B.Tech II Semester End Examinations DEC – 2023

DIFFERENTIAL EQUATIONS & VECTOR CALCULUS (20ABS5402)

(Common to CIV, CSE, ECE & MEC)

Time: 3 Hours | Max. Marks: 70

PART-A **(10 X 2 = 20 M)**

(Compulsory Question)

Answer the following.			Unit	Marks
I	(a)	Solve $(D^2 + 1)^2 (D - 1)y = 0$	I	(2 M)
	(b)	Find the P. I of $(D^2 - 2D + 4)y = e^x Cosx$	I	(2 M)
	(c)	If $U = x^2 \tan^{-1}\frac{y}{x} - y^2 \tan^{-1}\frac{x}{y}$ then Show that $\frac{\partial^2 U}{\partial x \partial y} = \frac{\partial^2 U}{\partial y \partial x}$	II	(2 M)
	(d)	If $U = \sin^{-1}\frac{x+2y+3z}{x^8+y^8+z^8}$ then find $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} + z\frac{\partial u}{\partial z}$	II	(2 M)
	(e)	If $\emptyset(\frac{z}{x^3}, \frac{y}{x}) = 0$ Prove that $x\frac{\partial z}{\partial x} + y\frac{\partial z}{\partial y} = 3z$	III	(2 M)
	(f)	Write the Working rule of Legrange's method of undetermined multipliers	III	(2 M)
	(g)	If $\emptyset = \log(x^2 + y^2 + z^2)$ find $\nabla\emptyset$	IV	(2 M)
	(h)	Evaluate div F at the point (1, 2, 3) given $F = x^2yz\,\vec{i} + xy^2z\,\vec{j} + xyz^2\vec{k}$	IV	(2 M)
	(i)	State Stoke's theorem	V	(2 M)
	(j)	Compute the line integral $\int_c y^2\,dx - x^2\,dy$about the triangle vertices (1, 0), (0, 1) and (-1, 0)	V	(2 M)

PART-B **(5 X 10 = 50 M)**

(Answer One FULL Question from each Unit; All questions carry EQUAL marks)

UNIT-I

2 A body hung weighing 10 Kg hung from a spring. A pull of 20 Kg weight will stretch the spring to 10 cm the body is pulled dowb to 20 cm below the static equilibrium and then released. Find the displacement of the body from it's equilibrium position at time t sec, the maximum velocity and period of oscillation (10 M)

(OR)

3 In an LCR circuit the charge q on a plate of a condenser is given by $L\frac{d^2q}{dt^2} + R\frac{dq}{dt} + \frac{q}{c} = E \sin pt$. The circuit is tuned to resonance so that $p^2 = \frac{1}{LC}$. If initially the current I and charge q are zero, Show that for small values of R/L, the current in the circuit at any time t is given by $\left(\frac{Et}{2L}\right) Sin\ pt.$ (10 M)

UNIT-II

4 A rectangular box open at the top is to have volume of 32 Cu units find the dimensions of the box requiring least material for it's construction (10 M)

(OR)

5 Find the Maximum and minimum distances of the point (3, 4, 12) from the sphere $x^2 + y^2 + z^2 = 4$ (10 M)

UNIT-III

6 Find the values of u(x, t) satisfying the parabolic equation $\frac{\partial u}{\partial t} = 4\frac{\partial^2 u}{\partial x^2}$ and boundary conditions u(0, t) = 0 = u(8, t) and $u(x, 0) = 4x - \frac{1}{2}x^2$ at the points x = i : i = 0, 1, 2 .... 8 and $t = \frac{1}{8}j$: j=0, 1. (10 M)

(OR)

7 Evaluate the pivotal values of the equation $u_{tt} = 16\ u_{xx}$ taking h = 1 upto t = 1.25 and the boundary conditions are u(0, t) = u(5, t) = 0 and $u(x, 0) = x^2(5 - x)$ (10 M)

UNIT-IV

8 A line makes angles $\alpha, \beta, \gamma, \delta$ with diagonals of a cube prove that $Cos^2\alpha + Cos^2\beta + Cos^2\gamma + Cos^2\delta = 4/3$ (10 M)

