B. Tech.

(SEM II) EVEN SEMESTER
MAJOR EXAMINATION: 2021-2022
ENGINEERING ECONOMICS

Time: 3 Hrs.   **Max. Marks: 50**

Note: Attempt all questions. Each question carries equal marks.

1. **Attempt any Four parts of the following.**   **(4×5=20)**

   (a) What are the determinants of demand?

   (b) Explain the price elasticity of demand with the help of curves.

   (c) What are the steps involved in decision-making?

   (d) Briefly discuss opportunity cost, incremental cost, and implicit & explicit cost.

   (e) Discuss production planning. Also, differentiate between average product, marginal product, and total product.

   (f) Explain the concept of perfect competition market structure. Also, discuss its features.

2. **Attempt any Three parts of the following.**   **(3×5=15)**

   (a) Define Managerial Economics. Discuss its application in an engineering perspective.

   (b) Differentiate between micro-economic and macro-economics. Also, discuss the nature of micro-economics.

   (c) How elasticity of demand can be helpful in managerial decision-making?

   (d) Define demand. Also, discuss the law of demand.

3. **Attempt any Three parts of the following.**   **(3×5=15)**

   (a) Establish a relationship between the short-run cost curve and marginal cost curve.

   (b) Briefly explain fixed cost, variable cost, and marginal cost with the help of curves.

   (c) Differentiate between oligopoly and monopolistic competition market structure.

   (d) Discuss various concepts of national income with respective formulas.

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B. Tech.

Year: I Semester: Even

Major Examination: 2021-22

Human Values & Professional Ethics-1

Max Marks: 50

Time: 2 Hrs.

Note: Attempt ALL questions. Each question carries equal marks.

		Marks	CO	BL	PO
Q1.	**Attempt any Four parts of the following.**				
a)	"A value is a belief that something is good and desirable." Critically evaluate the nature and functions of values considering the above statement.	5	1	5	8
b)	Do 'prosperity' and 'wealth' differ? Analyse the consequences of our incorrect understanding of the concepts of 'prosperity' and 'wealth'.	5	2	4	7
c)	Critically examine the divergent views that exist on the linkages of religion and ethics.	5	6	5	6
d)	What are the important elements of Professional Ethics?	5	5	2	6
e)	Summarize your views about the basic guidelines to be followed for value education.	5	6	3	6
f)	Spell out and explain some important values that lie at the core of good relationships.	5	3	2	9
Q2.	**Attempt any Three parts of the following.**				
a)	What do you understand by human values? How values differ from morals and ethics? Also explain at least five important human values.	5	1	2	8

b)	"There is a need for value education in technical and professional courses." Critically evaluate this statement.	5	1	5	8
c)	Which are the four orders of nature and how are they interdependent?	5	2	2	7
d)	Critically examine the concepts of natural acceptance and experiential validation as mechanisms of self-exploration.	5	4	3	8

Q3. Attempt any Three parts of the following.

a)	"Ethics is the science of ideal involved in human life." Considering this statement, comment on the scientific nature of ethics.	5	1	4	8
b)	How would you judge whether a human action/behaviour is subject to ethical enquiry or not?	5	4	3	8
c)	What are the basic principles that guide activities covered under Corporate Social Responsibility?	5	2	3	7
d)	What are the basic tenets of IEEE Code of Ethics for Engineers?	5	4	2	8

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B. Tech. (ECS)
1st YEAR SEMESTER-II
MAJOR EXAMINATION: 2021-2022
BASICS OF PROGRAMMING SKILLS

Max Marks: 50

Time: 3 Hrs.

Note: Answer all questions. Each question carries equal marks.

