _____ Total No of Pages: 2

4E2091

B. Tech. IV Sem. (Back) Exam., May - 2019

Applied Electronics & Instrumentation Engineering

4AI6.3 Data Base Management System

AI, EC

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 26

Instructions to Candidates:

*Attempt any **five questions**, selecting **one question** from **each unit.** All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

UNIT- I

Q.1 (a) What is DBMS? Explain need, purpose and goals of DBMS. [10]

(b) Describe the Role of DBA in DBMS. [6]

OR

Q.1 (a) Explain the Architecture of DBMS. [10]

(b) Explain Generalization and specialization. [6]

UNIT- II

Q.2 (a) What is Normalization? Explain 1 NF, 2NF and 3NF. [10]

(b) What is physical and logical view in DBMS? [6]

OR

Q.2 (a) Define Schema and Instance. [4]

(b) What is data independence? [4]

(c) Explain BCNF with example. [8]

UNIT- III

Q.3 (a) What is SQL? [2]

(b) Give difference between DDL and DML. [4]

(c) Explain triggers in detail. [10]

OR

Q.3 Use the schema and answer the queries in SQL-

SAILORS (sid, sname, rating, age)

BOATS (bid, bname, color)

RESERVES (sid, bid, day)

(a) Find the names of sailors who reserved green boat. [4]

(b) Find the colors of boats reserved by "SURESH". [4]

(c) Find the names of sailors who have reserved a red or a green boat. [4]

(d) Find the name of the sailors who have reserved a red boat. [4]

UNIT- IV

Q.4 (a) Explain random and hashed files. [8]

(b) Explain physical data organization of sequential file. [8]

OR

Q.4 Explain inverted and multilist structures. [16]

UNIT- V

Q.5 (a) What is concurrency control? [4]

(b) Explain Transaction model properties. [12]

OR

Q.5 Write short note on –

(a) Transaction Processing [4]

(b) Two Phase Locking [4]

(c) Lock Base Protocols [4]

(d) Log Based Recovery [4]

4E2149

Roll No. _____ Total No of Pages: 3

4E2149

B. Tech. IV Sem. (Back) Exam., May - 2019

Biomedical

4BM3 Digital Electronics

BM, EX, EI, EC

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks: 26

Instructions to Candidates:

*Attempt any **five questions,** selecting **one question** from **each unit.** All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

UNIT- I

Q.1 (a) Perform the following operations – [4×2=8]

(i) $(4)_{10} - (9)_{10}$ Using the 2's complement method.

(ii) Add $(83)_{10}$ and $(34)_{10}$ in BCD

(iii) $(83)_{10} - (21)_{10}$ Using the 9's complement method.

(iv) $(2003.31)_{10} \rightarrow (\ )_H$

(b) Convert the decimal number + 119 and – 119 into equivalent binary number using – [2×4=8]

(i) Signed Magnitude Representation

(ii) Signed 2's complement Representation

OR

Q.1 (a) Perform the following operations – [4×2=8]

(i) $(59.4375)_{10} \rightarrow (\ )_2$

(ii) $(FACE)_{16} \rightarrow (\ )_2$

(iii) $(1001)_2 \rightarrow (\ )_{Gray}$

(iv) $(46)_{10} \rightarrow (\ )_{xs.3\ (Excess.3)}$

(b) Simplify following Boolean expression and draw logic diagrams – [2×4=8]

(i) $y = C\,(\overline{ABC} + A\bar{B}C)$

(ii) $y = \overline{(\bar{A} + B)} + \overline{(A + \bar{B})} + \overline{(\bar{A}B)}\,.\,\overline{(A\bar{B})}$