Hall Ticket Number :

$\square$Code: 5G634R-15
II B.Tech. I Semester Supplementary Examinations May 2018
Building Materials and Construction
( Civil Engineering )
Time: 3 HoursMax. Marks: 70Answer all five units by choosing one question from each unit ( $5 \times 14=70$ Marks )
UNIT-I
1 a) Write properties of building stones and their structural requirements. Also write classification of stones. ..... 7M
b) What is dressing of stones? Explain tests conducted on stones. ..... 7M
OR
2 a) Classify bricks and write different tests of bricks. Write standards for good quality of bricks. ..... 6M
b) Explain the process for manufacturing bricks from black cotton soil. Discuss the operation of burning of the bricks in Hoffman's kiln with neat sketch. ..... 8M
UNIT-II
3 a) What is cement? Write manufacturing process of cement with flow chart. Explain different tests of cement and its importance. ..... 8M
b) Classify lime and explain its uses in different Civil Engg. Projects. ..... 6M
OR
4 a) Describe different types of cement and their uses. Define slurry, clinker and function of gypsum in cement. ..... 8M
b) Write manufacturing methods of tile and different uses in building. ..... 6M
UNIT-III5 a) Describe various parts of exogenous tree at any cross-section. Write defects of timber.7M
b) What is fiber-reinforced plastic [FRP]? Write uses of FRP in building. ..... 7M
OR
6 a) Differentiate between wood and timber. Classify different types of timber uses in building. ..... 7M
b) Write alternatives of wood. Write uses of steel and alluminium in building. ..... 7M
UNIT-IV
7 a) Explain different types of walls and roof for making building sound proof and heat proof. ..... 7M
b) Explain simplest footing used in building. Differentiate among strip footing, strap footing and continuous footing. ..... 7M
OR
8 a) What is bond used in brick wall? Why it is necessary? Explain any one of the famous bond. ..... 8M
b) Explain mat foundation and the situations where mat foundation is essential. ..... 6M
UNIT-V
9 a) Explain King post truss and Queen post truss with sketches. ..... 8M
b) Describe the purposes of damp proof coarse with materials. ..... 6 M
OR
10 a) Write different types of wall finishing such as white washing, distemper and painting. ..... 7M
b) What is Form Work? Describe the requirements of Form Work in details. ..... 7M

Hall Ticket Number : $\square$
Code: 5G538
II B.Tech. I Semester Supplementary Examinations May 2018 Electrical \& Mechanical Technology
( Civil Engineering)
Max. Marks: 70
Time: 3 Hours
Answer all five units by choosing one question from each unit ( $5 \times 14=70$ Marks )
Use separate booklets for Part-A \& Part-B

## PART-A

## UNIT-I

1. a) Define KVL, KCL
b) Find the loop current for the given circuit.

2. a) Derive the emf equation of a D.C. generator.
b) A 440 V D.C. shunt motor has an armature resistance of 0.6 and $R_{f}=150$.
Determine back emf when giving an output of 7.46 kW at $70 \%$ efficiency. 6 M

## UNIT-II

3. a) Explain the principle of operation of 1-Ф transformer with neat diagram.
b) A $250 \mathrm{kVA}, 1-\Phi$ transformer has $95 \%$ efficiency at full load and 0.8 p.f lagging. The efficiency at half load and 0.8 lagging p.f is $92 \%$. Calculate iron loss and full load copper loss.

OR
4. a) Explain the constructional details of an alternator.
b) Explain torque-slip characteristics of a $3-\Phi$ induction motor with a neat diagram.

## PART-B

## UNIT-III

5. a) What are the equipments used in arc welding? State their functions. ..... 7M
b) With a neat sketch, explain different types of flames used in gas welding process. Also list out their uses. ..... 7M
OR
6. a) Explain the principle of an arc welding. Compare the use of A.C and D.C. in welding. ..... 7M
b) Describe the differences between TIG and MIG welding process. ..... 7M
UNIT-IV
7. a) Classify I.C. engines. Explain the working principle of a two stroke Cl engine with a neat diagram ..... 7M
b) Mention various types of lubrication systems. Explain any one of lubrication system. ..... 7M
OR
8. a) Explain the working principle of a single stage reciprocating air compressor. ..... 7M
b) List the applications of a compressed air. ..... 3M
c) What are the advantages of a multi-stage compression over single stage? ..... 4M
UNIT-V
9. a) Explain briefly various methods of refrigeration with neat sketches.7M
b) Define refrigerating effect. What are the desirable properties of an ideal refrigerant? ..... 7M
OR
10. a) Define air conditioning. Explain the factors affecting comfort air conditioning. ..... 7M
b) Explain room air-conditioning system with a neat sketch. ..... 7M