(OR)

9. Find the moment about a line through the origin having direction of $2\mathbf{I} + 3\mathbf{J} + \mathbf{K}$ due to a 30 Kg force acting at a point (4, -2, 5) in the direction of $12\mathbf{I} - 4\mathbf{J} - 3\mathbf{K}$ (10 M)

UNIT-V

10 Verify Green's theorem for $\int_c [(xy + y^2)dx + x^3dy$ where c is bounded by $y = x$ and $y = x^2$ (10 M)

(OR)

11 Evaluate $\int_s F.ds$ where $\mathbf{F} = 4x\mathbf{I} - 2y^2\mathbf{J} + z^2\mathbf{K}$ and **s** is the surface bounding the region $x^2 + y^2 = 4$, $z = 0$ and $z = 3$ (10 M)

20ABS5402 22RU1A0402

B.Tech. DEGREE EXAMINATION, JULY-2023

Second Semester

DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

(Common to First Semester CE, CSE, ECE and ME)

(RU19 Regulations)

Time : 3 *Hours* *Max. Marks : 70*

PART — A

(Compulsory question) **(10 × 2 = 20 Marks)**

Answer the following.

1. (a) Solve : $(D^2+2D+4)y=0$.

(b) Find the P.I of $(D^2+a^2)y = Tan\, ax$.

(c) Eliminate the arbitrary constants from $z=(x^2+a)(y^2+b)$.

(d) Eliminate the arbitrary constants from $z=ax+by+a^2+b^2$.

(e) Classify $u_{xx}-3u_{xy}+u_{yy}=0$.

(f) Classify $u_{xx}+2u_{xy}+5u_{yy}=0$.

(g) Find the directional derivative of the function $xy^2+yz^2+zx^2$ along the tangent to the curve $x=t, y=t^2,\ z=t^3$ at the point $(1,1,1)$.

(h) Define the divergence of a vector.

(i) Find the work done in moving a particle in the plane $=3x^2$.

(j) State Gauss divergence theorem.

Turn Over

PART — B

(Answer ONE Full question from each Unit. All questions carry equal marks) **(5 × 10 = 50 Marks)**

UNIT – I

2. (a) Solve : $(D^3 - 5D^2 + 8d - 4)y = e^{2x}$. (5)

   (b) Solve : $(D^2 + 4D + 5)y = -2\cosh x$. (5)

Or

3. (a) A condenser of capacity C discharged through an inductance L and resistance R in series and the charge q at time t satisfies the equation. $L\frac{d^2q}{dt^2} + R\frac{dq}{dt} + \frac{q}{c} = 0$. Given that $L = 0.25$ hentries, $R = 250$ ohms, $C = 2\times10^{-6}$ farads and that when $t = 0$, charge q is 0.002 coulombs and $\frac{dq}{dt} = 0$ find q interms of t. (5)

   (b) A particle is executing SHM of period T about it's center O and it passes through the position $P(OP = b)$ with velocity in the direction OP. Show that the time elapses before it returns to P is (5)

UNIT II

4. (a) Find the differential equation of all spheres of fixed radius having their centre on the XY -plane. (5)

   (b) Form the partial differential equation by eliminating the arbitrary functions from $xyz = f(x^2 + y^2 + z^2)$. (5)

Or

5. (a) Solve : $(x^2 - y^2 - z^2)\,p + 2xyq = 2xz$. (5)

   (b) Solve : $p\tan x + q\tan y = z$. (5)

UNIT III

6. Solve $2+ = 0$, $z(x,0) = 5e^{-x}$ by the method of separation of variables. (10)

Or

7. A tightly stretched flexible string has its ends fixed at $x = 0$ and $x = l$. At the time $t = 0$, the string is given a shape defined by $F(x) = kx^2(l - x)$, where k is a constant, and then released from rest. Find the displacement at any point x of the string at any time $t > 0$. (10)

