

Roll No. ....

**3096**

**B. Tech. 4th Semester (EE)**

**Examination – July, 2021**

**ELECTRICAL MACHINES-II**

**Paper : PCC-EE-206-G**

*Time : Three hours ]*

*[ Maximum Marks : 75*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

*Note : Question No. 1 is compulsory. Attempt four more questions by selecting one question from each Section.*

1. (a) Mention the undesirable effects produced by certain combination of rotor and stator slots.
- (b) What is synchronizing power in alternators ?
- (c) What is the role of damper winding in synchronous motor ?
- (d) Why wound rotor construction is adopted ?
- (e) Define cogging.
- (f) Why synchronous motor is not self-starting ?

$2.5 \times 6 = 15$

### SECTION - A

2. (a) Describe mathematically development of rotating magnetic field in 3-phase induction motor. 10
- (b) State difference between squirrel cage and slip ring induction motor. 5
3. Draw and explain the equivalent circuit of 3-phase induction motor. 15

### SECTION - B

4. Why single phase induction motor is not self-starting while three-phase IM is self-starting? Describe starting methods used for single-phase IM. 15
5. What are the various methods of speed control of IM? Explain Slip power recovery speed control method of IM. Mention advantages and disadvantages of rotor resistance method. 15

### SECTION - C

6. Define voltage regulation of an alternator. Describe Potier method of determining regulation of an alternator. 15
7. (a) A 4-pole, 50 Hz, star connected alternator has 15 slots per pole and each slot has 10 conductors. All the conductors of each phase are connected in

3096- (P-3)/(Q-9)(21) (2)

series and the winding factor being 0.95. When running on no-load for a certain flux-per-pole, the terminal e.m.f. was 1825 volt. If the winding are lap-connected as in d.c. machine, what would be the e.m.f. between the brushes for the same speed and the same flux/pole? Assume sinusoidal distribution of flux. 10

- (b) Define pitch factor and distribution factor. 5

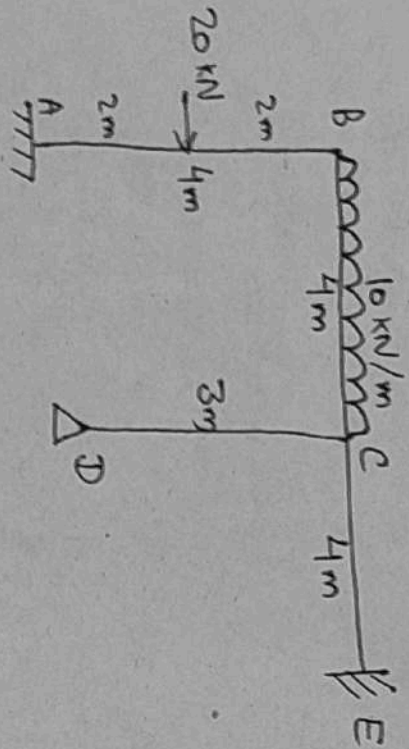
### SECTION - D

8. What are the conditions that must be satisfied for parallel operation of Alternators? Derive voltage and current equations for parallel operation of 2 alternators. 15
9. Write short note on : 15
  - (a) Damper winding.
  - (b) Synchronous condenser.
  - (c) Applications of synchronous motor.

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9. Analyse the frame by slope deflection method. 15



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3082

**B. Tech. 4th Semester (Civil)**  
**Examination – July, 2021**  
**STRUCTURAL ANALYSIS**  
Paper : PCC-CE-206-G

Time : Three hours ]

[ Maximum Marks : 75

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt five questions in all, selecting one question from each Section. Question No. 1 is compulsory.  
All questions carry equal marks.

1. (a) Describe the Maxwell's law of reciprocal deflections.  $3 \times 5 = 15$
- (b) Explain portal frames and its types.
- (c) Describe the temperature effect on three hinged arch.
- (d) Differentiate between statically determinate and indeterminate structures.
- (e) Explain Stiffening Girder and its types.

