CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech IV Semester Regular/Supplementary Examinations August-2023
Course Name: PYTHON PROGRAMMING
(Common for EEE, ME, ECE, CSE, IT, CSC & CSM)

Date: 07.08.2023 AN   Time: 3 hours   Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   10x2=20M

1. Identify the difference between the if, if-else, if-elif-else statements.   2 M
2. Outline the Characteristics of functions and modules.   2 M
3. What are local variable and how they are used?   2 M
4. Show the need of Void function.   2 M
5. Summarize about two dimensional Lists.   2 M
6. Discuss the need of Recursion.   2 M
7. Determine the Benefits of Instances.   2 M
8. Distinguish between Classes and Objects.   2 M
9. Classify the need of Turtle graphics.   2 M
10. How to use Widgets in python?   2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). i) Identify the most Commonly used Repetition structures in Python   5M
        ii) Write a Python program to convert height in feet and inches to cm. [1 feet = 12 inch   5M
        and 1 inch= 2.54 cm] (Sample input: 2 feet 7 inch Sample output: 78.74 cm)

OR

11. B). Summarize various operators, built-in functions and standard library modules that deals   10M
        with python numeric type.

12. A). i) Outline the declaration and calling of functions in Python? Illustrate with an example.   5M
        ii) Demonstrate the process of storing functions in Modules.   5M

OR

12. B). i) Write a Python program to print all prime numbers less than 256 using Functions   5M
        ii) What type of parameter passing is used in Python? Justify your answer with sample   5M
        programs.

13. A). i) Demonstrate the process finding items in Lists with the in Operator.   5M
        ii) Illustrate a Python program that counts the number of occurrences of a letter in a string,   5M
        using dictionaries.

OR

13. B). i) What is a list in Python? How to create nested lists? Demonstrate how to create and   5M
        print a 3-dimensional matrix with lists.
        ii) Write a python program to convert 'a, e, i, o, u' letters in a string with 'w, x, y, z, p'   5M
        using string translate method.

(P.T.O..)

14. A).   i) Classify the Techniques for Designing Classes.   5M

           ii) Elaborate the implementation of hierarchical inheritance in Python, with a program.   5M

OR

14. B).   i) Construct a python program to show the polymorphism in Python.   5M

           ii) How does Instances are created in python show with an example?   5M

15. A).   i) Can you categorize the different widgets in GUI designing.   5M

           ii) Show the implementation of two dimensional shapes.   5M

OR

15. B).   i) Elaborate the implementation of Radio Buttons, labels and Check Buttons in Python.   5M

           ii) How to Develop a python program to show Button widgets and Info Dialog boxes?   5M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech IV Semester Regular/Supplementary Examinations August-2023
Course Name: WEB PROGRAMMING
(Common for EEE, ME, ECE, CSD & AID)

Date: 07.08.2023 AN   Time: 3 hours   Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   10x2=20M

1.	How to preserve white space in XHTML?	2 M
2.	What is use of tag?	2 M
3.	What are <div> and <span> tags?	2 M
4.	What is an internal CSS?	2 M
5.	Define instance of operator in Javascript.	2 M
6.	What is the use of <noscript> tag?	2 M
7.	What is XSLT?	2 M
8.	Write the differences between XML and HTML.	2 M
9.	What is Ajax?	2 M
10.	Explain alert(), confirm() and prompt() methods of window object.	2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A).	What is a form? Explain form components with example.	10M
	OR	
11. B).	Differentiate XHTML and HTML.	10M
12. A).	Explain the basic table tags with the different attributes.	10M
	OR	
12. B).	What are Design issues of CSS? Explain in detail.	10M
13. A).	Explain various datatypes used in Javascript.	10M
	OR	
13. B).	i) Explain about Javascript operators.	5M
	ii) Write a Javascript to find factorial of a given number.	5M
14. A).	What do you mean by XML namespace? Explain in detail.	10M
	OR	
14. B).	What is DTD? Explain internal DTD and external DTD.	10M
15. A).	Explain about Ajax features.	10M
	OR	
15. B).	Explain about the Dojo Toolkit and XMLHttp request object.	10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech IV Semester Regular/Supplementary Examinations August-2023
Course Name: NUMERICAL TECHNIQUES & PROBABILITY DISTRIBUTIONS
(Common for CE, ME, CSE, IT, CSC & CSD)

