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R-19

Code: 19AC11T

I B.Tech. I Semester Supplementary Examinations December 2020

Algebra and 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)

UNIT-I

1. a) Find the rank of the matrix $A = \begin{bmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & -7 \end{bmatrix}$ by reducing it to Echelon form. 7M

b) Determine whether the following equations will have a non-trivial solution, if so solve them $4x + 2y + z + 3w = 0$, $6x + 3y + 4z + 7w = 0$, $2x + y + w = 0$. 7M

OR

2. Find the eigenvalues and eigenvectors of the following matrix

$$A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$$
14M

UNIT-II

3. If $A = \begin{bmatrix} 2 & 1 & 2 \\ 5 & 3 & 3 \\ -1 & 0 & -2 \end{bmatrix}$, verify Cayley-Hamilton theorem. Hence find A^{-1} and A^4 . 14M

OR

4. Reduce the Quadratic form $x^2 + 3y^2 + 3z^2 - 2yz$ to a canonical form by an orthogonal transformation and discuss its nature also find the modal matrix. 14M

UNIT-III

5. a) If $U = \frac{1}{\sqrt{x^2 + y^2 + z^2}}$, $x^2 + y^2 + z^2 \neq 0$ then prove that $\frac{\partial^2 U}{\partial x^2} + \frac{\partial^2 U}{\partial y^2} + \frac{\partial^2 U}{\partial z^2} = 0$. 7M

b) Find the maximum value of $x^m y^n z^p$ under the condition that $x + y + z = a$. 7M

OR

6. a) If $x = u(1-v)$ and $y = uv$, then prove that $JJ' = 1$. 7M

b) Examine the following function for extreme values $f(x, y) = x^4 + y^4 - 2x^2 + 4xy - 2y^2$. 7M

UNIT-IV

7. a) Obtain the Taylor's series expansion of $f(x) = \log_e x$ about $x=1$ and hence evaluate $\log_e 1.1$ correct to 4 decimal places. 7M
- b) Trace the curve $y^2(2a-x) = x^3$. 7M

OR

8. a) Obtain the Maclaurin's series expansion of $e^{\sin x}$ up to the term containing x^4 . 7M
- b) Trace the curve $r = a \sin 3\theta$. 7M

UNIT-V

9. a) Evaluate $\int_0^5 \int_0^{x^2} x(x^2 + y^2) dx dy$. 7M
- b) Show that $S(m, n) = \frac{\Gamma(m)\Gamma(n)}{\Gamma(m+n)}$, where $m > 0$ $n > 0$. 7M

OR

10. a) Change the order of integration and evaluate $\int_0^{4a} \int_{x^2/4a}^{2\sqrt{ax}} dy dx$. 7M
- b) Evaluate $\int_0^1 \frac{x^2 dx}{(1-x^4)}$. 7M

		CO	Blooms Level
1.	a)	CO1	L3
	b)	CO1	L5
2.		CO1	L3
3.		CO2	L3
4.		CO2	L3
5.	a)	CO3	L3
	b)	CO3	L3
6.	a)	CO3	L3
	b)	CO3	L4

		CO	Blooms Level
7.	a)	CO4	L2
	b)	CO4	L2
8.	a)	CO4	L2
	b)	CO4	L2
9.	a)	CO5	L3
	b)	CO5	L3
10.	a)	CO5	L3
	b)	CO5	L3

Code: 19AC13T

I B.Tech. I Semester Supplementary Examinations December 2020

Chemistry of Materials

(Common to CE & ME)

Max. Marks: 70

Time: 3 Hours

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

UNIT-I

1. a) Give the procedures for the preparation of various solutions used in the determination of hardness of water by EDTA method. 8M
- b) How do you measure water hardness? List the methods of determining hardness of water. 6M

OR

2. a) What is reverse osmosis? How sea water is purified using this technique. 6M
- b) What advantages does the "ion-exchange resin" provide over "zeolite process" for softening of hard water? 8M

UNIT-II

3. a) Describe the construction of lead-acid battery and give the reactions occurring during the discharge process. 8M
- b) How is calomel electrode prepared? Give a neat sketch of calomel electrode. 6M

OR

4. a) Write short note on fuel cell. How is it different from commercial cell? Mention the advantages of fuel cell? 8M
- b) Give the importance of Lithium battery. Explain the basic principles of involved in it. 6M

UNIT-III

5. a) Differentiate between chemical corrosion and electro chemical corrosion. 8M
- b) Differentiate cathodic and anodic inhibitors. 6M

OR

6. a) Explain electrochemical theory of corrosion by taking Fe as an example 8M
- b) Write short notes on Electroplating and electroless plating process. 6M

UNIT-IV

7. a) Give the preparation, properties and uses of polyphosphazenes. 8M
- b) What is octane number and cetane number? 6M

OR

8. a) With the help of sequence of chemical reactions explain the setting and hardening of cement. 8M
- b) Write a note on power alcohol and cetane number. 6M

