

H.T No:

--	--	--	--	--	--	--	--	--	--

**R18**

Course Code: A30101



**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**  
(UGC AUTONOMOUS)

B.Tech III Semester Regular & Supplementary Examinations Feb/March -2023

Course Name: **STRENGTH OF MATERIALS-I**

**(Civil Engineering)**

Date: 20.02.2023 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. Recall Hooke's law. 2 M
2. Compare tensile stress with compressive stress. 2 M
3. Draw the shear force and bending moment diagrams for cantilever of length L carrying a point load W at the free end. 2 M
4. Recall point of contra flexure. 2 M
5. List the assumptions made in the theory of simple bending. 2 M
6. Write the formula for shear stress distribution across a circular section. 2 M
7. List the different methods of finding of slope and deflection of a cantilever. 2 M
8. A cantilever of length 3m is carrying a point load of 25kN at the free end. If the moment of inertia of the beam =  $10^8 \text{ mm}^4$  and value of  $E = 2.1 \times 10^5 \text{ N/mm}^2$ , find the slope of the cantilever at the free end. 2 M
9. Define principal plane. 2 M
10. Define maximum shear stress theory. 2 M

**PART-B**

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). A tensile test was conducted on a mild steel bar. The following data was obtained from the test: 10M
- Diameter of the steel bar = 3cm  
 Gauge length of the bar = 20cm  
 Load of elastic limit = 250 kN  
 Extension at a load of 150kN = 0.21  
 Maximum load = 380kN  
 Total extension = 60mm  
 Diameter of the rod at the failure = 2.25cm
- Determine:
- (i) the young modulus
  - (ii) the stress at elastic limit
  - (iii) the percentage elongation
  - (iv) the percentage decrease in area.

**OR**

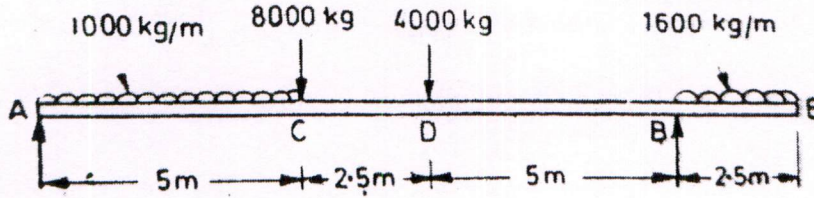
11. B). A bar of cross- section 8mm x 8mm is subjected to an axial pull of 7000N. The lateral dimension of the bar is found to be changed to 7.9985 mm x 7.9985mm. If the modulus of rigidity of the material is  $0.8 \times 10^5 \text{ N/mm}^2$ , determine the Poisson's ratio and modulus of elasticity. 10M

(P.T.O..)

12. A). A simply supported beam of length 6m carries point load of 3 kN and 6kN at distances of 2m and 4m from the left end. Draw the shear force and bending moment diagrams for the beam. 10M

OR

12. B). Draw the shear force and bending moment diagrams for the beam shown below. 10M



13. A). A rectangular beam 300mm deep is simply supported over a span of 4m. Determine the uniformly distributed load per meter which the beam may carry if the bending stress should not exceed 120 N/mm<sup>2</sup>. Take  $I = 8 \times 10^6 \text{ mm}^4$ . 10M

OR

13. B). A rectangular beam 100mm wide and 250mm deep is subjected to a maximum shear force of 50kN. 10M

Determine:

- (i) average shear stress
- (ii) maximum shear stress
- (iii) Shear stress at a distance of 25mm above the neutral axis.

14. A). A beam of length 6m is simply supported at its ends and carries two point loads of 48kN and 40kN at a distance of 1m and 3m respectively from the left support. Find the deflection under each load by Macaulay's method. 10M

OR

14. B). A simply supported beam of length 5m carries a point load of 5kN at a distance of 3m from the left end. If  $E = 2 \times 10^5 \text{ N/mm}^2$  and  $I = 10^8 \text{ mm}^4$ , determine the slope at the left support and deflection under the point load using conjugate beam method. 10M

15. A). Direct stresses of 120N/mm<sup>2</sup> tensile and 90 N/mm<sup>2</sup> compression exist on two perpendicular planes at a certain point in a body. They are also accompanied by shear stress on the planes. The greatest principal stress at the point due to these is 150 N/mm<sup>2</sup>. 10M

- (i) What must be the magnitude of the shearing stresses on the two planes?
- (ii) What will be the maximum shearing stress at the point?

