Code No: **19CST201** **R19**

I B. Tech II Semester Regular Examinations, December - 2020
PYTHON PROGRAMMING
(Common to CSE and IT)

Time : 3 hours **Max. Marks: 60**

Note : Answer **ONE** question from each unit (**5 × 12 = 60 Marks)**

UNIT - I

1.	a)	List different operators in Python, in the order of their precedence.	6M
	b)	Discuss about IDLE basic usage.	6M

(OR)

2.	a)	Differentiate between C and Python.	6M
	b)	Write in detail about the data types in Python?	6M

UNIT – II

3.	a)	Using branching statement display the grade of student.	6M
	b)	Explain Lists and Mutability with suitable examples.	6M

(OR)

4.	a)	What are the different loop control statements available in Python? Explain with suitable examples.	6M
	b)	Write a Python script to check the given string is Palindrome or not?	6M

UNIT – III

5.	a)	What is Module in Python? Explain, how can you use Modules in your program explain with an example code.	6M
	b)	Write a function to display ASCII Code of entered character.	6M

(OR)

6.	a)	What is lambda function? What are the characteristics of a lambda function? Give an example.	6M
	b)	Narrate scope of a variable in a function.	6M

UNIT –IV

7.	a)	Compare class and object with python code.	6M
	b)	Explain Python Built-in Exceptions?	6M

(OR)

8.	a)	i) Write a class with following criteria. **Class name** : Flower **Objects** : lilly, rose, hibiscus **Properties** : price, color, smell **Methods** : get(), display() ii) Narrate about polymorphism.	6M
	b)	Write about class constructor(_init_()), self-variable.	6M

UNIT –V

9.	a)	Explain Why testing is required? Explain about Test cases.	6M
	b)	Discuss about various Date and Time functions in Python.	6M

(OR)

10.	a)	Discuss about unit testing in Python.	6M
	b)	Write a Python program to move the turtle forward and then backward after a delay of 2 seconds.	6M

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Code No: **19EET202** **R19**

I B. Tech II Semester Regular Examinations, December - 2020
BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING
(Common to CE, ME, CSE and IT)

Time : 3 hours **Max. Marks: 60**

Note : Answer **ONE** question from each unit (**5 × 12 = 60 Marks)**

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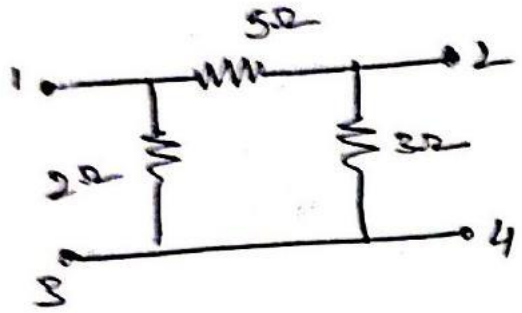
UNIT - I

1. a) Explain briefly about inductance and capacitance? Derive the necessary expressions for power and energy. 4M
   b) Give the statements of KCL and KVL with necessary diagrams and explanations. 4M
   c) Define peak factor and give its relation with r.m.s. value. 4M

(OR)

2. a) Identify the differences between series and parallel circuits. 6M
   b) Convert the following Π-network into its equivalent T-network using star delta transformation. 6M



UNIT – II

3. a) Explain the principle of operation of DC generator. 6M
   b) Explain the principle of operation of a DC motor. Classify the DC motors with the help of voltage and power equations. 6M

(OR)

4. a) Develop the emf equation of a DC generator. 6M
   b) A 4-pole DC motor is fed at 400V and taken armature current of 35A. The resistance of armature circuit is 0.2 ohm. The armature winding is wave connected with 800 conductors useful flux per pole is 0.023 wb. Calculate speed of the motor. 6M

UNIT – III

5. a) Explain the losses that occur in a transformer. 4M
   b) Explain the construction of slip ring induction motor. 4M
   c) Write the applications of induction motors 4M

(OR)

6. a) Explain the principle of operation of single phase transformer. 6M
   b) Explain the construction of squirrel cage induction motor. 6M
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UNIT –IV

7.	a)	Differentiate cut-in voltage and breakdown voltage in diodes.	4M
	b)	Draw the circuit diagram of full wave rectifier having two diodes and explain its operation.	4M
	c)	Define reverse breakdown voltage in diode.	4M

(OR)

8.	a)	Draw the characteristics of zener diode and write its applications	6M
	b)	Define avalanche region in diode characteristics.	6M

UNIT –V

9.	a)	Explain the operation of PNP transistor and draw its characteristics	6M
	b)	Draw the circuit and explain the characteristics of CB configuration.	6M

(OR)

10.	a)	Draw the circuit and explain the characteristics of CE configuration.	6M
	b)	Draw the input characteristics of CB configuration when $V_{CB2}>V_{CB1}$. Explain the operation.	6M

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Code No : 19SHT201 **R19**

I B. Tech II Semester Regular Examinations, December - 2020
MATHEMATICS-II
(Common to ALL Branches)