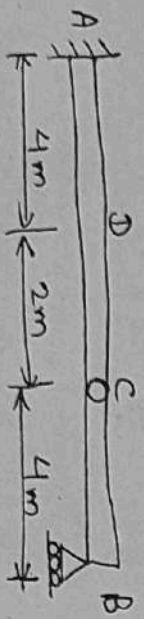
**SECTION - A**

2. Describe Williot Mohr diagram in details. 15
3. A horizontal girder of steel having a uniform section is 14 m long and is simply supported at its ends. It carries concentrated loads of 120 kN and 80 kN at sections 3 m and 4.5 m from the left end and right end respectively. Find the slope and deflection under the loads and the slopes at each end. 15

Take  $EI = 3.36 \times 10^{11}$  kN/mm<sup>2</sup>

**SECTION - B**

4. For the given beam draw the influence line diagram for the following : (i) reaction  $V_b$  at B, (ii) reaction  $V_a$  at A, (iii) reacting moment  $M_a$  at A, (iv) shear force at D and (v) bending moment at D. Also find the maximum values of these due to a live load of 20 kN/m. 15

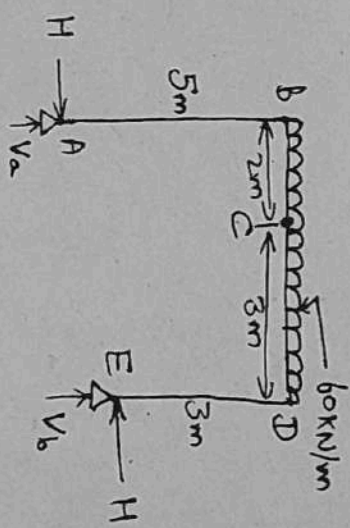


5. Two wheel loads 30 kN and 20 kN, 3m apart cross a girder of 9 m span with the 15 kN load leading from left to right. Draw the max. shear and max. bending moment diagrams. 15

3082-1750-(P-4)(Q-9)(21) (2)

**SECTION - C**

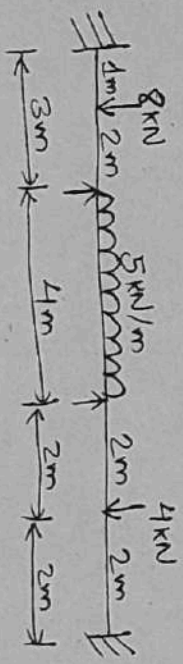
6. Analysis the given frame. Draw the B.M. diagram for this : 15



7. A fixed beam of span  $l$  carries a point load  $W$  at mid span. Determine the fixed end moments. The beam is of uniform section. 15

**SECTION - D**

8. Determine the support moments at A, B, C and D for continuous girder. 15



3082-1750-(P-4)(Q-9)(21) (3)

P. T. O.



9. Explain the following :

15

- (i) Hoop stress and longitudinal stress in case of thin cylinder
- (ii) Wire winding of thin cylinders
- \_\_\_\_\_

3114-2300-(P-4)(Q-9)(21)

(4)

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3114

**B. Tech. 4th Semester (ME)  
Examination – July, 2021**

**STRENGTH OF MATERIALS**

Paper : PCC-ME-206-G

Time : Three Hours ]

[ Maximum Marks : 75

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

**Note :** Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is *compulsory*. All questions carry equal marks.

1. Briefly answer the following :

2.5 × 6 = 15

- (a) Define Mohr circle.
- (b) Define Bulk modulus.
- (c) What do you mean by neutral axis ?

3114-2300-(P-4)(Q-9)(21)

P. T. O.

- (d) Explain Maxwell's reciprocating theorem.
- (e) Define Helical spring.
- (f) Explain moment area method to find deflection.

**UNIT - I**

2. Explain the following : 15

- (i) Principle stress and principle plane.
- (ii) Major and minor principle stress.

3. Derive the relationship between various elastic constants in details. 15

**UNIT - II**

4. Draw the shear force and bending moment diagram of the cantilever beam as shown in figure 1 : 15

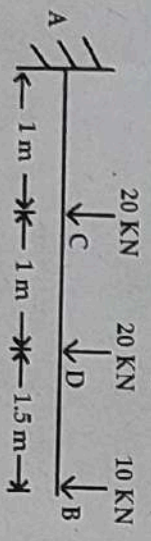


Figure 1

3114-2300-(P-4)(Q-9)(21) (2)

5. A circular pipe of external diameter 70 mm and thickness 8 mm is used as a simple supported beam over an effective span 2.5 m. Find the max. concentrated load that can be applied at the centre of span if permissible stress in the tube is 150 N/mm<sup>2</sup>. 15

**UNIT - III**

6. Explain the following : 15

- (i) Euler's formula for the elastic buckling load.
- (ii) Slenderness ratio.

