Code: 19AC21T

I B.Tech. II Semester Supplementary Examinations March 2021

Differential Equations and Vector Calculus

(Common to All Branches)

Max. Marks: 70   Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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Marks

UNIT–I

1. a) Solve $\dfrac{d^2 y}{dx^2} - 3\dfrac{dy}{dx} + 2y = xe^{3x} + \sin 2x$ 7M

   b) Solve $\dfrac{d^2 y}{dx^2} - 2\dfrac{dy}{dx} + y = xe^x \sin x$ 7M

OR

2. Using method of variation of parameters, solve

   $\dfrac{d^2 y}{dx^2} + y = x \sin x$ 14M

UNIT–II

3. Solve $(2x+3)^2 \dfrac{d^2 y}{dx^2} - (2x+3)\dfrac{dy}{dx} - 12y = 6x$ 14M

OR

4. An uncharged condenser of capacity C is charged by applying an e.m.f. $\dfrac{E \sin t}{\sqrt{LC}}$,

   through leads of self-inductance L and negligible resistance. Prove that at any

   time t, the charge on one of the plates is $\dfrac{EC}{2}\left\{\sin\dfrac{t}{\sqrt{LC}} - \dfrac{t}{\sqrt{LC}}\cos\dfrac{t}{\sqrt{LC}}\right\}$.   14M

UNIT–III

5. a) Form the partial differential equation by eliminating the arbitrary constants a, b
   and c from $(x-a)^2 + (y-b)^2 + z^2 = c^2$ 7M

   b) Solve $2xz - px^2 - 2qxy + pq = 0$ by Charpit's method.   7M

OR

6. a) Form the partial differential equation by eliminating the arbitrary function f from

   $z = y^2 + 2f\left(\dfrac{1}{x} + \log y\right)$ 7M

   b) Solve by the method of separation of variables $\dfrac{\partial u}{\partial x} = 4\dfrac{\partial u}{\partial y}$, given that

   $u(0, y) = 8e^{-3y}$.   7M

UNIT–IV

7. Prove that $\nabla^2 (r^n) = n(n+1)r^{n-2}$ 14M

OR

8. a) What is the directional derivative of $W = xy^2 + yz^3$ at the point (2, -1, 1) in the
   direction of the normal to the surface $x \log z - y^2 = -4$ at (-1, 2, 1).   7M

   b) Find the work done in moving a particle in the force
   field $\overline{F} = 3x^2 \overline{i} + (2xz - y)\overline{j} + z\overline{k}$, along the straight line from (0,0,0) to (2,1,3).   7M

UNIT–V

9. Verify Green's theorem for $\int_C (x^2 y dx + x^2 dy)$ where C is the boundary described

   counter clockwise of triangle with vertices (0, 0) , (1, 0) , (1, 1).   14M

OR

10. Verify Stoke's theorem for the vector field $\overline{F} = (2x - y)\overline{i} - yz^2 \overline{j} - y^2 z\overline{k}$ over

    the upper half surface of $x^2 + y^2 + z^2 = 1$, bounded by its projection on the xy-
    plane.   14M

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R-19

Code: 19A421T

I B.Tech. II Semester Supplementary Examinations March 2021
Electronic Devices and Circuits
(Common to EEE & ECE)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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			Marks	CO	Blooms Level

UNIT–I

1. a) **Draw** the self-bias circuit and obtain the expression for the stability factor. Discuss the advantages and disadvantages of self-biasing? — 7M — CO1 — L2

   b) **Justify** statement "Potential divider bias is the most commonly used biasing method" for BJT circuits. Explain how bias compensation can be done in such biasing through diodes? — 7M — CO1 — L2

OR

2. a) **Define** Thermal Runaway" in transistors? Derive the condition to prevent Thermal Runaway" in Bipolar Junction Transistors? — 7M — CO1 — L1, L3

   b) **Design** an Emitter bias circuit using silicon transistor to achieve a stability factor of 20, with the following specifications: V_{CC} = 16V, V_{BE} = 0.7V, V_{CEQ} = 8V, I_{CQ} = 4 mA &   = 50. — 7M — CO1 — L3

UNIT–II

3. a) With the help of neat sketches and characteristic curves **explain** the construction & operation of a JFET and mark the regions of operation on the characteristics? — 8M — CO2 — L2

   b) The P-channel FET has a $|I_{DS}|$=-12mA, $|Vp|$=5V, V_{GS} is 1.6 V. **Determine** I_D, G_m and G_{m0} ? — 6M — CO2 — L3