OR

15. B). According to the theory of maximum shear stress, determine the diameter of bolt which is subjected to an axial pull of 9kN together with a transverse shear force of 4.5kN. Elastic limit in tension is 225 N/mm<sup>2</sup>, factor of safety = 3 and Poisson's ratio = 0.3. 10M

\*\*\*\*\*

H.T No:

--	--	--	--	--	--	--	--	--	--

R18

Course Code: A30102



**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**  
(UGC AUTONOMOUS)

B.Tech III Semester Regular & Supplementary Examinations Feb/March-2023

Course Name: FLUID MECHANICS

(Civil Engineering)

Date: 22.02.2023 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. Outline the concepts kinematic viscosity.                               | 2 M |
| 2. List various types of pressure gauges.                                  | 2 M |
| 3. Define uniform & non uniform flow and steady & unsteady flow.           | 2 M |
| 4. Show that streamlines and potential lines are orthogonal to each other. | 2 M |
| 5. Illustrate surface forces and body forces with examples.                | 2 M |
| 6. Define Orifice and write its importance.                                | 2 M |
| 7. Define boundary layer thickness.  | 2 M |
| 8. Interpret the concept of Magnus effect.                                 | 2 M |
| 9. List various minor losses.  | 2 M |
| 10. Explain the characteristics of laminar flow.                           | 2 M |

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). i) Find the total pressure on one face of the plate and the position of center of pressure when a circular plate 2.5m diameter is immersed in water, its greatest and least depth below the free surface being 3m and 1m respectively. 5M
- ii) Prove that the relationship between surface tension ( $\sigma$ ) and pressure ( $p$ ) inside a droplet of liquid in excess of outside pressure is given by  $p=4\sigma / d$ . 5M

OR

- 11.B). i) Define Viscosity and show that Newton's law of viscosity is obtained as  $\tau = \mu * (du / dy)$  where  $\mu$  is Viscosity and  $\tau$  is shear stress,  $du / dy$  is velocity gradient. 5M
- ii) A differential manometer is connected between two pipes A and B. Pipe A is 3m above the pipe B. The mercury level in the manometer limb connected to the pipe A is 5m below the centre of the pipe A and is at a higher level than that in the limb connected to pipe B. The pipe A carries a liquid of specific gravity 1.5 and is maintained at a pressure of  $10\text{N/cm}^2$ , while the pipe B carries liquid of specific gravity 0.9 and maintained at  $18\text{N/cm}^2$ . Find the difference in mercury level in the differential manometer. 5M
12. A). i) Explain the concepts of streamline, streak line, stream tube and path line in detail. 5M
- ii) Determine the velocity and acceleration of a fluid particle at (2, 1, 3) at time  $t=1$  when the velocity vector in fluid flow is given as  $V = 4x^3i - 10x^2yj + 2tk$ . 5M

(P.T.O..)

OR

12. B). i) List various classification of fluid flows and discuss them in brief. 5M  
ii) Water flows through a pipe AB 1.2m diameter at 3m/s and then passes through a pipe BC 1.5m diameter. At C, the pipe branches. Branch CD is 0.8m in diameter and carries one third of the flow in AB. The flow velocity in branch CE is 2.5m/s. By applying Continuity equation, find the volume rate of flow in AB, the velocity in BC, the velocity in CD and the diameter of CE. 5M

13. A). i) Define notch and weir and discuss various classification of notches and weirs. 5M  
ii) Water is flowing through a pipe having diameter 300mm and 200mm at the bottom and upper end respectively. The intensity of pressure at the bottom end is  $24.525 \text{ N/cm}^2$  and the pressure at the upper end is  $9.81 \text{ N/cm}^2$ . Determine the difference in datum head if the rate of flow through pipe is 40lit/s. 5M

OR

13. B). i) Develop Euler's equation of motion when flow takes place along a streamline. 5M  
ii) Illustrate and explain the principle and working of Pitot tube with a neat sketch. 5M

14. A). i) Explain boundary layer with different zones when fluid flows over a thin flat plate placed parallel to the direction of flow. 5M  
ii) Examine the drag force on one side of the plate by assuming turbulent flow condition when a 1.8m wide 5m long plate moves through stationary air of density  $1.22 \text{ kg/m}^3$  and viscosity  $1.8 \times 10^{-5} \text{ Ns/m}^2$  at a velocity of 1.75m/sec parallel to its length. 5M

OR

14. B). i) Define displacement, momentum and energy thicknesses and write their equations. 5M  
ii) A flat plate 2m X 2m moves at 40 km / hour in stationary air of density  $1.25 \text{ kg/m}^3$ . If the co- efficient of drag and lift are 0.2 and 0.8 respectively, Analyze: 5M  
a) The lift force  
b) The drag force  
c) The resultant force