	Q1. Attempt any Five parts of the following.	Marks	CO	BL	PO	PI Code
(a)	What is the main purpose of an operating system? What are the different types of operating systems?	2	CO1	L1	PO2	1.1.1
(b)	Design a flowchart and algorithm to find the greatest number among three numbers.	2		L1		
(c)	Describe the conditional and increment/decrement operators with suitable programs.	2	CO2	L3	PO2	1.1.1
(d)	Explain the array of pointers with suitable example of programs.	2	CO3	L3	PO2	1.1.1
(e)	Write a program in C to sum two matrices.	2	CO2	L3	PO2	1.1.1
(f)	What is string? How it is different from array of characters?	2	CO3	L3	PO2	1.1.1
(g)	What are the differences between structure and union?	2	CO3	L2	PO2	1.1.1
	Q2. Attempt any Two parts of the following.					
(a)	Describe the compiler, interpreter, assembler. Write the name of compilers that are used in C programs.	5	CO2	L1	PO2	1.1.1
(b)	Describe about basic components of a computer with a neat block diagram.	5	CO3	L1	PO2	1.1.4
(c)	What is machine language, assembly language and high-level language?	5	CO4	L1	PO2	1.1.1
	Q3. Attempt any Two parts of the following.					
(a)	Discuss various data types used in C with suitable examples.	5	CO1	L1	PO2	1.1.1

(b)	Write a program in C to make simple calculator which has functionality of addition, subtraction, multiplication, division, and modulus.	5	CO3	L3	PO2	1.1.4
(c)	Define all type of storage classes with example. Write a program in C to print the prime numbers between 1 to 100.	5	CO4	L3	PO2	1.1.1

Q4. Attempt any Two parts of the following.

(a)	Define the calling function, called function, and function prototype declaration with suitable examples.	5	CO2	L2	PO2	1.1.1
(b)	Write a program in C to print the repeated elements of an array and print how many times elements are repeated in the array?	5	CO5	L5	PO2	1.1.2
(c)	Write a program in C to reverse a string, and concatenate two strings without using predefined string functions.	5	CO4	L4	PO2	1.1.1

Q5. Attempt any Two parts of the following.

(a)	Define structure with syntax. Write a program in C that compares two given dates using structure. Date contains three members namely date, month, and year. If, the dates are equal, then display message as 'equal' otherwise 'unequal'.	5	CO5	L3	PO2	1.1.1
(b)	Define the different types of pointers with their syntax. Write a program in C to print the array elements using pointer.	5	CO5	L3	PO2	1.1.3
(c)	Describe the following functions: (i) gets( ) (ii) getche( ) (iii) getch( ) (iv) malloc( ) (v) calloc( )	5	CO4	L1	PO2	1.1.4

BL – Bloom's Taxonomy Levels (1- Remembering, 2- Understanding, 3 plying, 4 – Analyzing, 5 – Evaluating, 6 - Creating)

CO – Course Outcomes

PO – Program Outcomes

PI Code – Performance Indicator Code

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B. Tech.

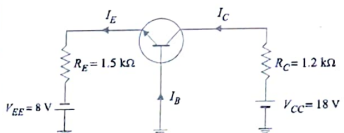## Year: I Semester: II

Major Examination: 2021-2022

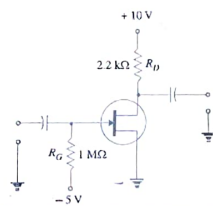## Fundamentals of Electronics Engineering

Max Marks: 50

Time: 3 Hrs.

Note: Attempt ALL questions. ALL questions carry equal marks.

Q1. Attempt any Five parts of the following.		Marks	CO	BL	PO	PI Code
a)	Explain the need of stabilization of Q point.	2	1	1	1	1.3.1
b)	Why is temperature co-efficient of semiconductors is negative?	2	2	3	1	1.3.1
c)	State function of 'Gate', 'Source' and 'Drain' terminals of FET.	2	4	2	1	1.3.1
d)	Simplify the following Boolean expression. $W'X(Z'+YZ) + X(W+Y'Z)$	2	3	3	2	2.1.3
e)	Implement Y= (1,4,5,6,7) in SOP form using AOI logic.	2	3	2	2	2.1.3
f)	Explain the operations of Enhancement and Depletion type N-channel MOSFET.	2	1	4	1	1.3.1
g)	Op-amp is mostly used as an integrator than a differentiator. Explain why?	2	2	2,4	1	1.3.1
Q2.	**Attempt any two parts of the following**					
a)	i. Define active region and saturation region in a silicon diode. ii. In the reverse-bias region the saturation current of a silicon diode is about 0.1 A (T 20°C). Determine its approximate value if the temperature is increased 40°C.	5	1,2	1,5	2	1.3.1