OR

4. a) **Explain** the construction & operation of a P-channel MOSFET in enhancement and depletion modes with the help of static drain characteristics and transfer characteristics? — 7M — CO2 — L2

   b) A self-biased p – channel JFET has a pinch – off voltage of V_P = 5 V and I_{DSS} = 12 mA. The supply voltage is 12 V. **Determine** the values of R_D and R_S so that I_D = 5 mA and V_{DS} = 6V? — 7M — CO2 — L3

UNIT–III

5. a) **Explain** ac and dc load lines. What is the **significance** of Q-point. — 7M — CO3 — L2

   b) **What** is ac emitter resistance? **Derive** voltage gain in terms of ac emitter resistance. — 7M — CO3 — L2

OR

6. a) **Define** Amplifier? **Outline** the classification of amplifiers in detail? — 7M — CO3 — L1, L4

   b) **Explain** the importance of the input impedance of an amplifier. — 7M — CO3 — L2

UNIT–IV

7. a) **Describe** is the effect of external source resistance on the voltage gain of a common source amplifier? Explain with necessary derivations? — 7M — CO4 — L2

   b) **Explain** the principle of CS amplifier with the help of circuit diagram. Derive the expressions for A_V, input impedance and output Impedance? — 7M — CO4 — L2

OR

8. a) A Common Source FET amplifier circuit shown in Figure.2 with unbypassed R_S has the following circuit parameters: R_d = 15K, R_S = 0.5K, Rg = 1M, r_d=5K, g_m= 5mS and V_{DD} = 20 V. **Find** A_V, A_I, R_i and R_0?
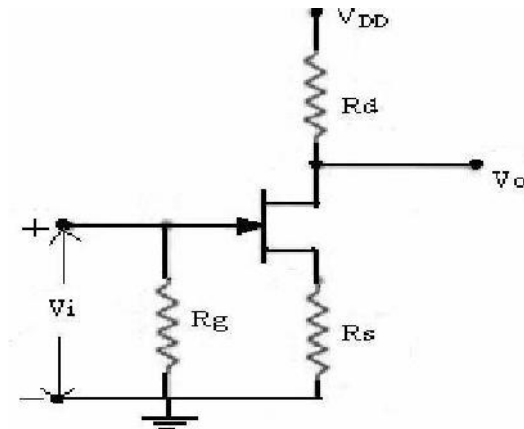
                                                        7M   CO4   L3

   b) **Draw** the small-signal model of common source FET amplifier. Derive expressions for voltage gain and output resistance?   7M   CO4   L3

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UNIT–V

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9. a) Write short notes on
     (i)   Varactor diode   (ii) Photo transistor   8M   CO5   L2

   b) **Draw** the symbol and explain the construction of SCR and explain its operation with characteristics   6M   CO5   L2

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OR

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10. a) Write short notes on
     (i) LED   (ii) UJT   8M   CO5   L2

   b) **Explain** the operation and characteristics of Schottky diode.   6M   CO5   L2

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R-19

Code: 19AC24T

I B.Tech. II Semester Supplementary Examinations March 2021
Engineering Chemistry
(Common to EEE & ECE)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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		Marks	CO	Blooms Level

UNIT–I

1. a) Explain the origin of single electrode potential and derive an expression for single electrode potential — 7M CO1 L2

   b) Classify the following cells into chemical cell, concentration cell (electrode or electrolyte) with or without transference:
   (i) H_2 (P_{H2}) | $H_2SO_{4(aq)}$, $Hg_2SO_{4(s)}$ | Hg
   (ii) $Zn(Hg)$ (a_1) | Zn^{2+} (a_{Zn2+}) | $Zn(Hg)$ (a_2)
   (iii) H_2 (g, 1 atm) | HCl (a_1) | HCl (a_2) | H_2 (g, 1 atm) — 7M CO1 L4

OR

2. a) What are reference electrodes? How do you construct hydrogen electrode? Write its half-cell reaction, advantages and disadvantages. — 7M CO1 L3

   b) (i) How can you differentiate the concentration cell from galvanic cell?
   (ii) What is half-cell reaction? Write half-cell reactions for metal-metal ion electrode and metal-metal insoluble salt electrodes with suitable examples. — 7M CO1 L3

UNIT–II

3. a) Discuss the chemistry and working principle of a lithium-MnO_2 cell — 7M CO2 L3

   b) List out the characteristics of good battery and explain any three of them in detail — 7M CO2 L2

OR

4. a) Explain the construction and working of propane and oxygen fuel cell — 7M CO2 L3

   b) What is meant by fuel cell? How does it differ from a conventional galvanic cell? Write merits of fuel cell? — 7M CO2 L3