15. A). i) Demonstrate Reynold's experiment with a neat sketch. 5M  
ii) Estimate the ratio of the head lost when the pipes are connected in series to the head lost when they are connected in parallel by neglecting minor losses, when two pipes each 300m long are available for connecting to a reservoir from which a flow of  $0.08 \text{ m}^3/\text{s}$  is required and the diameters of the two pipes are 0.30m and 0.15m respectively. 5M

OR

15. B). i) Develop an equation for turbulent flow when flow takes place in a pipe. 5M  
ii) A fluid of viscosity  $0.7 \text{ N-s/m}^2$  and specific gravity 1.3 is flowing through a circular pipe of diameter 100mm. The maximum shear stress at the pipe wall is given as  $196.2 \text{ N/m}^2$ , Estimate the average velocity and Reynolds number of the flow. 5M

\*\*\*\*\*

H.T No:

--	--	--	--	--	--	--	--	--	--

**R18**

Course Code: A30103



**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**  
(UGC AUTONOMOUS)

B.Tech III Semester Regular & Supplementary Examinations Feb/March-2023

Course Name: SURVEYING & GEOMATICS

(Civil Engineering)

Date: 24.02.2023 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. Distinguish Plane surveying and Geodetic surveying.          | 2 M |
| 2. Define Meridian.   | 2 M |
| 3. What is meant by Turning point?                              | 2 M |
| 4. Define Contour interval.                                     | 2 M |
| 5. What is meant by latitude and departure?                     | 2 M |
| 6. Draw a level section for embankment.                         | 2 M |
| 7. Define Transiting.   | 2 M |
| 8. What is the use of Trigonometric levelling?                  | 2 M |
| 9. What is the difference between stadia rod and levelling rod? | 2 M |
| 10. What is a compound curve?                                   | 2 M |

**PART-B**

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Distinguish briefly about plane surveying & geodetic surveying. 10M

**OR**

11. B). Following are the bearings taken in a closed compass traverse. 10M

Line	F.B.	B.B.
AB	S 37° 30' E	N 37° 30' W
BC	S 43° 15' W	N 44° 15' E
CD	N 73° 00' W	S 72° 15' E
DE	N 12° 45' E	S 13° 15' W
EA	N 60° 00' E	S 59° 00' W

Compute the interior angles and correct them for observational errors.

12. A). The following staff readings were taken with a level. The instrument having been shifted after 4<sup>th</sup>, 7<sup>th</sup> and 10<sup>th</sup> readings. R.L. of the starting B.M. is 100.00m. Find the R.L's of the staff positions by collimation method. 10M

2.65, 3.74, 3.83, 5.27, 4.64, 0.38, 0.96, 1.64, 2.84, 3.48, 4.68 and 5.26

**OR**

12. B). Discuss the advantages of Contours. 10M

(P.T.O..)

13. A). Derive Average- ordinate rule and Simpson's rule for finding the area from the offsets. 10M

**OR**

13. B). A road embankment is 8m wide and 200m in length at the formation level, with a side slope of 1.5:1. The embankment has a rising gradient of 1 in 100m. The ground levels at every 50m along the centre line are as follows: 10M

Distance (m)	0	50	100	150	200
R.L.(m)	164.5	165.2	166.8	167	167.2

The formation level of zero chainage is 166m. Calculate the volume of earthwork by Trapezoidal and Prismoidal rules.

14. A). Explain the measurement of horizontal angle by repetition method. 10M

**OR**

14. B). Discuss briefly about the methods of traversing. 10M

15. A). Explain the procedure to determine the tacheometric constants by fixed hair method. 10M

**OR**

15. B). Discuss briefly about the various elements to set out simple circular curve. 10M

\*\*\*\*\*

H.T No:

--	--	--	--	--	--	--	--	--	--

**R18**

Course Code: A30104



**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**  
(UGC AUTONOMOUS)

B.Tech III Semester Regular & Supplementary Examinations Feb/March-2023

**Course Name: ENGINEERING MATERIALS & GEOLOGY**  
(Civil Engineering)

Date: 27.02.2023 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. Classify the types of weathering. 2 M
2. State the Different class of bricks, based on its strength. 2 M
3. Mention the color and crystal form for Hornblende and Calcite. 2 M
4. Identify the properties and uses of civil engineering importance for Slate. 2 M
5. Differentiate between strike and dip with a sketch. 2 M
6. List the preliminary precautions to be carried out at Landslides. 2 M
7. List the factors which affect the selection of dam site. 2 M
8. State some applications of Geophysical methods in Civil Engineering investigations. 2 M
9. What are the preliminary steps to carry out before tunneling? 2 M
10. State the lining of rocks. 2 M