## Code: 5GC31

II B.Tech. I Semester Supplementary Examinations May 2018

## Engineering Mathematics-III

( Common to CE \& ME )
Max. Marks: 70
Time: 3 Hours
Answer all five units by choosing one question from each unit ( $5 \times 14=70$ Marks )
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## UNIT-I

1. a) Find the Rank of the matrix $\left[\begin{array}{llll}1 & 2 & 1 & 2 \\ 1 & 3 & 2 & 2 \\ 2 & 4 & 3 & 4 \\ 3 & 7 & 5 & 6\end{array}\right]$ by reducing it to the normal form.
b) Prove that the following set of equations are consistent and solve them.
$3 x+3 y+2 z=1, x+2 y=4,10 y+3 z=-2,2 x-3 y-z=5$

## OR

2. If $A=\left[\begin{array}{ccc}1 & 2 & -1 \\ 2 & 1 & -2 \\ 2 & -2 & 1\end{array}\right]$ Verify Cayley-Hamilton theorem. Find $A^{4}$ and $A^{-1}$ using

Cayley-Hamilton theorem.

## UNIT-II

3. a) Find a real root of the equation $x \log _{10} x=1.2$ which lies between 2 and 3 by bisection method.
b) Find $f$ (2.36) from the following table.

| $x$ | 1.6 | 1.8 | 2.0 | 2.2 | 2.4 | 2.6 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $y$ | 4.95 | 6.05 | 7.39 | 9.03 | 11.02 | 13.46 |
| OR |  |  |  |  |  |  |

4. Evaluate $\int_{0}^{6} \frac{1}{1+x} d x$ using
(i) Trapezoidal rule (ii) Simpson's $3 / 8^{\text {th }}$ rule and compare it with the actual value. 14 M

## UNIT-III

5. Solve $y^{\prime}=x^{2}-y, y(0)=1$ using Taylor's series method and compute $y(0.1), y(0.2), y(0.3)$ and $y(0.4)$

## OR

6. Use Milne's method to find $y(0.8)$ and $y(1.0)$ from $y^{\prime}=1+y^{2}, y(0)=0$. Find the initial values $y(0.2), y(0.4)$ and $y(0.6)$ from the Runge-Kutta Method.

## UNIT-IV

7. Find the half-range cosine series for $f(x)=x(2-x)$, in $0 \leq x \leq 2$ and hence find sum of the series $\frac{1}{1^{2}}-\frac{1}{2^{2}}+\frac{1}{3^{2}}-\frac{1}{4^{2}}+----$

## OR

8. a) Form a partial differential equation by eliminating the arbitrary function $f(x)$ and $g(y)$ from $z=y f(x)+x g(y)$
b) Solve by the method of Separation of Variables $u_{x}=2 u_{t}+u$

## UNIT-V

9. Prove that $u=e^{-x}\left[\left(x^{2}-y^{2}\right) \cos y+2 x y \sin y\right]$ is harmonic and find the Analytic function whose real part is $u$.

## OR

10. Evaluate $\int_{C} \frac{\cos \pi z^{2}}{(z-1)(z-2)^{3}} d z$ where C is $|z|=3$ by using Cauchy's integral formula.

II B.Tech. I Semester Supplementary Examinations May 2018

# Fluid Mechanics <br> ( Civil Engineering) 

Time: 3 Hours
Max. Marks: 70
Answer all five units by choosing one question from each unit ( $5 \times 14=70$ Marks )


1. a) Explain about dynamic and kinematic viscosity. How does viscosity of fluid vary with temperature?
b) Glycerin has a density of $1260 \mathrm{~kg} / \mathrm{m}^{3}$ and a kinematic viscosity of $0.00183 \mathrm{~m}^{2} / \mathrm{s}$. What shear stress is required to deform this fluid at a strain rate of $104 / \mathrm{s}$ ?

## OR

2. a) What is a manometer? How are manometers classified? Explain with neat sketch the working of pressure gauge.
b) A single column mercury manometer is used to measure accurate pressure. The pressure head $H$ measured is within $1 \%$ of the true height corresponding to a pressure differential. Find out the tank area is 200, find out the percentage error involved in the difference in pressure by reading the single column height $H$. Also sketch the configuration.

## UNIT-II

3. a) Define and distinguish between streamline, pathline and streakline.

 case of possible steady incompressible fluid flow. Calculate the velocity and acceleration at the point $(1,2,3)$.

## OR

4. A $25^{\circ}$ reducing bend is connected in a pipe line, the diameters at the inlet and outlet of the bend being 25 cm and 20 cm respectively. Find the force exerted by water on the bend if the intensity of pressure at inlet of the bend is $11 \mathrm{~N} / \mathrm{cm}^{2}$ and rate of flow of water is $0.80 \mathrm{~m}^{3} / \mathrm{s}$.

