CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech VI Semester Regular/Supplementary Examinations May-2023
Course Name: DESIGN & DRAWING OF STEEL STRUCTURES
(Civil Engineering)

Date: 08.05.2023 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.	Illustrate the advantages of HSFG bolts.	2 M
2.	Define yield strength.	2 M
3.	List the various types of tension members.	2 M
4.	What is net sectional area?	2 M
5.	Define strut.	2 M
6.	What are the assumptions made in Euler's analysis?	2 M
7.	Classify beam connections.	2 M
8.	List the methods used to analyse the loads in trusses.	2 M
9.	Explain economical depth in plate girder.	2 M
10.	What are the classifications in stiffeners?	2 M

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

11.A). Two flats of Grade Fe 410 each 210x8 mm are to be joined using 20mm diameter, 4.6 grade bolts to form a Lap joint the joint is supported to transfer a factored load of 250 kN . Design the joint and determine suitable pitch for the Bolts.   10M

OR

11. B). i) Explain the advantages and disadvantages of bolted connections.   5M

ii) Two plates of 15mm thickness connected in a lap joint using high strength friction grip bolts. Design the joint to transmit a pull equal to full strength of the plate.   5M

12. A). The connection shown in figure below uses 20mm diameter bolts of grade 8.8, with threads in the shear plane to connect an ISF 150x12mm with Gusset plate. Determine the Strength of the Joint if   10M

    i)   Slip is not permitted

    ii)   Slip is permitted

    (NOTE: BLOCK SHEAR STRENGTH NEED NOT BE CONSIDERED)
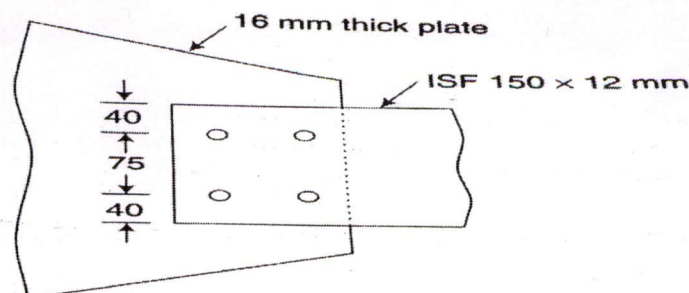
OR

12. B). A built up column consist of ISHB 400 @ 77.40kg/m with one 300mm x 12mm flange plate on each side. The column carries an axial load of 2600kN. Evaluate the loads and design a gusseted base if the column is supported on concrete pedestal with a bearing pressure of 5N/mm².   **10M**

13. A). A simply supported beam of 3.25m consist of rolled steel section ISLB 325 @ 422.8N/m. Examine and design the bending strength of the beam, if the beam is laterally supported.   **10M**

OR

13. B). Design a simply supported beam of 10 m effective span carrying a total factored load of 60 KN/m. The depth of beam should not exceed 500 mm. The compression flange of the beam is laterally supported by floor construction. Assume stiff end bearing is 75 mm.   **10M**

14. A). An ISLB300 carrying UDL of 50kN/m has effective span of 8m. This is to be connected to the web of girder ISMB 450. Design the framed connection using 20mm black bolts.   **10M**

OR

14. B). An ISMB 500 beam transmits an end reaction of 250kN to the web of a column ISHB300@577N/m. Design and sketch a stiffened seated connection. Use M24 black bolts. Sketch the connection details.   **10M**

15. A). A welded plate girder is simply supported over an effective span 15m. The girder is effectively supported in lateral direction. It carries an UDL of 65kN/m including its self weight and two concentrated load of 250kN at 3m from either support. Estimate the loads in Plate girder and design the mid section of plate girder.   **10M**

OR

15. B). A plate girder is subjected to a maximum factored moment of 4000kN and a factored shear force of 600kN. Design the section with stiffeners.   **10M**

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech VI Semester Regular/Supplementary Examinations May-2023
Course Name: FOUNDATION ENGINEEERING
(Civil Engineering)

Date: 10.05.2023 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 methods of soil explorations.	2 M
2.	What is soil exploration?	2 M
3.	Name various types of slope failure.	2 M
4.	What are the assumptions that are made in analysis of the stability of slopes?	2 M
5.	Write the assumptions of Rankine's Theory.	2 M
6.	What are different modes of failure for retaining wall?	2 M
7.	What is bearing capacity?	2 M
8.	Write Terzaghi ultimate bearing capacity equation for continuous footing.	2 M
9.	Define end bearing pile.	2 M
10.	What are the forces acting on well foundation?	2 M

PART-B
Answer the following. Each question carries TEN Marks.