Date: 09.08.2023 AN   Time: 3 hours   Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   10x2=20M

1. Find an iterative formula for $\frac{1}{N}$, $N > 0$ using Newton-Raphson method.   2 M

2. What is Lagrange's interpolation formula?   2 M

3. What is the order and error of Trapezoidal rule?   2 M

4. Find $y(0.4)$ if $\frac{dy}{dx} = x^2 - 2xy$, $y(0) = 2$ with the assumption $h = 0.25$ using Euler's method.   2 M

5. Find the Laplace transform of $t \cosh at$.   2 M

6. Find the inverse Laplace transform of $\frac{1}{s(s^2+a^2)}$.   2 M

7. If X is a discrete RV having the following probability distribution   2 M

x	1	2	3
$p(x)$	k	k	k^2

Find the value of k.

8. Find $P(X = 2)$ if X is binomially distributed with mean 5 and standard deviation 2   2 M

9. What is meant by contingency table?   2 M

10. List any two uses of chi-square test.   2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). Determine the positive root of $x^3 - 4x - 9 = 0$ by bisection method.   10M

OR

11.B). Use Newton's formula to estimate the polynomial $f(x)$ satisfying the following data, and hence find the value of $f(4)$ 10M

x	0	1	2	3
$f(x)$	1	2	1	10

12.A). Divide the range in to 6 equal parts, to find $\int_0^6 \frac{dx}{1+x^2}\, dx$ using Trapezoidal and Simpson's rule. Compare with the actual integration.   10M

OR

12.B). Examine the value of $y(0.1)$, $y(0.2)$ if $\frac{dy}{dx} = x - y^2$, $y(0) = 1$ using Fourth order Runge-Kutta method (assume $h = 0.1$).   10M

(P.T.O..)

13. A). Identify the Laplace transform of the "square wave" function $f(t)$ is defined by   10M
$$f(t) = \begin{cases} k \; if \; 0 \le t \le a \\ -k \; if \; a < t \le 2a \end{cases}$$ and $f(t + 2a) = f(t)$ for all t.

OR

13. B). Solve $y'' + 4y' + 3y = e^{-t}$ given $y(0) = 1 = y'(0)$, using Laplace transform.   10M

14. A). A random variable gives measurements X between 0 and 1 with probability density   10M
function $f(x) = 12x^3 - 21x^2 + 10x, 0 \le x \le 1$. Find the following:

(i) $P\left[X \le \frac{1}{2}\right]$ and $P\left[X > \frac{1}{2}\right]$

(ii) the value of k such that $P[X \le k] = \frac{1}{2}$.

OR

14. B). Messages arrive at a switchboard in a Poisson manner at an average rate of six per hour.   10M
Find the probability for each of the following events:
 i).   Exactly two messages arrive within one hour
 ii).   No message arrives within one hour
 iii). At least three messages arrive within one hour.

15. A). Test the significance of the difference between the means of the samples, drawn from two   10M
normal populations with same S.D. from the following data.

	Size	Mean	S.D.
Sample-1	100	61	4
Sample-2	200	63	6

OR

15. B). The theory predicts that the proportion of beans in the four groups A, B, C and D should   10M
be $9 : 3 : 3 : 1$. In an experiment among 1600 beans, the numbers in the four groups were
882, 313, 287 and 118. Do the experimental results support the theory?