## UNIT-III

5. a) Explain the terms: (i) Pipes in parallel (ii) Pipes in series
b) A compound piping system consists of 1800 m of $50 \mathrm{~cm}, 1200 \mathrm{~m}$ of 40 cm and 600 m of 30 cm pipes of the same material connected in series. (i) What is the equivalent length of a 40 cm pipe of the same material? (ii) What is the equivalent size of a pipe 3600 m long? (iii) If the three pipes are in parallel, what is the equivalent length of a 50 cm pipe?

## OR

6. a) Explain why a triangular notch is preferred to measure small quantities of flow of water?
b) A broad crested weir of 50 m length has 50 cm height of water above its crest.
i) Find the maximum discharge. Take $C_{d}=0.60$. Neglect velocity of approach.
ii) If the velocity of approach is to be taken in to consideration, find the maximum discharge when the channel has a cross sectional area of $45 \mathrm{~m}^{2}$ on the $\mathrm{u} / \mathrm{s}$ side.
UNIT-IV
7. a) Derive Hazen Poiseuille equation ..... 7M
b) An oil of viscosity 1.0 poise and relative density 0.9 is flowing through a horizontal circular pipe of diameter 9 cm and of length 10 m . Calculate the difference of pressure at the two ends of the pipe, if 100 N of the oil is collected in a tank in 35 sec

## OR

8. a) Derive the expression for viscous fluid between two parallel plates
b) An oil of viscosity 8 poise flows between two parallel fixed plates, which are kept at a distance of 30 mm apart. Find the rate of flow of oil between the plates, if the drop of pressure in a length of 1 m be $0.3 \times 104 \mathrm{~N} / \mathrm{m}^{2}$.

## UNIT-V

9. a) What do you mean by fundamental units and derived units? Give examples.
b) The discharge $Q$ over a small rectangular weir is known to depend upon the head $H$ over the weir, the weir height $P$, gravity $g$, width of the weir $L$ and fluid properties: density $\rho$, dynamic viscosity $\mu$ and surface tension $\sigma$. Express the relationship between the variables in dimensionless form.

## OR

10. a) State Buckingham's $\pi$-theorem. Why this theorem is considered superior to Rayleigh's
method for dimensional analysis?
b) Obtain expressions for the velocity ratio and force ratio similitude for a model which obeys Mach's law of similarity.
$\square$

## Code: 5G631

## R-15

II B.Tech. I Semester Supplementary Examinations May 2018

## Strength of Materials-I

( Civil Engineering )
Time: 3 Hours
Max. Marks: 70
Answer all five units by choosing one question from each unit ( $5 \times 14=70$ Marks )

## UNIT-I

1. a) Define the terms,
i. Prismatic bar
ii. Yield stress
iii. Volumetric strain
iv. True stress
v. Hookes law
8M
b) Two prismatic bars are rigidly fastened together and support a vertical load of 45 kN , as shown in Fig. The upper bar is steel having length 10 m and cross-sectional area $60 \mathrm{~cm}^{2}$. The lower bar is brass having length 6 m and cross-sectional area 50 $\mathrm{cm}^{2}$. For steel $E=200 \mathrm{GPa}$, for brass $E=100 \mathrm{GPa}$. Determine the maximum stress in each material.


## OR

2. a) Establish a relationship between $\mathbf{E}$ and $\mathbf{G}$ for an isotropic material.
b) What do you mean by a column of uniform strength?

## UNIT-II

3. A horizontal beam is simply supported at its ends and carries a uniformly distributed load of $40 \mathrm{kN} / \mathrm{m}$ between the supports, which are 75 m apart. Counter-clockwise moments of 100 and $80 \mathrm{kN}-\mathrm{m}$ are applied to the two ends. Draw the B.M. diagram and find (a) the reactions at the supports, and (b) the position and magnitude of the greatest B.M.

## OR

4. Draw the S.F. and B.M. diagrams of a simply supported beam of length 7 m carrying uniformly distributed loads as shown in Fig.

5. Consider the cantilever beam subject to the concentrated load shown in Fig. Determine the maximum shearing stress due to $F$ in the beam and also determine the shearing stress 25 mm from the top surface of the beam at a section adjacent to the supporting wall.

6. A beam of circular cross section is 18 cm in diameter. It is simply supported at each end and loaded by two concentrated loads of 80 kN each, applied 90 cm from the ends of the beam as shown in Fig. Determine the maximum bending stress in the beam.