Time : 3 hours **Max. Marks : 60**

Note : Answer **ONE** question from each unit (**5 × 12 = 60 Marks)**

UNIT - I

1. a) Find a real root of the eq. $x^3 - x - 1 = 0$ correct to three decimal places by Iteration method. 6M

   b) Solve the following system of equations by Jacobi's method starting with the solution (2, 3, 0) 6M
   $5x - y + z = 10$; $2x + 4y = 12$; $x + y + 5z = -1$

(OR)

2. a) Find a real root of the equation $x^4 - x - 9 = 0$ by Newton-Raphson method correct to three places of decimal. 6M

   b) Use method of false position to find the 4^{th} root of 32 correct to three decimal places. 6M

UNIT – II

3. a) Prove the following relations between the operators. 4M
   (i) $\Delta = E - 1$ (ii) $\nabla = 1 - E^{-1}$ (iii) $\delta = E^{1/2} - E^{-1/2}$ (iv) $\mu = \frac{1}{2}(E^{1/2} + E^{-1/2})$

   b) From the following table estimate the number of students who obtained marks between 40 and 45 by Newton's formula. 8M

Marks	30-40	40-50	50-60	60-70	70-80
No. of Students	31	42	51	35	31

(OR)

4. a) Use Gauss's forward formula to evaluate y_{30}, given that $y_{21} = 18.4708$; $y_{25} = 17.8144$; $y_{29} = 17.1070$; $y_{33} = 16.3432$; $y_{37} = 15.5154$. 6M

   b) Use Newton's divided difference formula to find f(9) for the following data 6M

x	5	7	11	13	17
f(x)	150	392	1452	2366	5202

UNIT – III

5. a) Evaluate $\int_0^6 \frac{1}{1+x^2}\,dx$ using (i) Trapezoidal rule (ii) Simpson's 3/8 rule by dividing into 6 equal sub intervals. 6M

   b) Apply Runge-Kutta Method to find an approximate value of y for x = 0.2 in steps of 0.1, if $\frac{dy}{dx} = x + y^2$ given that y = 1 when x = 0. 6M

(OR)

6. a) Using Picard's method obtain a solution up to the fifth approximation of the equation $\frac{dy}{dx} = x + y$ such that y = 1 when x = 0. 6M

   b) Using Modified Euler's method, find approximate value of y when x = 0.3, given $\frac{dy}{dx} = x + y$ and y = 1 when x = 0. 6M

UNIT –IV

7. a) Find $L(t^2e^{-2t}\cos t)$ 6M

b) Using Laplace transform, solve $(D^2 + 1)x = t\cos 2t$, given that $x = 0$, $\frac{dx}{dt} = 0$ at $t = 0$. 6M

(OR)

8. a) Evaluate $\int_0^\infty \frac{e^{-t} - e^{-2t}}{t}\,dt$, by using the Laplace transform. 6M

b) Find $L^{-1}\{\frac{1}{s(s^2+2s+2)}\}$ by using convolution theorem. 6M

UNIT –V

9. a) State Dirichlet's conditions for the expansion of a function in Fourier series. 2M

b) Find the Fourier cosine series over the interval $0 < x < 2$ for the function $f(x) = x$. 10M

(OR)

10. a) State Fourier integral theorem. 2M

b) Find the Fourier transform of $f(x) = \begin{cases} -1; & -1 \le x < 0 \\ 1; & 0 \le x \le 1 \\ 0; & \text{else where} \end{cases}$ 10M

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Code No: **19SHT202** **R19**

I B. Tech II Semester Regular Examinations, December - 2020
MATHEMATICS-III
(Common to ALL Branches)

Time: 3 hours **Max. Marks: 60**

Note : Answer **ONE** question from each unit (**5 × 12 = 60 Marks)**

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UNIT - I

1. a) Find rank of $A=\begin{bmatrix} -2 & -1 & -3 & -1 \\ 1 & 2 & 3 & -1 \\ 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & -1 \end{bmatrix}$ by reducing into Echelon form. 6M

   b) For what values of 'a' and 'b' the system of equations 6M
   $x + y + z = 6;\ x + 2y + 3z = 10;\ x + 2y + az = b$ has
   i) No solution ii) Unique solution iii) Infinite number of solutions.

OR

2. a) Find the Eigen values and the corresponding Eigen vectors of the matrix 6M
$$A=\begin{bmatrix} 8 & -8 & -2 \\ 4 & -3 & -2 \\ 3 & -4 & 1 \end{bmatrix}$$

   b) Solve 5x + 10y + z = 28; 4x + 8y + 3z = 29; x + y + z = 6 by using Gauss Jordan method 6M

UNIT - II

3. a) Verify Cayley-Hamilton theorem for $A=\begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$ and hence find A^{-1} and A^4. 6M

   b) Reduce the matrix $A = \begin{bmatrix} 4 & 1 \\ 2 & 3 \end{bmatrix}$ into diagonal matrix and find A^6. 6M

OR

4. Reduce the quadratic form $6x^2+3y^2+3z^2-4xy+4xz-2yz$ to a canonical form by orthogonal transformation method. Find Index, Rank, Signature and Nature of the quadratic form. 12M