       5x10=50M

11.A). Explain the procedure in detail of Standard Penetration Test with necessary corrections.   10M

OR

11. B). The cone penetration resistance obtained in a clay soil in a CPT was 50 kg/cm^2. Determine the undrained strength of clay. The total overburden pressure at the depth was 100 kN/m^2.   10M

12. A). An embankment is inclined at an angle of 35^0 and its height is 15m.The angle of Shearing resistance is 15^0 and the Cohesion intercept is 200kN/m^2. The unit weight of soil is 18kN/m^3. If Taylor's stability number is 0.06, find the factor of safety with respect to cohesion.   10M

OR

12. B). Find factor of safety of a slope of infinite extent having a slope angle of 20^0.The slope is made of cohesion less soil with ϕ = 30°. Also analyze the slope if it is made of clay having c'= 35kN/m2, ϕ' = 25°, e= 0.60 and Gs= 2.7 and under the following conditions: When soil is dry when the slope is submerged.   10M

13. A). A retaining wall, 6 m high, retains dry sand with an angle of friction of 30° and unit weight of 16.2 kN/m^3. Determine the earth pressure at rest. If the water table rises to the top of the wall, determine the increase in the thrust on the wall. Assume the submerged unit weight of sand as 10 kN/m^3.   10M

OR

13. B). Excavation was being carried out for a foundation in plastic clay with a unit weight of 22.5 kN/m^3. Failure occurred when a depth of 8.10 m was reached. What is the value of cohesion if ϕ = 0° ?   10M

(P.T.O..)

14. A). Calculate the elastic settlement of a rectangular foundation, 6mX12m, on a uniform sand with $E = 20,000$ kN/m^2 and Poisson's ratio, v= 0.2. The contact pressure is 200 kN/m2. The settlements are to be calculated at the centre, mid-point of long side, and midpoint of short side, and at the free corner.   10M

OR

14. B). Explain in detail Terzaghi's Bearing Capacity Theory.   10M

15. A). Explain how the Group capacity of piles can be found by different Methods.   10M

OR

15. B). A cylindrical well of external diameter 6 m and internal diameter 4 m is sunk to a depth 16 m below the maximum scour level in a sand deposit. The well is subjected to a horizontal force of 1000 kN acting at a height of 8 m above the scour level. Determine the total allowable equivalent resisting force due to earth pressure, assuming that (i) the well rotates about a point above the base, and (ii) the well rotates about the base. Assume $\gamma = 10$ kN/m^3, $\phi = 30°$, and factor of safety against passive resistance = 2. Use Terzaghi's Approach.   10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech VI Semester Regular/Supplementary Examinations May-2023
Course Name: ESTIMATION & COSTING
(Civil Engineering)

Date: 12.05.2023 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.	What are the main items of work in estimating a building?	2 M
2.	Define plinth area.	2 M
3.	Define lead and lift.	2 M
4.	What are the various methods used for computing the earthworks?	2 M
5.	What do you mean by rate analysis?	2 M
6.	Why there is necessity of specifications?	2 M
7.	Define bar bending schedule.	2 M
8.	Enumerate the different types of contracts.	2 M
9.	What is depreciation?	2 M
10.	Define salvage value and scrap value.	2 M