b)	i. Explain the working of positive clamper with proper circuit diagram and draw the waveforms at input and output of clamper. ii. Design and explain a clipper circuit that clips any portion of the input AC waveform below +4 volts using proper diagram.	5	2	3,4	2	2.1.2
c)	Derive the expression for the following parameters of half wave rectifier circuits. i. Average d.c Current (I_{dc}) ii. Average d.c Voltage (V_{dc}) iii. R.M.S value of current (I_{rms}) iv. Ripple factor(η) and Ripple efficiency(γ)	5	4	1,2	1	2.1.3

Q3. Attempt any Two parts of the following.

a)	Draw input and output characteristics of common emitter configuration. Calculate static forward resistance if applied forward bias voltage is 0.8 V and corresponding diode current is 150 mA.	5	2	4,5	2	2.1.3
b)	i. What do you understand by collector reverse saturation current? In which configuration does it have a greater value? ii. For the common base circuit, determine I_c and V_{CB}. Assume the transistor to be of silicon. I_E I_C R_E= 1.5 kΩ R_C= 1.2 kΩ V_{EE}= 8 V I_B V_{CC}= 18 V	5	2,4	2,4,5	2	2.1.3
c)	i. Explain the concept of early effect and current gain of the BJT. ii. Are the collector and emitter terminals of a transistor interchangeable? What is the physical difference between the emitter and collector?	5	2	3,4	2	1.3.1

Q4. Attempt any Two parts of the following.

a)	i. Derive relationship between transconductance (gm), amplification factor (m) and drain resistance (gd) of FET. ii. A JFET has values of V_{GS} (off) = – 8V and I_{DSS} = 16 mA. Determine the values of V_{GS}, I_D and V_{DS} for the circuit. + 10 V 2.2 kΩ R_D R_G 1 MΩ – 5 V	5	1,2	2,4,5	2	2.1.3
b)	i. Simplify the given SOP equation using K-map $y = F(A,B,C,D) = \Sigma m(2,3,6,7) + \Sigma d(8,10,11,15)$ ii. Convent the following into decimal number a. $(121)_{16}$ b. $(324)_8$	5	3	4,5	2	2.1.3
c)	i. What are the constructional differences between a FET and MOSFET? What effect do they have on the current conduction mechanism of a MOSFET? ii. Simplify the expressions, 1. $Y= ABC + \bar{A}B\bar{C} + A\bar{C}$ 2. $Y = AC + \bar{A}BC + AB\bar{C} + \bar{A}B$.	5	2,3	2,3	2	2.1.3

Q5.	Attempt any Two parts of the following.					
a)	What is Cathode Ray Oscilloscope? Explain its advantages and performance parameter with the help of basic block diagram.	5	6	1,3	1	1.3.1
b)	Why is inverting amplifier called a scale changer? Derive the expression with the help of neat and clean diagram.	5	4	3,4	1	1.3.1
c)	i. Differentiate between ideal and practical Op-amp. ii. Explain voltage transfer characteristics of open loop configuration of Op-amp with the help of proper diagram.	5	2,4	3,4,5	1	1.3.1

BL–Bloom's Taxonomy Levels (1-Remembering, 2-Understanding, 3–Applying, 4–Analysing, 5–Evaluating, 6-Creating)

CO – Course Outcomes

PO – Program Outcomes

PI Code – Performance Indicator Code

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B. Tech.
YEAR: I, SEMESTER: II
MAJOR EXAMINATION: 2021-2022
FUNDAMENTALS OF COMMUNICATION SYSTEMS

Max Marks: 50

Time: 3 Hrs.