UNIT IV

8. Find the constant a, b, c if $= (2x + 3y + 4z)\vec{i} + (bx + 2y + 3z)$. (10)

Or

9. (a) Show that $^2 f(r) = f''(r) + f'(r)$. (5)

(b) Show that is solenoidal. (5)

UNIT V

10. Use Gauss divergence theorem to evaluate ds. (10)

Or

11. Verify divergence theorem for $F = 4xzI - y^2J + yzK$, taken over the cube bounded by $x = 0,\ x = 1;\ y = 0,\ y = 1,\ z = 0,\ z = 1$. (10)

20AES0301T

B.Tech. DEGREE EXAMINATION, OCTOBER 2022

End Examination

Second Semester

Computer Science and Engineering, M.E.

ENGINEERING DRAWING

RU20 Regulations

(Academic Year 2021 – 22)

Regular & Supplementary

Time : 3 *Hours* *Max. Marks : 70*

Answer ONE full Question from each Unit.

All questions carry equal marks.

UNIT – I

1. Two points A and B are 50 mm apart. Draw the curve traced out by a point P moving in such a way that the difference between its distances from A and B is always constant and equal to 20 mm.

Or

2. Construct a cycloid having a rolling circle diameter as 50 mm for one revolution. Draw a normal and tangent to the curve at a point 35 mm above the directing line.

UNIT – II

3. A 100 mm line AB, measures 70 mm in top view and 80 mm in profile view. The end A 80 mm from profile plane, 90 mm above HP and 30 mm in front of VP. Draw the front view and top view of the line and find its inclinations with HP and VP.

Or

4. A regular hexagonal lamina with its edge 50 mm has its plane inclined at 45° to HP and lying with one of its edges in HP. The plan of one of its diagonals is inclined at 45° to XY. The corner nearest to VP is 15 mm in front of it. Draw its projections.

Turn Over

214A

UNIT – III

5. A hexagonal prism, side of the base 30 mm long and the axis 60 mm long has one of its sides on the H.P. and the axis is inclined at 45° to the H.P. Draw its projections. Project another front view on an auxiliary vertical plane which is inclined at 40 degrees to the V.P.

Or

6. A solid right circular cone of base diameter 50 mm and axis 50 mm long is freely suspended from a point on the periphery of base. Draw its projection when the axis is parallel to VP.

UNIT – IV

7. A right regular hexagonal prism, base 30 mm side and axis 60 mm has a face on ground and axis parallel to VP. It is cut by a plane perpendicular to HP and inclined at 45° to HP and passing through a point on the axis 20 mm from the base. Draw the projections.

Or

8. A cone, diameter of base 50 mm and axis 65 mm long, is lying on the H.P. on one of its generators with the axis parallel to the V.P. It is cut by a horizontal section plane 12 mm above the ground. Draw its front view and sectional top view.

UNIT – V

9. A hexagonal prism of side of base 30 mm and height 60 mm is resting on HP with one of its base edges parallel to VP. Right half of the solid is cut by an upward plane inclined at 60° to the ground and starting from the axis and 30 mm below the top end. The left half of the solid is cut by a plane inclined at 30° to the HP downwards from the axis. The two section planes are continuous. Draw the development of the lower portion.

Or

10. A vertical cone of 40 mm diameter of base and height 50 mm is cut by a cutting plane perpendicular to V.P and inclined at 30° to the H.P so as to bisect the axis of the cone. Draw the development of the lateral surface of the truncated portion of the cone.

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B.Tech. DEGREE EXAMINATION, JULY 2023.

Second Semester

APPLIED PHYSICS

(Common To CSE and ECE)

(RU 20 Regulations)

Time : 3 Hours *Max. Marks : 70*

PART — A

(Compulsory Question)

Answer the questions. **(10 × 2 = 20 Marks)**

1. (a) What is meant by Coherence?
   (b) Briefly Explain about Diffraction?
   (c) Write short notes on spontaneous emission?
   (d) Define Acceptance angle?
   (e) What is Anti Ferromagnetism?
   (f) Write a note on Permeability?
   (g) Define Matter waves?
   (h) Give mathematical Expression for Fermi-Dirac function?
   (i) What is Diffusion current?
   (j) Define intrinsic semiconductor?