UNIT–III

5. a) Explain the manufacturing of photovoltaic cells using vapour deposition technique — 7M CO3 L2

   b) Discuss physical and chemical properties of silicon and comment on solar grade silicon — 7M CO3 L2

OR

6. Explain the doping concept of a silicon semiconductor — 14M CO3 L2

UNIT–IV

7. a) Write a short note with suitable examples on (i) Chain growth polymerization and (ii) Step growth polymerization — 7M CO4 L4

   b) Discuss the functionality of monomers with good examples and how it is involved in the polymerization process. — 7M CO4 L3

OR

8. a) Describe the synthesis and applications of polyaniline, a conducting polymer. — 7M CO4 L2

   b) What is an elastomer? Discuss the preparation, main properties and uses of the following:
   (i) Bakelite and (ii) Buna-S — 7M CO4 L4

UNIT–V

9. a) What is meant by nanoparticles? Write a note on carbon nano tubes (CNT) and nanowires. — 7M CO5 L3

   b) Describe the working principle and applications of transition electron microscope (TEM) — 7M CO5 L2

OR

10. a) What are molecular switches? Explain the applications of Rotaxanes and Catenanes to molecular switches. — 7M CO5 L3

    b) Write a note on the following:
    (i) Cyclodextrin-based switches and
    (ii) Back and forth switching — 7M CO5 L2

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Code: 19AC26T

I B.Tech. II Semester Supplementary Examinations March 2021
Environmental Science
(Common to EEE & ECE)

Max. Marks: 70   Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1. a) List and explain the four conceptual spheres in the earth's environment.   7M
    b) Summarize the need for public awareness about environment.   7M

OR

2. Explain the scope and importance of environmental studies.   14M

UNIT–II

3. a) What are renewable and nonrenewable natural resources? Give examples.   7M
    b) Summarize the causes of deforestation.   7M

OR

4. a) Discuss the importance of land as a natural resource.   7M
    b) Explain the various effects of soil erosion.   7M

UNIT–III

5. a) Describe the components of an ecosystem.   7M
    b) Explain briefly the ex situ conservation of biodiversity.   7M

OR

6. a) With a neat sketch, explain how the element carbon is recycled in nature.   7M
    b) Discuss briefly the in situ conservation of biodiversity.   7M

UNIT–IV

7. a) List and explain the control measures of air pollution.   7M

    b) Identify and explain the human activities contributing to large scale water pollution. 7M

OR

8. a) Discuss in detail the control measures of noise pollution.   7M
    b) Describe the effects and control measures of water pollution.   7M

UNIT–V

9. a) Describe the causes of population explosion.   7M
    b) List the salient features of forest conservation act.   7M

OR

10. a) Summarize the salient features of air (prevention and control of pollution) act.   7M
    b) Explain the effects and control of AIDS.   7M

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R-19

Code: 19AC25T

I B.Tech. II Semester Supplementary Examinations March 2021

Functional English and Life Skills

(Common to EEE & ECE)

Max. Marks: 70   Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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		Marks	CO	Blooms Level

UNIT–I

			Marks	CO	Blooms Level
1. a)	What is Hazlitt's advice, in his letter to his son, on health and the choice of a profession?		7M	CO1	L2
b)	**Change the following statements into questions:** i. You don't want to play indoor games. ii. She attended the party yesterday iii. Ramya always thinks about her friends.		3M	C03	L4
c)	**Fill in the blanks with appropriate form (part of speech) of the underlined words:** i. <u>Attraction</u> is quite common for teenagers. They always want to _____the opposite gender. ii. Tharun is leading an ideal life. He never <u>insult</u>s anyone. He controls himself if he faces any _____ iii. <u>Believe</u> in yourself. That _____ makes you great in your life and career. iv. Symala's <u>behavior</u> is good. Her mother taught her how to ___ with others.		4M	CO3	L3

OR

			Marks	CO	Blooms Level
2. a)	'If neither foes nor loving friends can hurt you' - What kind of ethical behaviour one should possess to achieve the above mentioned state in the present day society?		7M	CO2	L2
b)	**Rearrange the following jumbled sentences in a correct sequence:** P. Then two astronomers—the German, Johannes Kepler, and the Italian, Galileo Galilei started publicly to support the Copernican theory, despite the fact that the orbits it predicted did not quite match the ones observed. Q. His idea was that the sun was stationary at the centre and that the earth and the planets moved in circular orbits around the sun. R. An idea / a simple model was proposed in 1514 by a Polish priest, Nicholas Copernicus. S. Nearly a century passed before this idea was taken seriously		4M	C04	L4
c)	Use the following words in your own sentences i. Compute ii. Lately iii. origin		3M	CO3	L3