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

11.A).   Briefly explain the different methods of estimates of buildings.   10M

OR

11. B).   Estimate the quantities of following item of two roomed building: 10M
    i).   Earthwork and
    ii).   First class brickwork in lime motor in super structure.
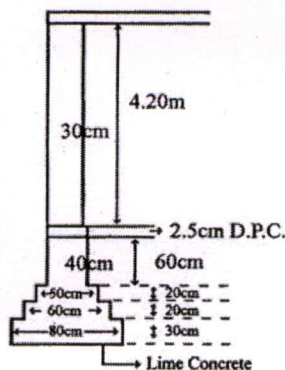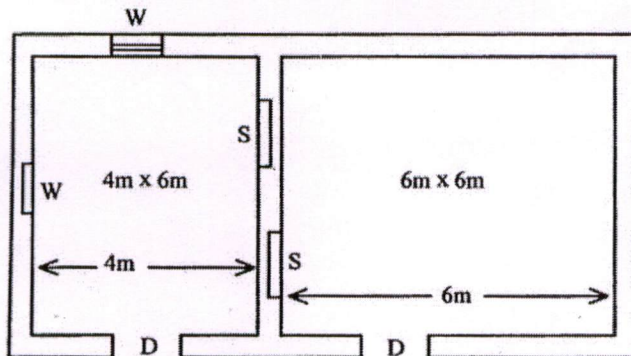
Door - D - 1.20m x 2.10m
Window - W - 1.00m x 1.50m
Shelves - S - 1.00m x 1.50m

(P.T.O..)

12. A). Explain in detail the methods of estimation of roads.   10M

                                                        OR

12. B). Prepare an estimate for the portion of a road from chainage 14 to 22 from the data given   10M
below. The formation width of the proposed road is 12 m, side slopes 11/2:1 in cutting
and 2:1 in banking.

Chainage (30 m)	14	15	16	17	18	19	20	21	22
RL of Ground	108.60	109.25	109.40	108.85	108.50	107.25	106.80	107.15	107.20

The road formation is proposed at uniform falling gradient 1 in 200 passing through GL at
14 m chainage. R.L of formation being 108.00 m.

13. A). Explain the importance of rate analysis in the construction work. Also, find the rate   10M
analysis for 100 sq. m of 12mm cement plastering (1:3).

                                                        OR

13. B). Find the rate analysis for 10 cu. m RCC work of M20 Grade.
                                                                                                              10M

14. A). Explain in detail the various types of construction contracts.
                                                                                                              10M

                                                        OR

14. B). A R.C.C. roof slab of overall size 6100 mm x 3300 mm and thickness 120 mm is provided   10M
with 12 mm diameter main bars bent up alternately and placed at 150 mm c/c. The
distribution bar of 8 mm diameter is provided at 200 mm c/c. The all-round cover is
15 mm. Workout the quantity of plain steel. Prepare the bar bending schedule.

15. A). What are the different methods of valuation? Briefly explain any one method.
                                                                                                              10M

                                                        OR

15. B). A government accommodation is built at the cost of Rs. 60,000/- . The water supply,   10M
sanitary and electrical installation expenditure is Rs. 15000/-. Calculate the standard rent
of the building if the following rate of return are fixed:

(i) 6 % on construction cost.

(ii) 1 1/2 % towards maintenance of building work.

(iii) 4 1/2 % on installation expenditure.

(iv) 4 % on maintenance of installation.

(v) Rs. 120/- as property tax per year.

(vi) Cost of land is be neglected.

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech VI Semester Regular/Supplementary Examinations May-2023
Course Name: WATER RESOURCES ENGINEERING
(Civil Engineering)

Date: 15.05.2023 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. Write various forms of precipitation.   2 M
2. Define Infiltration and Evaporation.   2 M
3. Write the concept of synthetic unit Hydrograph.   2 M
4. Write the concept of effective rainfall.   2 M
5. Write the difference between Aquifer and Aquitard.   2 M
6. What do you understand by well development?   2 M
7. Define base period and crop period.   2 M
8. Write the advantages of water logging.   2 M
9. Define Balancing depth of cutting.   2 M
10. What is the concept of stream gauging?   2 M

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

11.A). i) Discuss the working procedure of a Symon's rain gauge with the help of a neat sketch.   5M
ii) The average annual rainfalls at 4 existing rain gauge stations in a basin are 105, 79, 70 and 66cms. If the average depth of rainfalls over the basin is to be estimated within 10% error, determine the additional number of gauges needed.   5M

OR

11. B). i) Discuss how inconsistency in record is corrected using double mass curve method.   5M
ii) Discuss various components of runoff in which it is distributed.   5M