UNIT-V

9. a) Discuss the preparation of nano materials by chemical vapour deposition method 8M
- b) Explain any six applications of nanomaterials in various fields. 6M

OR

10. a) What are nano materials? Explain properties of nano materials 8M
- b) What materials are used in nanotechnology? 6M

		CO	Blooms Level
1.	a)	CO1	
	b)	CO1	
2.	a)	CO1	
	b)	CO1	
3.	a)	CO2	
	b)	CO2	
4.	a)	CO2	
	b)	CO2	
5.	a)	CO3	
	b)	CO3	
6.	a)	CO3	
	b)	CO3	
7.	a)	CO4	
	b)	CO4	
8.	a)	CO4	
	b)	CO4	
9.	a)	CO5	
	b)	CO5	
10.	a)	CO5	
	b)	CO5	

Code: 19A311T

I B.Tech. I Semester Supplementary Examinations December 2020

Engineering Graphics - I

(Common to CE & ME)

Max. Marks: 70

Time: 3 Hours

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

UNIT-I

1. a) Divide a straight line of 15cm length into 9 equal parts. 7M
 b) Construct a regular pentagon of side 40 mm. 7M

OR

2. A ball thrown from the ground level reaches a maximum height of 5 m and travel a horizontal distance of 11 m from the point of projection. Trace the path of the ball. 14M

UNIT-II

3. A wheel 50 mm diameter rolls on a straight road surface without any slip. Trace the path of a point on one of the spokes 10 mm from the rim towards the centre of the wheel for one complete revolution. 14M

OR

4. Draw a Hypocycloid, the diameter of the directing circle is 160 mm and the diameter of the generating circle is 40 mm. Draw a normal and tangent to the curve at any point on it. 14M

UNIT-III

5. a) Find the distance between the points A and B, when A is 20 mm behind the V.P and 30 mm below the H.P and the point B is 30 mm behind the V.P and 20 mm below the H.P. The distance between the projectors being 60 mm. 7M
 b) A line AB 50 mm long makes an angle 45° to the V.P. The end A is 15 mm in front of V.P and 12 mm above the H.P. Draw the top view and front view of the line AB. 7M

OR

6. A straight line AB 70 mm long has its front view inclined at 45° to the H.P. The point A is in the V.P and 20 mm above the xy line. The length of the front view is 35 mm. Draw the top view of the line and find its true inclinations to H.P and V.P. 14M

UNIT-IV

7. A circular plate of 60 mm diameter which is perpendicular to V.P and inclined at 50° to H.P. Determine the true shape of the plate. 14M

OR

8. A hexagonal lamina of 40 mm side, is resting on one of its corner on the H.P. Its plane is inclined at an angle of 30° to H.P and perpendicular to V.P. Draw the Projections. 14M

UNIT-V

9. A right circular cone of 60 mm diameter of base and axis 75 mm long, is resting on one of its generator on horizontal plane in such a way that its axis makes an angle 30° with the V.P. Draw its projections. 14M

OR

10. Draw the projections of a regular hexagonal prism, side of base 25 mm and axis 45 mm long is resting on one of the corner of its base in such a way that the axis makes an angle of 45° with the H.P and top view of axis is at 60° with the V.P. 14M

Code: 19AC15T

I B.Tech. I Semester Supplementary Examinations December 2020

Functional English and Life Skills

(Common to CE, ME & CSE)

Max. Marks: 70

Time: 3 Hours

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

UNIT-I

1. A) Hazlitt thinks that hostel life will teach his son how to behave with others. Do you agree with this belief? Explain this by giving examples from the text and from your personal life. 7M
- B) **i. Change the following statements into question forms**
- a. My friend arrived in the morning
 - b. John ran quickly to school.
 - c. Madhu missed the bus because he got up late
 - d. Sindhu's cat has spoiled the garden
- ii. Identify the parts of speech of the underlined words in the following sentences**
- a. Wash your hands before meals.
 - b. My niece enjoys walking in the rain.
 - c. Please speak clearly. 7M

OR

2. A) What are the three ways that help you to get along with everyone that Rudyard Kipling talk about in his poem *If*- 7M
- B) Write two short paragraphs about "cleanliness" and give an apt title for your writing. 7M

UNIT-II

3. A) How does Tennyson describe the landscape, flowers, plants and colours in the poem *Brook*? Did you enjoy the poem? Why? 7M
- B) **Develop the following hints into a meaningful paragraph**
Devan - clever thief - robs the rich - gives all to the sick and the needy - other thieves jealous - plan to get rid of him - challenge Devan to steal the King's pyjamas - Devan accepts challenge - finds king sleeping - opens a bottle of red ants on the bed - King badly bitten - cries for help - servants rush in pretends to look for ants - Devan removes King's pyjamas - escapes - other thieves dumbfounded - accept Devan their leader 7M