UNIT–II

			Marks	CO	Blooms Level
3. a)	. Write the summary of Alfred Lord Tennyson's poem 'The Brook'		7M	CO1	L1
b)	**Fill in the blanks with correct articles/zero article:** i. Ramanath is an Indian but his wife Katherina _____ European. ii. Danush plays cricket very well. He is _____ Virat Kohli of our college.		2M	CO3	L3
c)	Write a paragraph in about 70 words on 'Self Discipline'.		5M	CO4	L4

OR

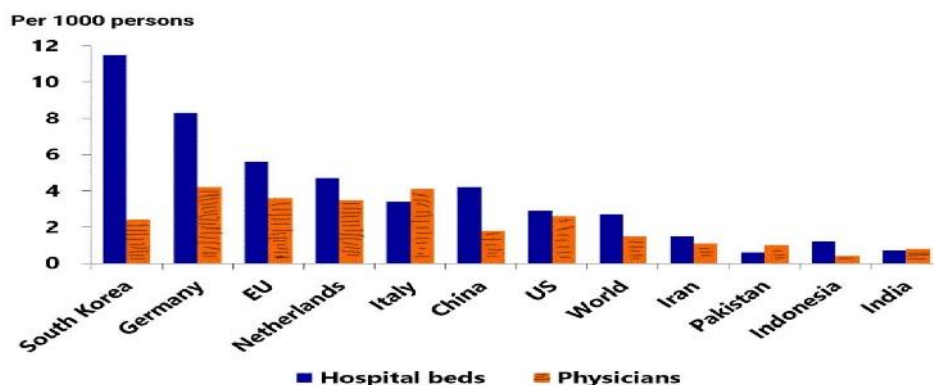|			Marks	CO	Blooms Level
4. a)	How did GB Shaw, a Nobel Prize winner in literature, who was nervous to speak in public, transform himself into a great public speaker?		7M	CO2	L2
b)	**Fill in the blanks with appropriate connectors/linkers:** i. After spending two months at home, the thought of returning to work is tiring. Obviously I don't want to go. _____, I have decided to go as I am in need of money. ii. Ramesh is honest and kindhearted. He always wants to help the people around him. Many of his friends, classmates and neighbours got help from him._____, his brother is a cruel man and he always has evil thoughts about others.		2M	CO3	L3
c)	Write a Paragraph in about 70 on 'Reading Books'		5M	CO4	L4

UNIT–III

5. a) Sketch the character of Dr. Stronetz in Saki's play 'The Death Trap'   7M   CO1   L2

b) **Summarize the following text:**

The Olympic Games are one of the best examples which prove how sporting events can bring nations together, at least temporarily. From the ancient history, when Greeks and Romans would interrupt battles to participate in the games to the more recent international disputes, when athletes from Palestine and Israel would forget their differences, compete peacefully and even embrace each other after an event. Moreover, these popular events have called the world's attention to the terrible consequences of the wars and thus some leaders have tried to reach agreements to end their disputes and live peacefully. Similarly, international sporting events show benefits in some developing countries which live in a daily internal civil war. For example, Brazil has a high rate of unemployment, lack of education, hunger, crime, poverty and corruption which leads to an immense embarrassment of being Brazilian and a low self-esteem. However, when the Football World Cup starts, the Brazilian squad, which is considered the best team in the world, provokes an amazing feeling of pride in their country. Most people seem to forget all their problems and even the criminal activity decreases. They paint roads with the national colours, wear the Brazilian team shirts and buy national flags. Moreover, the competition brings families and neighbors together and even rival gangs watch the games and celebrate peacefully. In conclusion, popular sporting events play an important role in decreasing international tensions and liberating patriotic feelings as history has shown.   5M   CO2   L4

c) **Change the following sentences into Indirect Speech:**

i. Rani said, 'She has applied for scholarship'

ii. My teacher says, ' health is wealth'   2M   CO3   L2

OR

6. a) 'Hold every hour in your grasp'- What exactly is the writer's view? Explain some time management tips.   7M   CO2   L2

b) **Fill in the blanks with the suitable form of the verb given in brockets:**

i. He has forgotten his pen again. He always_____ (forget) his pen.

ii. We were disappointed because the programme _____ (start) before we reached the venue.

iii. My close friend who owns two big companies _____ (earn) one crore rupees per annum.