PART — B

Answer One FULL Question from each Unit; All questions carry EQUAL marks **(5 × 10 = 50 Marks)**

UNIT-I

2. Explain about Interference in thin films by reflection? (10)

Or

3. Explain about Fraunhofer diffraction due to multiple slit? (10)

UNIT-II

4. Explain about Ruby LASER action with neat sketch? (10)

Or

5. Expalin about classification of optical fiber based on Refractive index? (10)

UNIT-III

6. Explain about Clausius-Mossoti Equation? (10)

Or

7. Explain about classification of magnetic materials? (10)

UNIT-IV

8. Derive the expression for Schrodingers Time dependent Equation? (10)

Or

9. Explain about Bloch function and Kronig-penny model. (10)

UNIT-V

10. Explain about Hall effect and coefficient? (10)

Or

11. Explain about Meisners effect and Applications of Superconductors. (10)

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20AES0301T

B.Tech. DEGREE EXAMINATION, JULY 2023

First Semester

ENGINEERING DRAWING

(Common To First Semester CE, ECE and Second Semester CSE and ME)

(RU 20 Regulations)

Time : 3 Hours *Max. Marks : 70*

Answer ONE full question from each Unit.

ALL questions carry equal marks.

UNIT I

1. Draw an ellipse, given the minor and major diameters are 100mm and 150mm respectively. Draw the tangent and normal at any point on the curve. (14)

Or

2. Construct a hypocycloid, rolling circle 60 mm diameter and directing circle 180mm diameter. Draw a tangent to it at a point 60 mm from the center of the directing circle. (14)

UNIT II

3. The end A of a line AB of 100 mm length is in the H.P, while the end B is in the V.P. The line is equally inclined to both HP and VP. Draw the projections of AB.(14)

Or

4. A square ABCD of 50 mm side has its corner A in the H.P. its diagonal AC inclined at 30 degrees to the H.P. and the diagonal BD inclined at 45^0 to the V.P. and parallel to the H.P. Draw its projections. (14)

UNIT III

5. Draw the projections of a pentagonal prism, base 30 mm side and axis 60 mm long, resting on one of its rectangular faces on the H.P. with the axis inclined at 30^0 to the V.P. (14)

Or

6. Draw the projections of a cone, base 50 mm diameter and axis 75 mm long. lying on a generator on the ground with the top view of the axis making an angle of 45^0 with the vertical plane. (14)

UNIT IV

7. A hexagonal prism side of base 30mm and axis 60mm long, rests with its base on HP such that one of its rectangular faces is parallel to VP. A section plane perpendicular to HP and parallel to VP cuts the prism at distance of 10 mm from its axis. Draw its top and sectional front views. (14)

Or

8. A cone of base 55mm diameter and axis 65mm long, rests with its base on HP. A section plane perpendicular to both HP and VP cuts the cone at a distance of 8 mm from its axis. Draw its top view, front view and sectional side view. (14)

Turn Over

UNIT V

9. A right regular hexagonal prism, base 30 mm side and axis 60 mm has a face on ground and axis parallel to VP. It is cut by a plane perpendicular to HP and inclined at 45^0 to HP and passing through a point on the axis 20 mm from the base. Draw the projections and development of the sectioned solid. (14)

Or

10. A vertical cone of 40 mm diameter of base and height 50 mm is cut by a cutting plane perpendicular to V.P and inclined at 30^0 to the H.P so as to bisect the axis of the cone. Draw the development of the lateral surface of the truncated portion of the cone. (14)

20AHS5201T

B.Tech. DEGREE EXAMINATION, JULY 2023.

First Semester

COMMUNICATIVE ENGLISH

(Common to I Sem CE and ECE & II Sem CSE and ME)

Time : 3 Hours *Max. Marks : 70*

PART — A

(Compulsory Questions) **(10 × 2 = 20 Marks)**

Answer the following.

