

Python Programming**(Common to all Branches)****Time: 3 Hours****Max Marks: 70**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

		Marks	CO	BTL
<u>UNIT-I</u>				
1.	a) Explain Python's history and its advantages over traditional languages.	7	1	L2
	b) Discuss the use of loops in Python with examples.	7	1	L2
(OR)				
2.	a) Write short notes on operators in Python	7	1	L2
	b) Write a Python program to check whether a given number is prime	7	1	L3
<u>UNIT-II</u>				
3.	a) Explain the concept of sets and their operations in Python.	7	2	L2
	b) Explain various sequence data types with examples	7	2	L2
(OR)				
4.	a) Explain the role of dictionaries in data manipulation.	7	2	L2
	b) Write a Python program to count character frequencies in a given string	7	2	L3
<u>UNIT-III</u>				
5.	a) Discuss different types of functions in Python with examples.	7	3	L3
	b) Explain exception handling in file operations.	7	3	L2
(OR)				
6.	a) Explain recursive functions with an example.	7	3	L2
	b) Write a Python program to generate the Fibonacci series up to n terms	7	3	L3
<u>UNIT-IV</u>				
7.	a) Explain the concept of modules and their importance.	7	4	L2
	b) Write short notes on module attributes with examples	7	4	L2
(OR)				
8.	a) Discuss packages in Python with a suitable example.	7	4	L2
	b) Explain the role of the os module in Python.	7	4	L2
<u>UNIT-V</u>				
9.	a) Explain polymorphism with examples in Python	7	5	L3
	b) Discuss database connectivity in Python.	7	5	L2
(OR)				
10.	a) Explain regular expression symbols and their uses.	7	5	L2
	b) Write short notes on object-oriented features in Python	7	5	L2

ENGINEERING MECHANICS

(Common to Civil & Mechanical Engineering)

Time: 3 Hours

Max Marks: 60

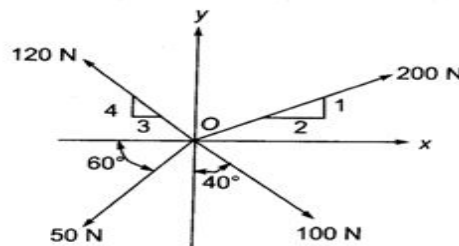
Answer ONE Question from each Unit

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UNIT-I

1. A system of four forces acting on a body is shown in the **Figure** [10 M]
Determine resultant force and its direction

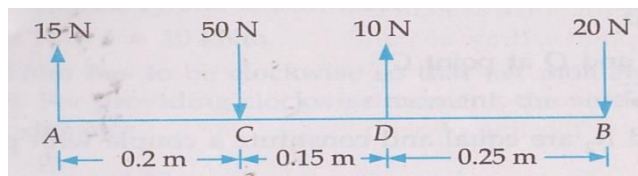


(OR)

2. Two forces of magnitude 340N and 300N are acting at a point O. If the angle between the forces is 60° , determine the magnitude of the resultant force. Also, find the direction of the resultant with the horizontal force. [10 M]

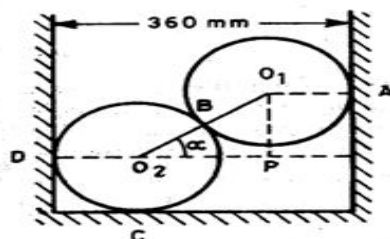
UNIT-II

3. A rigid bar is subjected to a system of parallel forces as shown figure. Reduce this system to [10 M]
(a) A single force
(b) A single force-moment system at A
(c) A single force-moment system at B



(OR)

4. Two smooth spheres each of radius 100 mm and weight 100 N, rest in a horizontal channel having vertical walls, the distance between which is 360 mm. Find the reactions at the points of contacts A, B, C and D shown in **Figure 1** (All dimensions are in mm) [10 M]