**PART-B**

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Discuss about the past earthquakes' histories of failure of some civil engineering constructions. 10M
- OR**
11. B). i) State the classification of bricks. 5M  
ii) State the advantages of Kiln burning. 5M
12. A). Describe about the description, textures distribution and economic uses of Granite, Marble, sandstone and basalt. 10M
- OR**
12. B). Discuss and differentiate the properties of Igneous, Sedimentary and Metamorphic Rocks. 10M
13. A). Discuss about the various types of unconformities with their engineering importance. 10M
- OR**
13. B). With the help of neat sketches, describe about the various types of fold and its engineering considerations. 10M
14. A). Describe the importance of geological investigations and the effects of geology on dams 10M
- OR**
14. B). Explain the electrical resistivity method and their applications in Civil Engineering. 10M
15. A). Discuss about the purpose of tunneling and effects of tunneling. 10M
- OR**
15. B). Explain the geological conditions influence the sits for selection of tunnels. 10M

H.T No:

--	--	--	--	--	--	--	--	--	--

**R18**

Course Code: A30226



**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**  
(UGC AUTONOMOUS)

B.Tech III Semester Regular & Supplementary Examinations Feb/March-2023  
Course Name: **BASIC ELECTRICAL & ELECTRONICS ENGINEERING**  
(Common for CE & ME)

Date: 01.03.2023 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

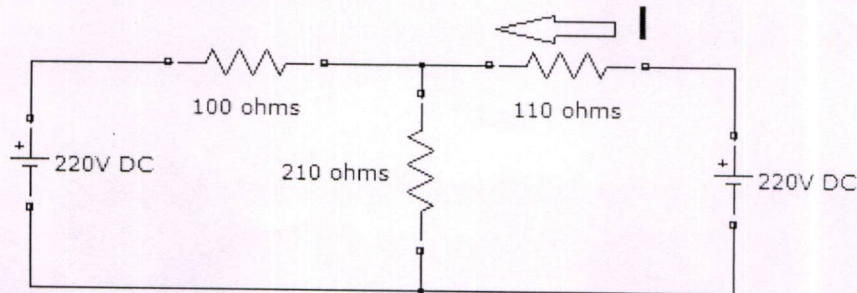
1. State Ohm's law. 2 M
2. State Maximum power transfer theorem. 2 M
3. Classify the DC Motors. 2 M
4. Write the Principle of operation of the DC generator. 2 M
5. Define Slip. 2 M
6. State the principle of operation of a single-phase transformer. 2 M
7. List the applications of diode. 2 M
8. Draw the V I characteristics of the Diode. 2 M
9. List the applications of CRO. 2 M
10. Distinguish between CRO and ordinary measuring instruments. 2 M

**PART-B**

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). In the figure given below, using superposition theorem determine the current flowing through 110 Ω resistor 10M

**OR**

11. B). i) Distinguish between MI and MC instruments. 4M  
ii) Explain the construction and working principle of PMMC instrument with neat sketch. 6M
12. A). Derive the EMF equation of DC generator. 10M

**OR**

12. B). Derive the expression for torque developed in a DC Motor. 10M

(P.T.O..)



13. A). Define the term voltage regulation of Alternator. Develop the formula for voltage regulation of 3-phase alternator by Synchronous impedance method. 10M

**OR**

13. B). Explain various Losses in a Single-Phase Transformer. Derive the condition for Maximum efficiency. 10M

14. A). Explain the principle of operation of half-wave rectifier with neat wave forms. 10M

**OR**

14. B). What are different modes of operation of transistors? And explain how the transistor acts as an amplifier. 10M

15. A). What is a CRO (Cathode Ray Oscilloscope) & explain its Working with neat sketch. 10M

**OR**

15. B). Explain how the CRO can be used for Measurement of Frequency. 10M

\*\*\*\*\*

H.T No:

--	--	--	--	--	--	--	--	--	--

**R18**

Course Code: A30531



**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**  
(UGC AUTONOMOUS)

**B.Tech III Semester Regular & Supplementary Examinations Feb/March-2023**

**Course Name: PYTHON PROGRAMMING**

**(Common for CE, EEE, ME, ECE, CSE, IT, CSC & CSM)**

**Date: 03.03.2023 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. Mention any two features of Python. 2 M
2. What is implicit conversion? Give an example. 2 M
3. Python strings are immutable. Justify. 2 M
4. Do Loop statements have else clause? When will it be executed? 2 M
5. How will you update list items? Give one example. 2 M
6. What is difference between list and tuple in python? 2 M
7. Explain what a constructor does. 2 M
8. How is the lifetime of an object determined? What happens to an object when it dies? 2 M
9. Explain what happens when a program receives a non-numeric string when a number is expected as input. 2 M
10. When would you make a data field read-only, and how would you do this? 2 M