1. (a) Define uncountable Nouns with suitable Countable and examples for each.

(b) Identify Parts of speech of the words in bold in the following sentences:

(i) The Horse **Pranced** down the road

(ii) She shouted in a **loud** voice.

(c) Change the following sentences from Present Tense to Past Tense:

(i) I see the movies yesterday.

(ii) Australia wins the cricket by four runs.

(d) Write word forms for the following words; NO

UN	VERB	ADJECTIVE
_____	_____	Independent
_____	Confuse	_____

(e) Provide Articles for the following sentences:

(i) What _____ nice view!

(ii) Canada is one of _____ leading countries in IT sector.

(iii) Medicine is _____ useful course.

(iv) I Want to know _____ truths.

Turn Over

(f) Change the following into Indirect Speech:

(i) Paul came in and said, "I'm really hungry.

(ii) "I Have a new car"

(g) Convert the following into Passive voice:

(i) The kids have cleared the kitchen

(ii) We found a new car in the woods"

(iii) Father helped me.

(iv) He is taking a test to qualify in the course.

(h) Use the Adverbs and frame meaningful following sentences.

(i) Nastily

(ii) Valiantly

(iii) Thankfully

(iv) More

(i) Write a brief note on types of adjectives with appropriate examples for each.

(j) Punctuate the following sentences:

(i) Do your chores.

(ii) Mistakes were made I didn't make them.

PART — B

Answer ONE Full Question from each Unit; All questions carry Equal marks

(5 × 10 = 50 Marks)

UNIT – I

2. What according to William Hazlittis the "Ignorance of the Learned". (10)

Or

3. Read the following passage and answer the questions that follow. (10)

The tribal youth are given vocational training under a special scheme to enable them to become self-employed. Then, there are youth hostels set up all over the country to provide cheap accommodation to the youth to inspire them into undertaking educational tours and excursions to visit the cultural and historic sites to revisit our glorious past. 446 Nehru YuvakKendras strewn around the country provide vocational training to non-student rural youth and improve their personality. 'Bharat Scouts and Guides' and 'All India Boy Scouts Association' are teaching Indian youth the importance of loyalty and goodwill for others under the international scouting and guiding movement.

QUESTIONS:

(a) For what purpose youth hostels with cheap accommodation are set up?

(b) What is the Aim of this scheme?

(c) How many centers were established in this scheme?

(d) What is the importance of this scheme?

(e) What is the eligibility for this scheme?

UNIT – II

4. Write a paragraph about a new invention that you would create. Use descriptive phases to describe your invention and to support the topic. (10)

Or

5. (a) Why has the word 'chatter' been repeated in the poem? (5)

(b) What are the mechanics of Writing? (5)

UNIT – III

6. Do you feel the title of the play, The Death trap, appropriate? If so why? (10)

Or

7. (a) Fill in the blanks with appropriate tense forms. (5)

(i) Good students never ———— lies (told/tell)

(ii) He ill since last week. (has been/had been)

(iii) The steamer yesterday. (sailed/has sailed)

(iv) I will ———— his parents tomorrow. (see/seen)

(v) The school time is over, the peon ———— the bell (ring/rung)

(b) Identify Subject and Predicate in the following Sentences. (5)

(i) I want a new bike.

(ii) Tim plays soccer.

(iii) The Sun is moving.

(iv) Sujith is a nice boy.

(v) The fish swim in the ocean.

UNIT – IV

8. Write a Letter to District Collector demanding that the Govt. School in your area should be renovated. (10)

Or

9. (a) Fill in the blanks given below with the correct prepositions. (5)

   (i) Cat jumped _____the counter.

   (ii) Gita lost her ring _____ the beach.

   (iii) She was hiding _____the table.

   (iv) We are playing _____the tree

   (v) He drove _____ the bridge.

   (b) Write a short note on the significance of verbs and Adverbs in a sentence with suitable examples. (5)

UNIT – V

10. (a) Write a short note on "Individuality of an women". (5)

   (b) Correct the following sentences. (5)

   (i) Do not advise her, she won't listen.