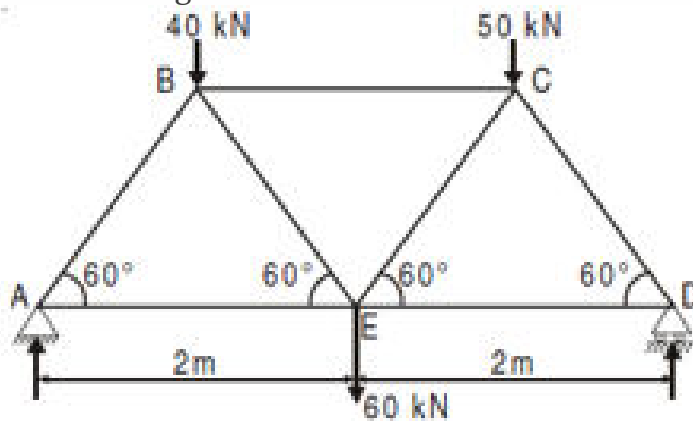


UNIT-III

- | | | Marks | CO | Blooms
Level |
|----|--|--------|-----|-----------------|
| 5. | A ladder 5m long and of 250N weight is placed against a vertical wall in a position where its inclination to the vertical is 30° . A man weighing 800N climbs the ladder. At what position will he induce slipping? The co-efficient of friction for both the contact of surfaces of the ladder viz. with the wall and the floor is 0.2 | [10 M] | CO3 | L3 |

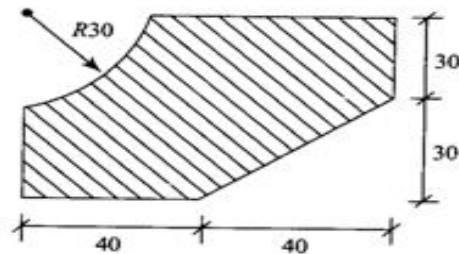
(OR)

- | | | | | |
|----|---|--------|-----|----|
| 6. | Determine the forces in all the members of the truss shown in figure and indicate the magnitude and nature of forces on the diagram of the truss. All indicated members are at 60° to horizontal and length of each member is 2m | [10 M] | CO3 | L4 |
|----|---|--------|-----|----|



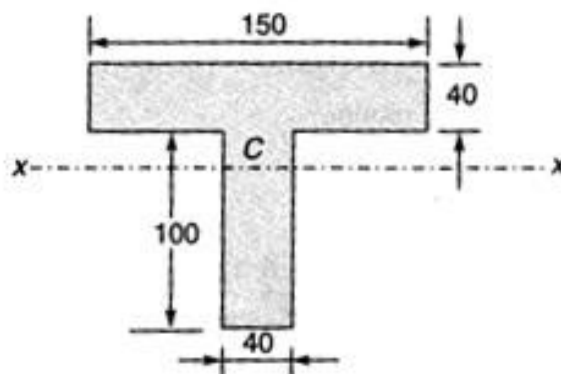
UNIT-IV

- | | | Marks | CO | Blooms
Level |
|----|--|--------|-----|-----------------|
| 7. | Determine the centroid of the shaded area as shown in figure | [10 M] | CO4 | L3 |



(OR)

- | | | | | |
|----|--|--------|-----|----|
| 8. | Determine the moment of inertia about its horizontal axis for the plane section as shown in figure | [10 M] | CO4 | L3 |
|----|--|--------|-----|----|



UNIT-V

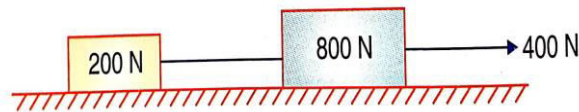
9. When the angular velocity of a 1.2m diameter pulley is 3 rad/sec, the total acceleration of a point on its rim is 9m/s^2 , determine angular acceleration of the pulley at this instance [10M] CO5 L3

(OR)

10. a) A stone dropped into a well is heard to strike the water in 4 seconds. Find the depth of the well assuming the velocity of sound to be 335 m/sec. [6M] CO5 L3
- b) Driver of a car travelling at 72km/hour observes the light 300 m ahead of him turning red. The traffic light is timed red for 20 sec before it turns green. If the motorist wishes to pass the lights without stopping to wait for it to turn green, determine (i) the required uniform acceleration of the car (ii) the speed with which the motorist crosses the traffic light. [4M] CO5 L3