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech IV Semester Regular & Supplementary Examinations August-2023
Course Name: FLUID MECHANICS & HYDRAULIC MACHINES
(Mechanical Engineering)

Date: 11.08.2023 AN   Time: 3 hours   Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   10x2=20M

1.	Define dynamic viscosity and kinematic viscosity with their units.	2 M
2.	What are the different types of non-Newtonian fluids?	2 M
3.	Define the following terms :(i) stream line (ii) path line	2 M
4.	What are the instruments used to measure the discharge and velocity?	2 M
5.	What are the reasons for drag and lift in fluid stream?	2 M
6.	What do you know about hydraulic gradient line?	2 M
7.	Enumerate the differences between the impulse turbine and reaction turbine.	2 M
8.	What are the uses of a draft tube?	2 M
9.	What is cavitation? How can it be avoided in reaction turbine?	2 M
10.	Define unit quantities in case of centrifugal pump.	2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). Determine the force required to pull a flat plate having a surface area of 1 m² over another plate moving with a relative speed of 0.3 m/s if the distance between two plates is 0.1 mm. Consider the viscosity of the fluid between two plates is 1 poise. Also, calculate the corresponding power.   10M

OR

11. B). Describe the working of Piezometer and U-tube manometer.   10M

12. A). Given that u = xy, v = 2yz, examine whether these velocity components represents two or three dimensional incompressible flow; if three dimensional, determine third component.   10M

OR

12. B). A nozzle having inlet and outlet diameters as 30 cm and 15 cm respectively. If the velocity of water at inlet is 3 m/sec, find out the velocity of the water jet at outlet, velocity head at inlet and outlet and discharge.   10M

13. A). Derive Darcy-Weisbach formula for calculating loss of head due to friction in a pipe.   10M

OR

13. B). Find the ratio of displacement thickness to momentum thickness and momentum thickness to energy thickness for the velocity distribution in the boundary layer is given by u /U= 2(y/δ) −(y/δ)².   10M

(P.T.O..)

14. A). Derive expression for power and efficiency of jet of water striking the curved plate at the center. If the diameter of the jet is 100 mm and velocities of the jet and the plate are 20 m/s and 8 m/s find its, work done and efficiency.　10M

OR

14. B). A Kaplan turbine runner is to be designed to develop 7357.5kW shaft power. The net available head is 5.5 m. Assume that the speed ratio is 2.09 and flow ratio is 0.68 and the overall efficiency is 60%. The diameter of the boss is $1/3^{rd}$ of the diameter of the runner. Find the diameter of the runner, its speed and its specific speed.　10M

15. A). A centrifugal pump having outer diameter equal to 2 times the inner diameter and running at 1200rpm works against a total had of 75m. The velocity of flow through the impeller is constant and equal to 3m /s. The vanes are set back at an angle of 30° at outlet. If the outer diameter of the impeller is 600mm and width at outlet is 50mm, determine the i) the vane angle at inlet, ii) Work done/sec.　10M

OR

15. B). Explain the working principle of single acting reciprocating pump with the help of neat sketch and obtain an expression for work done by reciprocating pump.　10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech IV Semester Regular & Supplementary Examinations August-2023
Course Name: APPLIED THERMODYNAMICS
(Mechanical Engineering)

Date: 14.08.2023 AN Time: 3 hours Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks. 10x2=20M

1. List out the important basic components of an IC engines. 2 M
2. What is function of the carburetor? 2 M
3. How does the engine temperature and pressure influence the knocking in Spark Ignition Engines? 2 M
4. Define Normal Combustion and abnormal Combustion. 2 M
5. Define Brake Power and indicated Power. 2 M
6. What is mean by the fuel - air ratio? 2 M
7. State how the air compressors are classified. 2 M
8. How are rotary compressor classified? 2 M
9. Define the refrigeration and refrigerated system. 2 M
10. State the difference between the Specific humidity and relative humidity. 2 M

PART-B
Answer the following. Each question carries TEN Marks. 5x10=50M

11.A). Show the theoretical and actual valve-timing diagram for Petrol engine. 10M

OR

11. B). Explain any six classifications of Internal Combustion engines. 10M

12. A). Explain the stages of combustion in SI engine. Also explain the phenomena of knocking in S.I. Engine and how it can becontrolled. 10M

OR

12. B). Explain the factors affecting the delay period. Also briefly discus about the fuel quality on engine performance. 10M

13. A). The following observations were recorded in a test of one hour duration on a single cylinder oil engine working on four stroke cycle. Bore = 300mm, Stroke = 450 mm, Fuel used = 8.8 kg, Calorific value of fuel = 41800 kJ/kg, Average speed = 200 rpm, m.e.p. = 5.8 bar, Brake friction load = 1860 N, Quantity of cooling water = 650 kg, Temperature rise = 22°C, Diameter of the brake wheel = 1.22 m.
Calculate: i) Mechanical efficiency, ii) Brake thermal efficiency. Draw the heat balance sheet. 10M

(P.T.O..)