Note: Attempt ALL questions. ALL questions carry equal marks.

Q1. Attempt any Five parts of the following.		Marks	CO	BL	PO	PI Code
a)	Draw the block diagram of a communication system and explain the function of each block.	2	CO1	1	1	1.3.1
b)	An FM radio link has a frequency deviation of 30 kHz. The modulating frequency is 3 kHz. Calculate the bandwidth needed for the link. What will be the bandwidth if the deviation is reduced to 15 kHz?	2	CO3	3	1	1.3.1
c)	What are the different type of signals? Differentiate between periodic and aperiodic signal.	2	CO4	2	1	1.3.1
d)	What is Nyquist rate? Discuss aliasing effect.	2	CO4	2		2.1.3
e)	What is Time division multiplexing? Differentiate between Synchronous and asynchronous TDM.	2	CO5	1	1	2.1.3

f)	Define the term modulation index. what is over modulation, under modulation and 100% modulation related to AM.	2	CO1	1	1	1.3.1
g)	Discuss about the concepts of frequency reuse and channel assignment in mobile communication	2	CO5	2	1	1.3.1

Q2. Attempt any Two parts of the following.

a)	Discuss DSB-SC-AM with diagram & drive the mathematical expression for bandwidth and power for the wave.	5	CO1	2	1	2.1.2
b)	When the percentage modulation is 75, an AM transmitter produces 10kW. How much of this is carrier power?. What would be the percentage saving in power if the carrier & one of the sidebands were suppressed before transmission took place?	5	CO1	3	1	2.1.3
c)	Explain the VSB-SC with its frequency spectrum. Mention Some of its advantages, disadvantages & applications.	5	CO1	3	1	2.1.3

Q3. Attempt any Two parts of the following.

a)	An angle modulated signal has the form $v(t) = 100cos[2\pi f_c t + 4\,Sin\,2000\pi t\,]$ where $fc = 5MHz$ i) Determine the average transmitted power ii) Determine the peak phase deviation iii) Determine the peak frequency deviation iv) Is this FM or a PM signal? Explain					
b)	Discuss the indirect methods for generation a wide-band FM signal.	5	CO3	2	1	2.1.3
c)	Discuss phase modulation (PM) signal with suitable diagram. Drive the equation for phase and frequency deviation for PM signal.	5	CO3	2	1	1.3.1

Q4. Attempt any Two parts of the following.

a)	State Sampling theorem with suitable figure. Further Determine the Nyquist sampling rate and the Nyquist sampling interval for the following signals. i. $\sin(2000\pi t)$ ii. $sin(4000\pi t) + \sin(6000\pi t)$	5	CO4	1,2,3	1	2.1.3
b)	Discuss pulse width modulation (PWM) with diagram. Compare PAM, PWM and PPM pulse modulation techniques.	5	CO4	1,2	1	2.1.3

			5	CO4	2	1	2.1.3
e)	Explain pulse code modulation (PCM) with suitable block diagram. Also elaborate each component of PCM systems.						

Q5. Attempt any Two parts of the following.

a)	What are the different types of noise in signal? Define (i) Signal to noise ratio (ii)Figure of Merits	5	CO5	1	1	1.3.1
b)	Discuss the evolution of mobile communication from 1G to 5G.	5	CO5	2	1	1.3.1
c)	Discuss the following: i. CDMA ii. GSM iii. LAN	5	CO5	3	1	1.3.1

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B. Tech.

YEAR : I SEMESTER : II
EVEN SEMESTER EXAMINATION, 2021-2022
Ordinary and Partial Differential Equations

Time: 03 Hrs.   **Max. Marks: 50**

Note: Answer all questions.