   (ii) They had a party planned for Amy.

   (iii) The man's purse was lost in the bus.

   (iv) I will ask to my mother tonight.

   (v) I knew Paul at a party last year.

Or

11. Orwell's essay was written in 1946. Do you think any of its lesson still resonate in recent times? Elaborate. (10)

B.Tech IV Semester End Examinations DEC – 2023

Python Programming (20AES0503T)

(CSE)

Time: 3 Hours

Max. Marks: 70

PART-A

(Compulsory Question) **(10 X 2 = 20 M)**

Answer the following.

			Marks
1	a)	What is the difference between compiled and interpreted languages?	2M
	b)	Explain about keywords used in Python.	2M
	c)	What are Python assignment operators? Explain.	2M
	d)	What is the difference between immediate mode and script mode?	2M
	e)	Explain the syntax of "for- loop"?	2M
	f)	What are lists?	2M
	g)	Explain the syntax of WHILE-loop?	2M
	h)	Give a short note on indexing and slicing?	2M
	i)	Differentiate between class variables and instance variables.	2M
	j)	Write functions.	2M

PART-B

(Answer One FULL Question from each Unit; All questions carry EQUAL marks) **(5X 10 = 50 M)**

UNIT-I

2		List different operators in Python in the order of their precedence	(10 M)
		(OR)	
3	a)	Describe the features of Python.	(5 M)
	b)	Explain the rules for writing identifiers. Write any four keywords in Python.	(5 M)

UNIT-II

4		Explain the need for fruitful functions with suitable examples.	(10 M)
		(OR)	
5		Write Python code to determine whether the given string is a Palindrome or not	(10 M)

UNIT-III

6		Discuss about list and dictionary comprehensions in Python.	(10 M)
		(OR)	
7		What are the different operations that can be performed on a list? Explain with example programs.	(10 M)

UNIT-IV

8		Explain inheritance class with suitable example in Python.	(10 M)

(OR)

9 How to implement method overriding in Python? Explain. (10 M)

UNIT-V

10 Explain NumPy data types? And also explain NumPy sorting arrays? (10 M)

(OR)

11 Explain functional programming in detail. (10 M)

20AES0503T

B.Tech DEGREE EXAMINATION, JULY 2023.

Second Semester

(CSE)

PYTHON PROGRAMMING

(RU 20 Regulations)

Time : 3 Hours *Max. Marks : 70*

PART — A

(Compulsory Question) **(10 × 2 = 20 Marks)**

Answer the following

1. (a) What is the difference between compiled and interpreted languages?
   (b) Describe type( ) method with example.
   (c) What are Python assignment operators? Explain.
   (d) Explain about keywords used in Python.
   (e) Explain about built-in functions of tuple.
   (f) What is the purpose of lambda functions in Python?
   (g) What are iterators in Python?
   (h) Define type based dispatch.
   (i) Explain creating classes in Python with examples.
   (j) What is NumPy? Why is NumPy is faster than lists?

PART — B

(Answer one FULL question from each unit; All questions carry equal marks) **(5 × 10 = 50 Marks)**

UNIT-I

2. Describe Arithmetic Operators, Assignment Operators, Comparison Operators, Logical Operators arid Bitwise Operators in detail with examples. (10)

Or

3. (a) Explain the precedence of operators in Python. (5)
   (b) Write Python code to determine whether the given number is a Palindrome or not. (5)

Turn Over

UNIT-II

4. Explain about fruitful functions with examples. (10)

Or

5. What are the different function prototypes? Explain with suitable example. (10)

UNIT-III

6. Discuss about tuples in Python. (10)

Or

7. Discuss the basic Tuple operations with examples. (10)

UNIT-IV

8. How to handle an exception using try except block? Explain with the help of a program. (10)

Or

9. Explain how to implement inheritance in Python. (10)

UNIT-V

10. (a) Explain object-oriented features in python. (5)

(b) How data hiding is achieved in Python? (5)

Or

11. What is functional programming? How well does python support functional programming? (10)