iv. You rejected her love proposal. If I were you, I _____ (accept) her love without second thought.   4M   CO3   L3

c) **Choose the correct option from the brockets:**

i. Neither my friend nor my classmates ____ (has/ have) supported me in this issue.

ii. Samantha as well her co-actors _____(is/are) coming to our village.

iii. A number of poor people _____(die/dies) every day due to lack of food.   3M   CO3   L3

UNIT–IV

7. a) How did Yellamma earn a special place with her artistic skills in 'Chindu Baghavatam'?   7M   CO1   L2

b) **Transfer the information into text:**
Health Facilities in different Countries

Per 1000 persons
■ Hospital beds   ■ Physicians
South Korea, Germany, EU, Netherlands, Italy, China, US, World, Iran, Pakistan, Indonesia, India

   7M   CO2   L2

OR

8. a) 'Innovative ideas are essential to success'- justify your answer with reference to Yunus Social Business.   7M   CO2   L4

b) **Mark the following comparisons true or false:**

i. Kamala is the tallest of the two girls.

ii. The climate of Bengaluru is better than Kadapa

iii. India is one of the biggest democratic counties in the world.   3M   CO3   L2

c) **Give antonyms to the underlined words:**

Nature is our mother. Nature <u>heals</u> us. We have a strong bond and emotional connection with nature. The <u>serenity</u> of nature calms our heart. Both the stillness and the movement in nature have a hypnotizing effect. The unfolding creativity of nature is an art. The practice of devoting ourselves to the <u>bliss</u> of nature is soothing and reviving. Nature always <u>strengthen</u>s her children.   4M   CO3   L3

UNIT–V

9. a) What are the questions, according to George Orwell, a scrupulous writer asks himself in every sentence he writes?   7M   CO1   L1

b) **Correct the following sentences:**

  i. The doctor and the philosopher has been felicitated this morning.

  ii. If my father will permit, I will attend the function.

  iii. The students are learning English for two years

  iv. All the articles which has been placed on the table needs repair.

  v. Teja prefers money than fame.

  vi. My father is a MP and my elder sister is an MLA.

  vii. Rao's father congratulated him for his success.   7M   CO3   L3

OR

10. a) Narrate Mrunalini Sarabai's motivated life story.   7M   CO1   L1

b) Write an Essay in about 150 words on the topic 'The social Responsibilities of Multinational Companies' using the following claims.

Earning money should not be the sole aim of the companies- they can hold the entire nation's political power in their grip – they themselves should be ready to take up socially benefited schemes- they need to give something back to the society- smile on the lips of the people should be the goal of MNCs.   7M   CO4   L5

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Code: 19A522T

I B.Tech. II Semester Supplementary Examinations March 2021
Programming through Python
(Common to EEE & ECE)

Max. Marks: 70   Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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		Marks	CO	Blooms Level
	UNIT–I			
1.	Examine the various control structures in python with suitable examples	14M	CO1	L3
	OR			
2. a)	Describe the following operation in tuples, i) Maxima ii) Minima iii) Sum of two tuples iv) Duplicate a tuple v) Slicing operator	7M	CO1	L1
b)	Show how an input and output function is performed in python with an example.	7M	CO1	L1
	UNIT–II			
3. a)	Describe the syntax and rules involved in the return statement in python	7M	CO2	L1
b)	What is the major advantage and disadvantages of sets over lists? Describe a Python program to demonstrate differences between normal and frozen set	7M	CO2	L1
	OR			
4.	Examine the following **a**) Creating the List **b**) Accessing values in the Lists **c**) Updating the Lists **d**) Deleting the list Elements	14M	CO2	L3
	UNIT–III			
5. a)	How to access characters of a string?	7M	CO3	L3
b)	Define file handling. Illustrate with an example of closing a file.	7M	CO3	L3
	OR			
6. a)	Examine the importance of user – defined Exceptions	7M	CO3	L3
b)	Write a python program for reading text from a file	7M	CO3	L3
	UNIT–IV			
7. a)	Show the importance of encapsulation in python. Explain with example.	7M	CO4	L3
b)	List the companies which employ python and quote the areas in which python is used extensively nowadays.	7M	CO4	L3
	OR			
8.	Illustrate the concept of classes in python with suitable program.	14M	CO4	L3
	UNIT–V			
9.	Describe the concept of stack implementation using python list.	14M	CO5	L1
	OR			
10.	Define Single linked list and examine (**i**) traversing (**ii**) searching operations with example program	14M	CO5	L1&L3

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