OR

4. A) What does Bernard Shaw do to overcome the fear of public speaking? What do you do to improve your public speaking? 7M
- B) **i. Fill in the blanks with suitable articles**
My friend went on ___European tour along with his family. He stayed in _____ most comfortable hotel in Europe. He bought _____ expensive watch for me from the tour.
- ii. Fill in the blanks with suitable prepositions**
Ratan Tata lives _____ Bombay. He comes _____ a very rich family. He was raised___ his grandmother. He is so fond_____ dogs. 7M

UNIT-III

5. A) Evaluate the character of the prince in *The Death Trap* by Saki using the examples from the text. 7M
- B) **i. Rewrite the sentences as per the directions given in brackets**
- a. He said , "I visited New York last year" (into indirect speech)
 - b. My teacher said , "Let's go to the Chemistry lab" (into indirect speech)
 - c. He said, "Please close the window." (into indirect)
- ii. Fill in the blanks with suitable verbs**
Last night I _____(watch) a movie. When I _____ (watch) the movie my uncle _____ (come) from Chennai. My uncle (be) a businessman 7M

OR

6. A) What do you understand about 'time' from Seneca's *On Saving Time*? 7M
- B) **Rearrange each group of jumbled sentences below so as to have well-written paragraphs**
- As there was no washing machine at home, the chore of doing the laundry fell to her and her twin sister
 - During her 10th standard, her mother fell ill and father was undergoing medical treatment.
 - Remya Jose is the inventor of the washing-cum-exercise machine that won her a National Award.
 - She kept a rust-proof mesh cylinder inside a metal box and connected it to two pedals and made an appliance that saves time, energy and keeps you fit, all at the same time
 - So instead of just wishing futilely for a washing machine, she decided to try her hand at making one during the vacations.
 - What you need to do is - put the clothes in the box, add detergent, fill half the box with water, and pedal for four minutes and the clothes are washed.
 - Taking the help of a local mechanic she made washing cum exercise machine by using some recycled bicycle parts. 7M

UNIT-IV

7. A) Briefly explain the history of Chindu Bhagavatam from the information provided in the text *Chindu Yellamma*. 7M
- B) **i. Rewrite the following sentences as per the directions given in brackets**
- No one in this world as good as my father (into comparative and superlative)
 - Swami is the most adorable character created by R.K.Narayan (into positive and comparative) 4M
- ii. Write the adjective and adverb forms for the following nouns**
- beautiful
 - Action
 - collect 3M

OR

8. Describe, compare and contrast the schools taking the information given in the table

Information	Spring School	Daffodil School
Medium of instruction	English	English
Bus facility	Yes	No
No. of Students	1000	800
Boys	600	300
Girls	400	500
Playground	Yes	No
Lab facility	Yes	Yes
Fees per year	Rs.8,000	Rs. 6,000

14M

UNIT-V

9. A) How does George Orwell overcome the fear of public speaking? Discuss. 7M
- B) Correct the following Sentences
- I have visited this place in 2018
 - I am hearing a strange noise from the forest
 - Japanese prefer native English teachers than Indian English teachers
 - She owns an apartments beside an independent house
 - The P.M. along with other ministers are coming here
 - The clerk and cashier are working in this bank.
 - Please write the letter with ink. 7M

OR

10. Write an essay on water conservation 14M

Hall Ticket Number :

R-19

Code: 19A511T

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Problem Solving and C programming

(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)

UNIT-I

1. a) Explain the structure of C program with an example program. 7M
b) Write a C Program to find maximum number among three numbers using conditional operator. 7M

OR

2. a) List and explain the various symbols used in flowchart with figures. 7M
b) Discuss about C data types. 7M

UNIT-II

3. a) In what way if statements differ from switch case statements. Explain 7M
b) What is meant by searching? Explain binary search algorithm 7M

OR

4. a) What are the different types of arrays in C? Explain with a suitable example, array declaration, initialization and accessing of the elements for these different types. 7M
b) Write a c program to print array of elements in ascending order using bubble sort. 7M

UNIT-III

5. a) Illustrate different String Input/output functions 6M
b) Explain the following key words with example. i) auto ii) register iii) static iv) extern. 8M

OR

6. Explain all the function prototypes with example 14M

UNIT-IV

7. a) Define pointer. Explain pointer arithmetic operations 7M
b) Explain dynamic memory allocation functions. 7M

OR

8. a) Write a C program to demonstrate array of pointers 7M
b) Explain different parameter passing techniques with suitable routines. 7M

UNIT-V

9. a) Define structure and union. Explain the syntax and accessing elements from structure and union with an example. 7M
b) Explain with example structures within structures. 7M

OR

10. a) Discuss about file operations 7M
b) Write a program in C that reads files and displays them on the screen. 7M

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1.	a)	CO1	L2
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	b)	CO2	L1
4.	a)	CO2	L1
	b)	CO2	L3
5.	a)	CO3	L2
	b)	CO3	L2

		CO	Blooms Level
6.		CO3	L2
7.	a)	CO4	L1
	b)	CO4	L2
8.	a)	CO4	L3
	b)	CO4	L2
9.	a)	CO5	L1
	b)	CO5	L2
10.	a)	CO5	L1
	b)	CO5	L3