12. A). i) Explain the different methods of base flow separation in a hydrograph.   5M
ii) The ordinates of a 4h Unit Hydrograph of a basin of area 300km² measured at 1 h intervals are 5, 18, 36, 56, 65, 58, 46, 30, 19, 15, 10, 6, 3, 2 and 1m³/s respectively. Obtain the ordinates of a 3h unit hydrograph for the basin using S-curve method.   5M

OR

12. B). i) Define unit hydrograph and discuss its applications and limitations.   5M
ii) Derive 6 hr UHG using the given 2 Hr UHG   5M

Time (Hr)	0	2	4	6	8	10	12	14	16	18	20	22
Discharge (Cumec)	0	25	100	160	200	170	110	70	30	20	8	0

(P.T.O..)

13. A). i) Define the following properties: Porosity, Permeability, Transmissivity and Specific yield. 5M

ii) A well of 0.3m diameter penetrates fully into a confined aquifer of thickness 15m and hydraulic conductivity 8×10^{-4} m/s. The radius of influence is 220m and the drawdown in the well is not to exceed 3m. Determine the transmissivity of the aquifer and maximum yield expected from the well. 5M

<div align="center">OR</div>

13. B). i) Derive an expression for the steady state discharge of well fully penetrating into a confined aquifer with clear sketch and write the appropriate assumptions. 5M

ii) Write various types of well and explain construction of any one well 5M

14. A). i) Discuss the various methods of application of irrigation water in detail. 5M

ii) After how many days will you supply water to soil in order to ensure sufficient irrigation of the given crop, if: Field capacity of the soil=25%, Permanent Wilting Point=12, Dry density of soil=1.3gm/cc Effective depth of root zone= 60cm and Daily consumptive use of water for given crop=10mm. 5M

<div align="center">OR</div>

14. B). i) Define duty and delta and write their relationship. What are the ways by which duty can be improved. 5M

ii) The left branch canal carrying a discharge of 20cumecs has culturable command area of 20,000hectares. The intensity of Rabi crop is 80%, and the base period is 120 days. The right branch carrying discharge of 8cumecs has culturable command area of 12,000 hectares, intensity of irrigation of Rabi crop is 50% and the base period is 120 days. Compare the efficiencies of the two canals. 5M

15. A). i) Briefly explain the classification of canals under various considerations. 5M

ii) Design an irrigation channel in alluvial soil according to Lacey's silt theory for the following data: 5M
Full supply discharge = 10cumec
Lacey's silt factor = 0.9
Side slopes of channel = 0.5H:1V

<div align="center">OR</div>

15. B). i) How do you estimate the design discharge using rational formula. 5M

ii) Provide a detailed explanation of design of irrigation canal by Kennedy's method. 5M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech VI Semester Regular/Supplementary Examinations May-2023
Course Name: PRESTRESSED CONCRETE
(Civil Engineering)

Date: 17.05.2023 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.	Compare pre-tensioning with post-tensioning.	2 M
2.	Write the general principle of prestressing.	2 M
3.	What is meant by loss of prestress?	2 M
4.	List the types of losses in post – tensioning.	2 M
5.	Draw the stress block diagram adopted in IS code specifications for flexural strength.	2 M
6.	What is meant by thrust line?	2 M
7.	Recall anchorage zone.	2 M
8.	What is meant by bursting force?	2 M
9.	List the advantages of precast prestressed units in in-situ concrete process.	2 M
10.	Define the term composite beams.	2 M

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

11.A). Explain the advantages of high strength concrete and high tension steel in Prestressed concrete.   10M

OR

11. B). Discuss any two types of Prestressing systems.   10M

12. A). A prestressed concrete beam 200×300 mm deep is prestressed with wires (area = 320 mm^2) located at 50 mm from the bottom carrying an initial stress of 1000 N/mm^2. The span of the beam is 10 m. Solve the percentage loss of prestress in wires when the beam is post-tensioned. Assume E_s = 210 kN/mm^2, E_c = 35 kN/mm^2. Relaxation of steel stress = 5% initial stress, shrinkage of concrete = 200×10^{-6}, creep coefficient = 1.6, slip at anchorage = 1 mm, friction coefficient = 0.0015 per meter.   10M

OR

12. B). A rectangular concrete beam 100×300 mm is prestressed by means of eight 5 mm wires located 65 mm from the bottom and two 5 mm wires located 35 mm from the top of the beam. If the wires are tensioned to a strong of 900 N/mm^2, solve the percentage loss of stress in steel immediately after transfer allowing for the loss of stress due to elastic deformation of concrete only. Given, E_s = 210 kN/mm^2 and E_c= 31.5 kN/mm^2.   10M

(P.T.O..)