7. Find the maximum deflection and the maximum slope for the beam as shown in figure 2 : 15

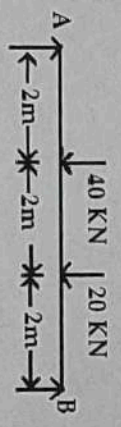


Figure 2

**UNIT - IV**

8. Derive torsional equation and assumptions in the theory of torsion. 15

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**3092**

**B. Tech. 4th Semester (ECE)  
Examination – July, 2021**

**DIGITAL ELECTRONICS**

**Paper : PCC-ECE-205-G**

*Time : Three hours ]*

*[ Maximum Marks : 75*

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*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

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*Note : Question No. 1 is compulsory. Attempt any one from each Section.*

1. (a) Find the hex sum of  $(93)_{16} + (DE)_{16}$ .  $2.5 \times 6 = 15$
- (b) Differentiate between latch and flip flop.
- (c) Why NAND-NAND realization is preferred over AND-OR realization ?
- (d) What is Race around condition ?
- (e) Realize OR gate using universal gates.
- (f) What is programmable logic array ? How it is differs from ROM ?

**SECTION - A**

2. (a) Reduce by K-mapping and implement using NOR-NOR logic : 10  

$$y = \sum m(1,2,3,4,6,7,10,11,13,14)$$
- (b) Find 9's complement and 10's complement of 155 and 255. 5
3. (a) State and prove De-Morgan's theorem. 5
- (b) What is Quine McCluskey method ? Use QM method to reduce each following expression to a minimum SOP form : 10
- (i)  $y = \overline{ABCD} + \overline{AB}CD + ABCD + ABC\overline{D}$
- (ii)  $y = \overline{A}B(\overline{C}D + \overline{C}D) + AB(\overline{C}D + \overline{C}D) + A\overline{B}CD$

**SECTION - B**

4. (a) Perform each of the following conversions : 10
- (i)  $(11010)_2 = ( )_{BCD}$
- (ii)  $(10111011)_2$  into its equivalent grey code.
- (b) Determine the single error correcting code for the information code 10111 for odd parity. 5
5. (a) Implement the function  $F(x, y, z) = \Sigma(1, 2, 6, 7)$  using  $4 \times 1$  Multiplexer. 10
- (b) Explain full adder circuit in detail. 5

3092- (P-3)(Q-9)(21) (2)

**SECTION - C**

6. (a) Convert the following : 10
- (i) SR Flip flop into JK Flip flop
- (ii) JK Flip flop into D Flip flop
- (b) Write short note on Edge triggered Flip flop. 5
7. (a) Explain working of serial in serial out shift register. 10
- (b) Design MOD-10 synchronous counter with JK-Flip flop. 5

**SECTION - D**

8. What is FSM ? Describe types of FSM. Mention advantages, disadvantages and applications for the same. 15
9. Compare PAL and PLA. Also draw combinational circuit for a PLA with three inputs, three product terms and two outputs. 15

3092- (P-3)(Q-9)(21) (3)



- (b) Find the critical depth and critical velocity of the water flowing through a rectangular channel of width 5 m, when discharge is  $15 \text{ m}^3/\text{s}$ . 5
- (c) Find the rate of change of depth of water in a rectangular channel of 10 m wide and 1.5 m deep, when the water is flowing with a velocity of 1 m/s. The flow of water through the channel of bed slope 1 in 4000, is regulated in such a way that energy line is having a slope of 0.00004. 5

**UNIT - IV**

8. (a) The depth of flow of water, at a certain section of a rectangular channel of 2 m wide, is 0.3 m. The discharge through the channel is  $1.5 \text{ m}^3/\text{s}$ . Determine whether a hydraulic jump will occur, and if so, find its height and loss of energy per kg of water. 7
- (b) What is hydraulic jump ? Write down different types of hydraulic jump and various applications of hydraulic jump. 8
9. (a) Define surge in an open channel. Derive an expression for positive surge due to sudden increase of flow. 10
- (b) Explain the moment of momentum equation. 5

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**3080**

**B. Tech. 4th Semester (Civil)**  
**Examination - July, 2021**  
**HYDRAULIC ENGINEERING**  
 Paper : PCC-CF-202-G

Time : Three hours ]

[ Maximum Marks : 75

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt five questions by selecting one question from each Unit and question no. 1 is compulsory.