**PART-B**

**Answer the following. Each question carries TEN Marks.**

**5x10=50M**

- 11.A). Write Python Program to reverse a number and also find the Sum of digits in the reversed number. Prompt the user for input. 10M

**OR**

11. B). Explain the basic data types available in Python with examples. 10M

12. A). Write a function to determine whether a given natural number is a perfect number. A natural number is said to be a perfect number if it is the sum of its divisors. 10M

**OR**

12. B). List the three types of conditional statements and explain them. 10M

13. A). Write a Python program to add 'ing' at the end of a given string (length should be at least 3). If the given string already ends with 'ing' then add 'ly'. instead. If the string length of the given string is less than 3, leave it unchanged. 10M

**OR**

13. B). Compare and contrast different functions and methods used in dictionaries and set. 10M

**(P.T.O..)**

14. A). i) Write a short notes on different built in attributes associated with a class. 5M  
ii) With the help of examples explain the concept of class methods and static methods. 5M

**OR**

14. B). Write a program that uses datetime module within a class. Enter manufacturing date and expiry date of the product. The program must display the years, months, and days that are left for expiry. 10M

15. A). Write a line of code that adds a Float Field to a window, at position (1, 1) in the grid, with an initial value of 0.0, a width of 15, and a precision of 2. 10M

**OR**

15. B). Describe the Graphical user interface using the tkinter module and widgets. 10M

\*\*\*\*\*

H.T No:

--	--	--	--	--	--	--	--	--	--

**R18**

Course Code: A30105



**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**  
(UGC AUTONOMOUS)

**B.Tech III Semester Regular & Supplementary Examinations Feb/March-2023**  
**Course Name: BUILDING CONSTRUCTION, PLANNING & DRAWING**  
**(Civil Engineering)**

**Date: 06.03.2023 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. Enumerate the differences between stone masonry and brick masonry. 2 M
2. What is the significance of bonding in brick work? 2 M
3. Differentiate between paint and distemper. 2 M
4. List out the factors affecting selection of foundations. 2 M
5. Write two uses of conventional signs. 2 M
6. What do you understand by built up area? 2 M
7. Draw sign convention for the following materials: i) Cast iron and ii) Glass. 2 M
8. What are the guide lines to be kept in mind for deciding the width of doors in a building? 2 M
9. Indicate the situations where steel staircase is used. 2 M
10. List out the various components of roof trusses. 2 M

**PART-B**

**Answer the following. Each question carries TEN Marks.**

**5x10=50M**

- 11.A). i) Draw plan and elevation of 1½ brick English bond for even courses. 5M  
ii) What suggestions do you propose for the improvement in construction to avoid decay of timber? 5M

**OR**

11. B). i) Explain the situation where stone masonry of foundation is used. 5M  
ii) Explain the term "Seasoning of timber" with its importance. 5M

12. A). i) Write in detail on the different types of varnishes and paints. 5M  
ii) What are the major types of foundations used in buildings? Explain their suitability. 5M

**OR**

12. B). i) Discuss the reasons for the causes of defects in painting work. 5M  
ii) Explain in briefly the type of foundation adopted on black cotton soils. 5M

13. A). i) Explain briefly the classification of buildings. 5M  
ii) Discuss in brief the type of footing applicable when the safe bearing pressure is very high. 5M

**OR**

13. B). i) What are the objectives of the building byelaws? 5M  
ii) If the wall or column under construction is near some other property, it will not be possible to spread the footing to both the sides of wall or column. In such case which types of footing is used and draw the elevation of such footing. 5M

**(P.T.O..)**

14. A). i) Explain the terminology floor area ratio. 5M  
ii) Enumerate the requirements of different rooms and their grouping. 5M

**OR**

14. B). Draw plan of a building which consists of two bed rooms, one kitchen, one drawing hall, one verandah, one dining room and toilets with standard dimensions. Provide thickness of walls as 300 mm. Also, provide doors and windows at appropriate locations with standard dimensions. 10M

15. A). What are the points to be considered in designing of a dog-legged staircase for an office building? Draw the plan of the staircase. 10M

**OR**

15. B). i) Explain the different forms of stairs. 5M  
ii) Explain the different features of Queen post truss. 5M

\*\*\*\*\*