13. B). A single cylinder 4 stroke diesel engine gave the following results while running on full load: Area of indicator card = 300 mm^2, Length of diagram = 40 mm, Spring constant = 1 bar/mm, Speed of the engine = 400 rpm, Load on the brake = 370 N, Spring balance reading = 50 N, Diameter of brake drum = 1.2 m, Fuel consumption = 2.8 kg/hr, Calorific value of fuel = 41800 kJ/kg, Diameter of the cylinder = 160 mm, Stroke of the piston = 200 mm. Calculate: i) Indicate mean effective pressure, ii) Brake power and brake mean effective pressure, iii) Brake specific fuel consumption, brake thermal and indicated thermal efficiencies.   10M

14. A). Explain the working process of Axial flow compressor with neat sketch.   10M

OR

14. B). Derive the expression for work done of single stroke single acting reciprocating compressor.   10M

15. A). In a refrigeration plant working on Bell Coleman cycle, air is compressed to 5 bar from 1 bar. Its initial temperature is 10^0 C. After compression, the air is cooled up to 20^0 C in a cooler before expanding to a pressure of 1 bar.
Determine the theoretical C.O.P of the plant and net refrigerating effect. Take Cp = 1.005 kJ/kg K and Cv = 0718 kJ/kg K.   10M

OR

15. B). What are the Psychrometric process used in summer and winter air conditioning systems and also compare winter air conditioning system with summer airconditioning system.   10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech IV Semester Regular/Supplementary Examinations August-2023
Course Name: MANUFACTURING PROCESSES
(Mechanical Engineering)

Date: 16.08.2023 AN   Time: 3 hours   Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   10x2=20M

1. List various types of pattern allowances.   2 M
2. What do you mean by the term 'casting'?   2 M
3. Compare Cold extrusion and Hot Extrusion.   2 M
4. Define Hydrostatic extrusion   2 M
5. State the factors affecting the tool life   2 M
6. What is rake angle?   2 M
7. Illustrate the rapid prototyping   2 M
8. Write the types of flames used in oxy-acetylene welding. 2 M
9. List any two essential functions of spark generator used in EDM process. 2 M
10. What is the working principle of ultrasonic Machining?   2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). Suggest and explain the most suitable casting technique to manufacture Steam turbine Blades.   10M

OR

11. B). Explain the basic parts of Gating system with neat sketch.   10M

12. A). Derive an expression for estimating power required for rolling process.   10M

OR

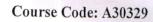12. B). Explain the principle of wire drawing process with a neat sketch.   10M

13. A). Draw a Merchant's circle diagram, derive the equations to find i) cutting force, ii) vertical force, iii) shear force, iv) normal shear force, v) friction force, vi) normal force and vii) coefficient of friction (μ).   10M

OR

13. B). A mild steel tubing of 50 mm outside diameter is turned with cutting speed of 20 m/min with a tool having rake angle of 35^0. The tool is given a feed of 0.10 mm/rev, the cutting force 250 kg and feed force 100 kg. length of continuous chip in one revolution is 80mm. calculate the coefficient of friction, shear plane angle and chip thickness.   10M

(P.T.O..)