1. Define any six from the following : 2.5 × 6 = 15
- (i) Causes of turbulence
  - (ii) Loss of head due to obstruction and bend in pipe
  - (iii) Sub-critical, critical & super-critical flow
  - (iv) Elements & characteristics of hydraulic jump
  - (v) Loss of head due to sudden expansion and sudden contraction in pipe
  - (vi) Steady and unsteady flow
  - (vii) Branching of pipes
  - (viii) Differentiate between Open Channel flow and Pipe flow



### UNIT - I

2. (a) Derive any *two* of the following for laminar flow between two parallel fixed plates : 10
- (i) Velocity distribution
- (ii) Ratio of maximum velocity to average velocity
- (iii) Drop of pressure head for a given length
- (b) Name various methods adopted for measurement of viscosity of a fluid and write in brief about any *one*. 5
3. (a) Describe Reynold's experiment with a neat sketch. 7
- (b) A smooth pipe of diameter 400 mm and length 800 m carries water at the rate of  $0.04 \text{ m}^3/\text{s}$ . Determine the head lost due to friction, wall shear stress, centre-line velocity and thickness of laminar sub-layer. Take the kinematic viscosity of water as 0.016 stokes. 8
4. (a) The rate of flow of water through a horizontal pipe is  $0.30 \text{ m}^3/\text{s}$ . The diameter of the pipe which is 200 mm is suddenly enlarged to 400 mm. The pressure intensity in the smaller pipe is  $11.772 \text{ N/cm}^2$ . Determine : 7

### UNIT - II

- (i) Loss of head due to sudden enlargement
- (ii) Pressure intensity in the large pipe
- (b) Explain Pipes in series and parallel with diagrams and its expression. 8
5. (a) Define hydraulic gradient line and total energy line with diagram. 6
- (b) A Pipe of diameter 20 cm and length 2000 m connects two reservoirs, having difference of water levels as 20 m. Determine the discharge through the pipe. If an additional pipe of diameter 20 cm and length 1200 m is attached to the last 1200 m length of the existing pipe, find the increase in the discharge. Take  $f = 0.015$  and neglect minor losses. 9
6. (a) A rectangular channel carries water at the rate of 300 liters/sec when bed slope is 1 in 2000. Find the most economical dimensions of the channel if  $C = 40$ . 7
- (b) What is most economical section ? Derive conditions for the most economical trapezoidal channel section. 8
7. (a) Classify various surface profiles in brief. 5

### UNIT - III



UNIT – IV

8. Write detail note on different measures of central tendency.

9. Write note on :

- (i) Large sample test for single proportion.
- (ii) Tests for single mean.

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3100

B. Tech. 4th Semester (EE)  
Examination – July, 2021

MATHEMATICS-III (Numerical Methods, Probability & Statistics)

Paper : BSC-MATH-204-G

Time : Three Hours ]

[ Maximum Marks : 75

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

*Note : Attempt five questions in all, selecting one question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.*

1. (a) State Regula-Falsi method.
- (b) Write Newton's forward difference formula.
- (c) Write Trapezoidal rule of numerical integration.
- (d) Define transcendental equation.

3100-1500-(P-4)(Q-9)(21)

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P. T. O.



(e) Explain Taylor's series method for ordinary differential equations.

(f) Write one dimensional heat equation.

(g) Define conditional probability.

(h) Define discrete random variables.

(i) Define skewness.

(j) Define hypothesis.

#### UNIT - I

2. Find the positive root of  $x^3 - 2x - 5 = 0$  by :

(i) Bisection method

(ii) Newton's method

3. Given the values :

$x$  : 5 7 11 13 17

$f(x)$  : 150 392 1452 2366 5202

Evaluate  $f(9)$ , using Newton's divided difference formula.

3100-1500-(P-4)(Q-9)(21) (2)

#### UNIT - II

4. Apply Runge-Kutta method to find an approximate value of  $y$  for  $x = 0.2$  in steps of 0.1, if  $\frac{dy}{dx} = x + y^2$ , given that  $y = 1$ , where  $x = 0$ .

5. Solve the Poisson equation :

$$U_{xx} + U_{yy} = -81xy, \quad 0 < x < 1, \quad 0 < y < 1 \text{ given that:}$$

$$u(0, y) = 0, \quad u(x, 0) = 0, \quad u(1, y) = 100, \quad u(x, 1) = 100 \text{ and}$$

$$h = \frac{1}{3}.$$

#### UNIT - III

6. Explain various discrete probability distributions in short.

7. Write short note on :

(i) Expectation of discrete random variables.

(ii) Variance of a sum of discrete random variables.