13. A). A beam is of simply supported span 8 m. The size of the beam is 350 mm × 700 mm. A prestressing force of 1000 kN was applied. The cable is parabolic with an eccentricity of 100 mm at the centre and zero at the supports. It is subjected to a udl of 25 kN/m. Solve the extreme stresses at midspan.   10M

OR

13. B). Recall the design steps of shear reinforcement as per IS code provisions.   10M

14. A). Explain about the transfer of prestress and transmission length in end block.   10M

OR

14. B). Explain Magnel's method for end block design.   10M

15. A). A composite T beam is made up of pre tensioned web 100 mm wide, 200 mm deep and a cast insitu slab 400mm wide,40mm thick having a modulus of elasticity 28 kN/mm^2.If the differential shrinkage is 100 x 10^{-6}, solve the shrinkage stresses developed in precast and cast insitu units.   10M

OR

15. B). A concrete beam having a rectangular section 100 × 300 mm is prestressed by a parabolic cable with an initial prestressing force of 240 kN. The cable has an eccentricity of 50 mm at the center and concentric at the supports. If the span of the beam is 10 m and subjected to a live load of 2 kN/m, calculate the short term deflection at midspan. Assume Ec = 38 kN/mm^2, Creep coefficient = 2, loss of prestress = 20%. Estimate the long-term deflection.   10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech VI Semester Supplementary Examinations May-2023
Course Name: ELEMENTS OF EARTHQUAKE ENGINEERING
(Civil Engineering)

Date: 17.05.2023 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. What is an earthquake?   2 M

2. Explain briefly magnitude of an earthquake.   2 M

3. Explain ductility of structure.   2 M

4. Explain about Non-structural elements in a building.   2 M

5. What are the principles of earthquake resistant design of RCC members?   2 M

6. Explain about flexural failure in RCC members.   2 M

7. What are the different categories of masonry buildings?   2 M

8. Write a note on strengthening of masonry walls.   2 M

9. Briefly explain about shear walls.   2 M

10. State the factors affecting the ductility of structure.   2 M

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

11.A). Explain in detail with sketches different types of Seismic Waves.   10M

OR

11. B). An SDOF system consists of a mass with weight of 180kg and a spring constant, k = 530kN/m. While testing the system a relative velocity of 30cm/s was observed on application of a force of 460N. Determine damping ratio, damped frequency of vibration, logarithmic decrement, and the ratio of two consecutive amplitudes.   10M

12. A). Explain how simplicity, Uniformity and symmetry play an important role in the design of earthquake resistant building. Give examples with sketches.   10M

(P.T.O..)

<div align="center">OR</div>

12. B). The plan and elevation of three-storey RCC educational building is shown in figure   10M
below. The building is located in seismic zone V. The type of soil encountered is medium
stiff and it is proposed to design the building with special moment-resisting frame. The
intensity of dead load is 8kN/m² and imposed load is 3kN/m². Determine the design
siesmic loads on the structure by static analysis.

(a) Plan   (b) Elevation
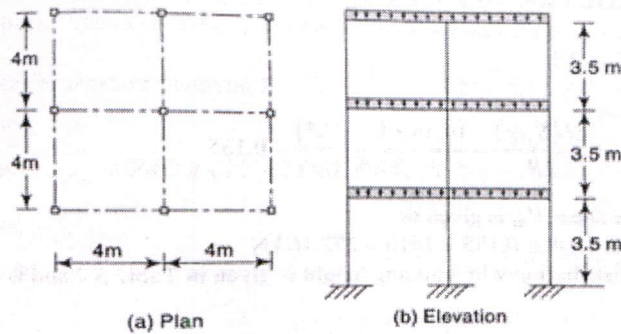
13. A). A fixed-ended RC beam of rectangular section has to carry a live load of 20kN/m and   10M
dead load of 25kN/m. The maximum bending moment is 60kNm and maximum shear
force is 40kN. The effective length is 6m. Design the beam using M20 grade concrete and
Fe415 steel.