UNIT - III

5. a) Calculate the angle between the normal to the surface $xy-z^2=9$ at points (4, 1, 2) and (3, 3, -3). 6M

   b) Find the values of a and b so that the surfaces $ax^2-byz=(a+2)x$ and $4x^2y+z^3=4$ intersect orthogonally at (1, -1, 2). 6M
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OR

6. a) Find a, b, c such that $\overline{F}=(2x+3y+az)\bar{i}+(bx+2y+3z)\bar{j}+(2x+cy+3z)\bar{k}$ is irrotational. 6M

b) Show that $\nabla^2 r^n = n\,(n+1)r^{n-2}$. 6M

UNIT – IV

7. Apply Green's theorem to evaluate $\oint_C (2xy-x^2)dx+(x^2+y^2)dy$ where C is the region bounded by $x = y^2$ and $y = x^2$. 12M

OR

8. a) If $\overline{F}=(5xy-6x^2)\bar{i}+(2y-4x)\bar{j}$ and C is the curve $y=x^3$ in xy - plane. Evaluate the line integral $\int_C \overline{F}\,.\,d\,\bar{r}$ from (1, 1) to (2, 8). 6M

b) Verify Stoke's theorem for $\overline{F}=(x^2+y^2)\bar{i}-2xy\,\bar{j}$ where taken around the rectangle bounded by the lines $x = \pm a$, $y = 0$, $y = b$. 6M

UNIT - V

9. a) Form a partial differential equation by eliminating arbitrary function from the equation $z = xy + f(x^2+y^2)$ 6M

b) Solve $(yz)p+(zx)q=xy$ 6M

OR

10. a) Solve $z^2(p^2+q^2+1)=1$ 6M

b) Solve $\left(D^2-4DD'+4D'^2\right)z=0$ 6M

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Code No: **19SHT205** **R19**

I B. Tech II Semester Regular Examinations, December - 2020
APPLIED PHYSICS
(Common to CSE and IT)

Time : 3 hours **Max. Marks: 60**

Note : Answer **ONE** question from each unit (**5 × 12 = 60 Marks)**

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UNIT - I

1. a) With the help of a neat diagram, describe the experimental arrangement to produce Newton's rings by reflected light. Prove that the diameter of dark rings is proportional to the square root of the natural numbers. 8M
   b) In Newton's ring experiment the diameter of the 5^{th} dark ring is reduced to half of its value on introducing a liquid below the convex surface of the lens. Calculate the refractive index of the liquid. 4M

(OR)

2. a) Explain qualitatively Fraunhofer diffraction due to a single slit. 8M
   b) Explain Rayleigh's criteria for resolution. 4M

UNIT – II

3. a) Describe the construction and working of He-Ne laser with relevant energy level diagram. List out its advantages over a ruby laser. 8M
   b) Differentiate between spontaneous and stimulated emission of radiation. 4M

(OR)

4. a) What is meant by holography? Why is it called wave front reconstruction? 4M
   b) How holography does is different from photography? 4M
   c) Describe in brief how a hologram is constructed. 4M

UNIT – III

5. a) Explain the B-H curve of ferromagnetic material on the basis of domain theory. 8M
   b) A magnetic field of 1800A/m produces a magnetic flux of $3x10^{-5}$Wb / m^2 in an iron bar of cross sectional area 0.2cm^2. Calculate hysteresis loss per cycle. 4M

(OR)

6. a) What is electronic polarization? Show that the electronic polarization depends on the radius of the constituent atom. 8M
   b) A solid elemental dielectric with density 3 x 10^{28} atoms/m^3 shows electronic polarizability of 10^{-40} Fm^2. Calculate the ε_r of the material. 4M

UNIT –IV

7. a) Apply Schrodinger's wave equation to obtain the permitted energy values for a particle in a one-dimensional potential box. 8M
   b) A particle is moving in a one-dimensional potential box of infinite height of width 2.5nm. Calculate its state of least energy. 4M
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(OR)

8.	a)	Describe the Davisson and Germer experiment to verify the wave nature of matter.	8M
	b)	Calculate the de Broglie wavelength of a neutron whose kinetic energy is 0.025eV. (Given : mass of neutron = 1.674×10^{-27} kg and Planck's constant $h = 6.625 \times 10^{-34}$ J-s).	4M

UNIT –V

9.	a)	Deduce an expression for carrier concentration of electrons in the conduction band of an intrinsic semiconductor.	8M
	b)	Describe conductivity in an intrinsic semiconductor.	4M

(OR)

10.	a)	Derive the expression for Hall coefficient. How is the Hall coefficient related to the mobility of charge carriers?	8M
	b)	An n-type semiconductor specimen has a Hall coefficient (R_H) $3.66 \times 10^{-11} m^3\ C^{-1}$. The conductivity of the specimen is found to be $112 \times 10^7/\Omega m$. Calculate the charge carrier density (n) and the electron mobility (μ) at room temperature.	4M

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