14. A). Compare and Contrast Brazing and Soldering Process.   10M

OR

14. B). Explain the various stages in the development of rapid prototyping systems highlighting the advantages and limitations.   10M

15. A). Explain ultrasonic machining with a neat diagram. List out the process variables and its effect on MRR and surface finish. Also mention its applications and limitations.   10M

OR

15. B). Explain with neat diagram the principle of wire EDM. State its advantages and disadvantages.   10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech IV Semester Regular & Supplementary Examinations August-2023
Course Name: KINEMATICS OF MACHINERY
(Mechanical Engineering)

Date: 18.08.2023 AN   Time: 3 hours   Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   10x2=20M

1. State Grubler's criterion. Contrast it with Kutzbach criterion.   2 M

2. Determine the number of degrees of freedom of the following pairs: 2 M
   a) a ball and socket joint such as human shoulder and arm pit
   b) lead screws operating in nuts to transmit motion in lathe
   c) a prism on a plane
   d) a sphere on a plane

3. Draw all instantaneous centres of a 4 bar chain.   2 M

4. Define rubbing velocity.   2 M

5. Distinguish between Ackermann's and Davis steering gear mechanism.   2 M

6. Draw Pantograph mechanism. Write the equation for producing enlarged and reduced lines.   2 M

7. Draw the displacement, velocity, and acceleration curves for follower with Simple Harmonic Motion.   2 M

8. Classify Cams.   2 M

9. Distinguish between involute and cyloidal gear tooth profiles.   2 M

10. Define reverted gear train and formulate its train value.   2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). Illustrate the inversions of Single Slider crank chain with sketches and explain in detail.   10M

OR

11. B). Classify kinematic pairs in detail. Enlist practical applications used in industry for each case.   10M

12. A). Locate all the instantaneous centers of the slider crank mechanism as shown in Fig.1 The lengths of crank OB and connecting rod AB are 100 mm and 400 mm respectively. If the crank rotates clockwise with an angular velocity of 10 rad/s. Find (i) Velocity of the slider A, and (ii) Angular velocity of the connecting rod AB.   10M
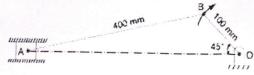

Fig.1

OR

12. B). Define Corolios component of acceleration. In what applications does it occur? How is it determined? Formulate the mathematical relation from first principles.   10M

(P.T.O..)

13. A). Explain Hart's mechanism. Formulate the condition for Harts mechanism to trace an exact straight line.　10M

OR

13. B). In a Hooke's Joint, the angle between the two shafts is 15^0. Find the angles turned by the driving shaft when the velocity of the driven shaft is maximum, minimum and equal to that of the driving shaft. Also, determine when the driven shaft will have the maximum acceleration and retardation.　10M

14. A). Design a cam to raise a valve with simple harmonic motion through 50 mm in 1/3 of a revolution, keep if fully raised through 1/12 revolution and to lower it with harmonic motion in 1/6 revolution. The valve remains closed during the rest of the revolution. The diameter of the roller is 20 mm and the minimum radius of the cam is 25 mm. The diameter of the camshaft is 25 mm. The axis of the valve rod passes through the axis of the camshaft. If the camshaft rotates at uniform speed of 100 rpm find the maximum velocity and acceleration of a valve during raising and lowering.　10M

OR

14. B). The following data rotate to a cam profile in which the follows moves with uniform acceleration and deceleration during ascent and descent. Minimum radius of the cam = 25 mm: Roller radius = 7.5 mm; lift = 28 mm; off-set of follower axis – 12mm towards right; Angle of ascent = 60°, Angle of descent = 90°; Angle of dwell between ascent and descent = 45, speed of cam = 200 rpm. Draw the profile of the cam and determine the maximum velocity and the uniform acceleration of the follower during outstroke and the return stroke.　10M

15. A). Two 20^0 involute spur gears mesh externally and give a velocity ratio of 3. Module is 3mm and the addendum is equal to 1.1 module. If the pinion rotates at 120 rpm, determine (i) the minimum number of teeth on each wheel to avoid interference (ii) the number of pairs of teeth in contact.　10M

OR

15. B). An epicyclic gear train consists of a pinion, a wheel of 40 teeth and an annulus with 84 internal teeth concentric with the wheel. The pinion gears with the wheel and the annulus. The arm that carries the axis of pinion rotates at 100 rpm. (i) If the annulus is fixed, find the speed of the wheel (ii) If the wheel is fixed find the speed of the annulus.　10M

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