<div align="center">OR</div>

13. B). Explain the following: 10M
i) Ductile Failure
ii) Weak beam-strong-column design
iii) Failure of joints

14. A). i) Describe the various earthquake resistant features that can be introduced in a masonry   5M
building to make it earthquake resistant.
ii) Define bands. At what levels in masonry buildings bands are provided.   5M

<div align="center">OR</div>

14. B). Determine the frequency and design seismic coefficient for an ordinary masonry shear   10M
wall in a school building at Allahabad, for the following data. Roof load = 15kN/m, height
of wall = 3.0m, width of wall = 0.2m, unit weight of wall 19.2kN/m³ . Soil is medium.

15. A). Explain about: 10M
i) Importance of non-structures in buildings
ii) Failure mechanisms of non structures
iii) Isolation of doors, windows and partition walls with sketch.

<div align="center">OR</div>

15. B). i) What is the difference in structural behavior of long and short shear walls?   5M
ii) Explain the ductile detailing considerations as per IS Code provisions.   5M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech VI Semester Regular/Supplementary Examinations May-2023
Course Name: PYTHON PROGRAMMING
(Common for CE, EEE, ME & ECE)

Date: 19.05.2023 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. Evaluate the following arithmetic expressions using the rules of Operator Precedence in python   2 M
   a)   5 * 6 ** 3
   b)   24 // 6 // 3

2. Which of the following results is True?   2 M
   a)   >>>9==9 and 1==1
   b)   >>>3==5 or 7==3
   c)   >>>9==9 or 1==1
   d)   >>>4<1 and 1>6

3. How many numbers will be printed?   2 M
```
i=5
while  i>=0:
    print(i)
    i=i-1
```

4. Find the output of the following code.   2 M
```
def  f():
    s="Hello World!"
    print(s)


s="welcome to the python programming"
f()
```

5. Identify the output in the following statements   2 M
```
S= "Welcome"
print(S[1:3])
print(S[ :6])
```

6. Differentiate between Tuple and List give an example.   2 M
7. With the help of an example explain the significance of the __init__ () method.   2 M
8. Identify the role of **self** argument in the class methods.   2 M
9. The ----------- module has a variety of commonly used GUI elements.   2 M
10. Give examples of commonly used widgets.   2 M

(P.T.O..)

11.A). Write a program to prepare grocery bill. For that enter the name of the items purchased, 10M quantity in which it is purchased, and its price per unit. Then display the bill in the following format.

****************BILL*****************************

Item Name   Item Quantity   Item Price

****

Total Amount to be paid

OR

11. B). Write a program to calculate salary of an employee given his basic pay (to be entered by 10M the user), HRA=10 percent of basic pay, TA= 5 percent of basic pay. Define HRA and TA as constants and use them to calculate the salary of the employee.

12. A). i) Draw a comparison between recursive and iterative technique for problem solving. 5M
ii) Write a program to print the Fibonacci series without using recursion. 5M

OR

12. B). Write a short notes on the following with an example: 10M
     i)   Keyword arguments
     ii)   Default arguments
     iii)   Lambda functions

13. A). Write a program to get a string made of the first two and last two characters from a given 10M a string. If the string length is less than two return instead the empty string.

OR

13. B). Write a program to print index at which a particular value exists. If the value exists at 10M multiple locations in the list, then print all the indices. Also count the number of times that value is repeated in the list.

14. A). Write a program with class Employee that keeps a track of the number of employees in an 10M organization and also stores their name, designation and salary details.

OR

14. B). What will happen when a class inherits from another class with the same attributes or 10M methods? Will it override them?

15. A). i) Write a program to print the screen size using tkinter. 5M
ii) Write a program to make the window fullscreen. 5M

OR

15. B). Explain the following widgets and their functions: 10M
     i)   Frame
     ii)   Button
     iii)   Text
     iv)   Canvas
     v)   Listbox

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