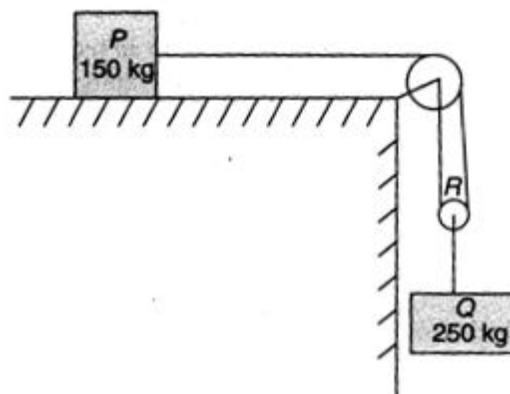
UNIT-VI

11. Two blocks of weights 800 N and 200 N are connected by a string and move along a rough horizontal surface when force of 400 N is applied to the block of 800 N weight as shown figure. Apply D'Alembert's principle to determine the acceleration of the blocks and tension in the string. Assume the coefficient of friction between the sliding surface of the blocks and the plane is 0.3. [10M] CO6 L3



(OR)

12. a) State the equations of equilibrium of a rigid body experiencing a planar motion? [4M] CO6 L3
- b) Two blocks shown in the figure. start from rest. Determine the acceleration of each and the tension in each chord. Assume that horizontal plane and pulley are frictionless and the pulley is of negligible Mass [6 M] CO6



Time: 3 Hours**Max Marks: 60**

Answer ONE Question from each Unit

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	<u>UNIT-I</u>	Marks	CO	Blooms Level
1. a)	Illustrate the different types of control flow statements available in Python with flowcharts.	5M	1	2
b)	Explain the features of Python programming	5M	1	2
	(OR)			
2. a)	Demonstrate the operators bitwise and membership in python	5M	1	3
b)	Write a program to generate Fibonacci series.	5M	1	6
	<u>UNIT-II</u>			
3. a)	What is tuple. Recall the various methods performed on it.	5M	2	1
b)	Write a program to creating a dictionary and display its keys alphabetically.	5M	2	6
	(OR)			
4. a)	Define Set. Recall the various methods performed on it.	5M	2	1
b)	Explain briefly about Mutable vs immutable data type	5M	2	2
	<u>UNIT-III</u>			
5. a)	Explain the file handling functions tell() and seek().	5M	3	2
b)	Demonstrate a program to read a file line by line into a list.	5M	3	3
	(OR)			
6. a)	Describe the different access modes of the files with an example	5M	3	2
b)	Define function. Explain how to declare the user defined function with a program.	5M	3	1
	<u>UNIT-IV</u>			
7. a)	Explain different Module Built-in Functions in python.	5M	4	2
b)	Write a python program to define a module and import a specific function in that module to another program.	5M	4	1
	(OR)			
8. a)	Explain the concept of packages in python.	5M	4	2
b)	What is module? How to importing module attributes in python.	5M	4	3
	<u>UNIT-V</u>			
9. a)	Define inheritance. Categorize the various types of inheritance	5M	5	4
b)	Describe how the data base connectivity with python programme with an example	5M	5	2
	(OR)			
10. a)	Explain the importance of overloading in python	5M	5	2
b)	Create Classes in python with examples and explain special Methods	5M	5	3
	<u>UNIT-VI</u>			
11. a)	Why do you need regular expressions in Python?	5M	6	3
b)	Write the python programs to implement re.subn, re.search and re.Match.	5M	6	1
	(OR)			
12. a)	Discuss the following methods supported by compiled regular expression objects. a) search() b) match() c) findall()	5M	6	2
b)	Write a Python program to check the validity of a password (input from users).	5M	6	3

Validation:

- At least 1 letter between [a-z] and 1 letter between [A-Z].
- At least 1 number between [0-9].
- At least 1 character from [\$#@].
- Minimum length 6 characters.
- Maximum length 12 characters.