Q1. Attempt any five parts of the following.	Marks	CO	BL	PO	PI Code
(a) Solve the following simultaneous differential equations $\frac{dx}{dt} - y = e^t, \frac{dy}{dt} + x = \sin t$, given $x(0) = 0 = y(0)$.	2	1,6	3	1	1.1.1
(b) Solve the following P.D.E. by the method of separation of variable: $2u_x + 3u_y + 5u = 0$ with $u(0, y) = ze^{-y}$.	2	2,6	3	1	1.1.1
(c) Solve, $\frac{d^2y}{dx^2} - 2x\frac{dy}{dx} + (x^2 + 2)y = e^{\frac{1}{2}(x^2+2x)}$.	2	1,6	2/3	1	1.1.1
(d) State and prove Rodrigue's formula.	2	3,6	3	1	1.1.1
(e) Find the complete and singular integrals of $z = px + qy + pq$.	2	2,6	3	1	1.1.1
(f) Evaluate the value of $J_{\frac{1}{2}}$ and $J_{\frac{-1}{2}}$.	2	3,6	3	1	1.1.1
(g) Solve $r + s - 2t = (y - 1)e^x$.	2	2,6	3	1	1.1.1
Q2. Attempt any two parts of the following.					
(a) Solve $\frac{d^2y}{dx^2} + 3\frac{dy}{dx} + 2y = e^{e^x} + \sin(x + 3)$	5	1,6	3	1	1.1.1
(b) Solve, $y'' - 2y' + 2y = e^x \tan x$ by method of variation of parameter.	5	1,6	3	1	1.1.1
(c) Solve $x^2\frac{d^2y}{dx^2} + 4x\frac{dy}{dx} + 2y = \frac{1}{x} + \log x \sin(\log x)$.	5	1,6	3	1	1.1.1
Q3. Attempt any two parts of the following.					
(a) Prove that (i) $\int_{-1}^{1}(x^2 - 1)P_{n+1}P_n' \, dx = \frac{2n(n+1)}{(2n+1)(2n+3)}$. (ii) $\int J_3(x)dx = -J_2 - \frac{2}{x}J_1$.	5	3,6	3	1	1.1.1

(b)	Solve in series the differential equation $x\dfrac{d^2y}{dx^2}+\dfrac{dy}{dx}-y=0$.	5	3,6	3	1	1.1.1

(c)	Show that (i) $nP_n = xP'_n - P'_{n-1}$. (ii) $xJ'_n = nJ_n - xJ_{n+1}$.	5	3,6	2,3	1	1.1.1

Q4. Attempt any two parts of the following.

(a)	Solve (i) $(mz - ny)p + (nx - lz)q = lx - my$. (ii) $(D^2 + 6DD' + 9D'^2)z = 6x + 2y + e^{2x+y}$.	5	2,6	3	1	1.1.1
(b)	Use Charpit's method to find the complete integral of following P.D.E. $(p^2 + q^2)x = pz$.	5	2,4,6	3	1	1.1.1
(c)	Find the general integral of the PDE $(2xy - 1)p + (z - 2x^2)q = 2(x - yz)$ and the integral which passes through the lines $x = 1, y = 0$.	5	2,4,6	3	1	1.1.1

Q5. Attempt any two parts of the following.

(a)	A tightly stretched sting with fixed end points $x = 0$ and $x = 0$ is initially at rest in its equilibrium position. If it is set vibrating by giving to each of its points on initial velocity $\lambda x(l - x)$, find the displacement of the string at any distance $'x'$ from one end at any time t.	5	4,5,6	3	1	1.1.1
(b)	Determine the solution of one-dimensional heat equation $\dfrac{\partial u}{\partial t} = c^2\dfrac{\partial^2 u}{\partial x^2}$ subject to the boundary conditions $u(o, t) = 0, u(l, t) = 0, (t > 0)$ and the initial condition $u(x, 0) = x$, l being the length of the bar.	5	4,5,6	3	1	1.1.1
(c)	An initially long uniform plate is bounded by two parallel edges and an end at right angle to them. The breadth in π, the end is maintained at a temperate $100°C$ at all points and other edges are at $0°C$. Find the state temperature.	5	4,5,6	3	1	1.1.1

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