## UNIT-IV

7. Determine the deflection curve of a cantilever beam subject to the uniformly distributed load w, shown in Fig.


OR
8 A horizontal beam $A B$ is simply supported at $A$ and $B, 6 \mathrm{~m}$ apart. The beam is subjected to a clockwise couple of 300 kNm at a distance of 4 m from the left end as shown in Fig. If $\mathrm{E}=2 \times 10^{5} \mathrm{~N} / \mathrm{mm}^{2}$ and $\mathrm{I}=2 \times 10^{8} \mathrm{~mm}^{4}$, determine:
(i) deflection at the point where couple is acting and
(ii) the maximum deflection.


## UNIT-V

9. a) Draw a 2D stress element at a point in a material which is subjected to pure torsion. Find out the following from Mohr's circle.
i. Principal stresses
ii. Max shear stress
iii. Principal planes
iv. Max.shear stress plane
b) State the maximum shear stress theory of failure. For which materials it is preferred.

## OR

10. State the significance of static theories of failure in design. Draw the failure envelops for different theories of failure in 2D.

I| B.Tech. I Semester Supplementary Examinations May 2018

## Surveying

( Civil Engineering )
Max. Marks: 70
Time: 3 Hours
Answer all five units by choosing one question from each unit ( $5 \times 14=70$ Marks )

## UNIT-I

1. a) What is the need of surveying? Classify the survey based on the purpose of surveying.
b) Determine the true bearing of a line $A B$ If the
(i) Magnetic bearing of a line AB is $110^{\circ} 43^{\prime}$ and declination is $1^{\circ} 05^{\prime} \mathrm{E}$,
(ii) Magnetic bearing of a line AB is $\mathrm{N}^{2} 5^{\circ} 45^{\prime} 45^{\prime} \mathrm{W}$ and declination is $2^{\circ} 46^{\prime} \mathrm{W}$.
2. a) What do you understand by surveying? Briefly explain the principles of surveying.
b) What are the various adjustments done on a surveyor's compass?

## UNIT-II

3. a) The caption of ship standing on the deck, just sees a light house of 75 m above MSL. If the caption, s eye is 7 m above MSL then what is the distance of light house from the captain?
b) Given below are the perpendicular offsets that were taken from a chain.

| Chainage $(\mathrm{m})$ | 0 | 30 | 60 | 90 | 120 | 150 | 180 | 210 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Offset $(\mathrm{m})$ | 0 | 8.76 | 7.89 | 9.43 | 8.44 | 7.54 | 7.35 | 8.75 |

Compute the area between the chain line and irregular boundary by, Simpson's rule

## OR

4. The following consecutive readings were taken with a level on a 4 m staff on a continuously sloping ground at an interval of 20 m : $0.650,1.535,1.850,2.435$, $2.995,3.350,1.150,1.850,2.045,3.635,0.905,1.055,1.750 .2 .550$. The RL of the first point is 110.780 . Rule out the page of level book by hight of collimation method and record the above readings. Calculate RL of various points.

## UNIT-III

5. Briefly describe the construction and working of Theodolite in details. What are its uses?

## OR

6. a) The following bearings were observed for a closed traverse.

| Line | FB | BB |
| :---: | :---: | :---: |
| AB | $124^{\circ} 30^{\prime}$ | $305^{\circ} 30^{\prime}$ |
| BC | $68^{\circ} 15^{\prime}$ | $246^{\circ}$ |
| CD | $310^{\circ} 30^{\prime}$ | $135^{\circ} 15^{\prime}$ |
| DA | $200^{\circ} 15^{\prime}$ | $17^{\circ} 45^{\prime}$ |

Find out the corrected bearing of all lines.
b) A man standing at a point sees the top of a building and the line of sight makes an angle of $60^{\circ}$ from vertical. When the man moves 15 m towards the building the angle becomes $40^{\circ}$ from horizontal. What is the height of the building?

## UNIT-IV

7. a) In an ordinary stadia telescope, the focal length is 25 cm . the tacheometric constants are $\mathrm{K}=100$ and $\mathrm{c}=0$. An error of 0.0040 cm exists in stadia interval. What will be the numerical error in computed horizontal distance if staff intercept is 1.2 m .
b) Write various advantage and disadvantages of plane table surveying.

## OR

8. a) If you want to conduct a plane table survey on an area, write down the various steps taken in the plane table survey by 2 point problem.
b) The stadia readings with sight horizontal taken on a vertical staff 72 m away from the tacheometer were 1.250 m and 1.685 m . The focal length of the object lens was 35 cm and distance between object lens and vertical axis of tacheometer was 20 cm . find the stadia interval.

## UNIT-V

9. A circular curve of radius 250 m is to be inserted between two straight meetings at a deflection angle $70^{\circ}$. What is the degree of curve by arc definition and by chord definition? Also find the length of curve, tangent length, and length of long chord, apex distance and mid-ordinate.

## OR

10. a) How you will set out the horizontal circular curve by two theodolite method? 7M
b) What are linear methods of setting out a simple circular curve? Discuss any two methods in brief.7M