Time: 3 Hours**Max Marks: 60**

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- | | <u>UNIT-I</u> | Marks | CO | Blooms Level |
|-----------------|--|-------|-----|---------------|
| 1. a) | Derive the EMF equation of DC generator. | 5 | CO1 | Remembering |
| b) | An 8 pole D.C. generator has 960 armature conductors and a flux per pole of 20m-wb. Calculate the emf generated when running at 500 rpm if the armature is:
i) lap connected
ii) wave connected. | 5 | CO1 | Apply |
| (OR) | | | | |
| 2. a) | Explain the Simple Single loop DC generator | 5 | CO1 | understanding |
| b) | A 6 pole DC generator has 300 conductors and each conductor is capable of carrying a current of 40 A. the flux per pole per pole is 0.015 wb and it is drive at speed of 1800 rpm. Compute the (a) total armature current (b) generated voltage .The armature winding is wave type | 5 | CO1 | Apply |
| UNIT-II | | | | |
| 3. a) | Explain about the losses in a DC generator | 5 | CO2 | Understanding |
| b) | A 4-pole lap-wound DC generator has 400 conductors and a total flux per pole of 0.02 Wb. It generates a load current of 100 A. The brushes are shifted by 5 degrees' mechanical angle from the geometrical neutral axis. Calculate the demagnetizing ampere-turns per pole . | 5 | CO2 | Apply |
| (OR) | | | | |
| 4. a) | Explain the commutation process in DC generator and methods to improve it | 5 | CO2 | Understanding |
| b) | A 6-pole 148 A dc shunt generator has 480 conductors and is wave –wounded. Its field current is 2 A. find the demagnetizing and cross-magnetizing AT/pole for brush shift from GNA is 5 electrical degrees | 5 | CO2 | Apply |
| UNIT-III | | | | |
| 5. a) | Derive torque equation in DC motor. | 5 | CO3 | Understand |
| b) | Determine the value of total torque established by the armature of 4 pole motor having 774 Conductor 2 parallel path if flex for 24mwb. total armature current 50 Amp. | 5 | CO3 | Apply |
| (OR) | | | | |
| 6. a) | Compare the characteristics of the DC shunt, DC series and compound motors | 5 | CO3 | Understanding |
| b) | A 200 V, 100A , 1500 rpm long shunt compound motor , the armature, series and shunt winding have resistance of 0.25 ,0.15,and 50 respectively . Find the electromagnetic torque developed | 5 | CO3 | Apply |

UNIT-IV

<u>UNIT-IV</u>		Marks	CO	Blooms Level
7.	a) Explain with the help of a neat sketch the principle of operation of a 3-point starter.	5	CO4	Remembering
	b) The following readings are obtained when doing a load test on DC Shunt motor using brake drums: Spring balance reading is 10 kg and 35 kg Diameter of drum 40 cm speed of motor 950 rpm. Applied voltage 200v, line current 30A. Calculate output power and efficiency.	5	CO4	Apply

(OR)

8.	a)	Explain the break test on the DC shunt motor with neat sketch	5	CO4	Remembering
	b)	A full load brake test on a small d.c shunt motor gave the following data:	5	CO4	Apply
		Spring balance readings	35 Kg and 6 Kg		
		Pulley Diameter	19.5 cm		
		Motor speed	1500 rpm		
		Applied voltage	230 V		
		Line current	12.5 A		
		Calculate the efficiency of the motor			

UNIT-V

<u>UNIT-V</u>		Marks	CO	Blooms Level
9.	a) Explain the working principal of Transformer.	5	CO5	understanding
	b) A single phase 2300, 230v ,50 HZ, core type transformer has core section of 0.05m ² . if the permissible maximum flux density is 1.1 Wb/m ² , Calculate the number of turns on primary and secondary.	5	CO5	Apply

(OR)

10.	a)	Define efficiency of transformer and Derive the condition for the maximum efficiency	5	CO5	understanding
	b)	A 20 KVA, 2500/250 V, 50 Hz 1-ph. transformer gave the test results. The OC test (LV Side) is conducted at rated voltage, the wattmeter reading is 105 W and SC test (HV side) is conducted at half full load current is 160 W. Find the efficiency of the transformer at full load and 0.8 pf lagging	5	CO5	Apply

UNIT-VI

<u>UNIT-VI</u>		Marks	CO	Blooms Level
11.	a) Explain the OC and SC test on transformers	5	CO6	Remembering
	b) A 20 KVA, 2500/250 V, 50 Hz 1-ph. transformer gave the following SC test (HV side): 104 V, 8 A, 320 W Find the Voltage regulation of transformer at $\frac{3}{4}$ of full load with 0.8 pf lead.	5	CO6	Apply

(OR)

12.	a)	Elaborate necessary condition for the parallel operation of two different KVA ratings of transformers.	5	CO6	understanding
	b)	Two 1-Ph. transformers rated 1000 KVA and 500 KVA have per unit leakage impedance of $(0.02+j0.06)$ and $(0.025+j0.08)$ respectively. what is the largest KVA Load delivered by parallel combination.	5	CO6	Apply