3100-1500-(P-4)(Q-9)(21) (3)

P. T. O.



UNIT - IV

8. (a) Given the equation  $\frac{dy}{dx} = 3x^2 + 1$  with  $y(1) = 2$  Estimate  $y(2)$  by Euler's method using  $h = 0.5$ . 7.5
- (b) Use Runge-Kutta method of order '4' to estimate  $y(0.4)$  when  $\frac{dy}{dx} = x^2 + y^2$  with  $y(0) = 0$ . Assume  $h = 0.2$  7.5
9. (a) Solve the Poisson equation  $\nabla^2 f = 2x^2y^2$  over the square domain  $0 \leq x \leq 3, 0 \leq y \leq 3$  with  $f = 0$  on the boundary and  $h = 1$ . 7.5
- (b) Solve the problem  $2f_{xx}(x, t) = f_t(x, t), 0 < t < 1.5$  and  $0 < x < 4$  given initial condition  $f(x, 0) = 50(4 - x), 0 \leq x \leq 4$  and the boundary conditions  $f(0, t) = 0, 0 \leq t \leq 1.5, f(4, t) = 0, 0 \leq t \leq 1.5$ . 7.5

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3094

B. Tech. 4th Semester (ECE)  
Examination – July, 2021

MATHEMATICS-III (Partial Differential Equations and

Numerical Methods)

Paper : BSC-MATH-202-G

Time : Three hours ]

[ Maximum Marks : 75

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

*Note : Attempt five questions in all, selecting one question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.*

1. (a) Define partial differential equation and its application.
- (b) Define the convergence of Newton-Raphson method.
- (c) What do you mean by Algebraic Equation? Quote an example.
- (d) Define ordinary differential equation and its solution with an example.
- (e) Explain numerical differentiation and quote an example.

- (f) Define Interpolation and what are the various methods of Interpolation ? 2.5 × 6 = 15

### UNIT - I

2. (a) Form a partial differential equation by eliminating arbitrary function from : 7.5

$$z = xf_1(x+y) + f_2(x+y)$$

- (b) Solve Lagrange's linear partial differential equation : 7.5

$$y^2 zp + x^2 zq = xy^2$$

3. (a) Solve the differential equation : 7.5

$$zxp + yzq = xy$$

- (b) Solve by Charpit's method : 7.5

$$pxy + pq + qy = yz$$

### UNIT - II

4. (a) Solve the homogeneous partial differential equation : 7.5

$$\frac{\partial^2 z}{\partial x^2} - 5 \frac{\partial^2 z}{\partial x \partial y} + 6 \frac{\partial^2 z}{\partial y^2} = e^{x+y}$$

- (b) Solve non-homogeneous partial differential equation : 7.5

$$(D - D' - 1)(D - D' - 2)z = e^{2x-y}$$

5. (a) Using method of separation of variables, solve partial differential equation : 7.5

$$4 \frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} = 3u$$

given that  $u = 3e^{-y} - e^{-5y}$ ;  $x = 0$

- (b) Solve the boundary value problem : 7.5

$$\frac{\partial^2 y}{\partial t^2} = 4 \frac{\partial^2 y}{\partial x^2}$$

Given that  $y(0, t) = y(5, t) = 0$ ;  $y(x, 0) = 0$ ,

$$\left( \frac{\partial y}{\partial t} \right)_{t=0} = f(x)$$

### UNIT - III

6. (a) Find the root of equation  $x^2 - 4x - 10 = 0$  using Bisection method. 7.5

- (b) Compute a root of each of the following equation : 7.5

$$x^2 - 5x + 6 = 0, x_0 = 5$$

using Newton-Raphson method.

7. (a) Estimate the value of 'sin  $\theta$ ' at  $\theta = 25^\circ$  using Newton-Gregory forward difference formula with the help of following table : 7.5

$\theta$	10	20	30	40	50
sin $\theta$	0.1736	0.3420	0.5000	0.6428	0.7660

- (b) Evaluate the following integral using Simpson's  $\frac{1}{3}$  rd rule  $\int_{-1}^1 e^x dx$ . 7.5



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**3116**

**B. Tech. 4th Semester (ME)  
Examination – July, 2021**

**INSTRUMENTATION AND CONTROL**

**Paper : PCC-ME-210-G**

*Time : Three Hours ]*

*[ Maximum Marks : 75*

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*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

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*Note : Attempt five questions in all, selecting one question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.*

1. Attempt all the six questions :  $2.5 \times 6 = 15$
- (a) What do you understand by accuracy ?
  - (b) What is opto-electrical transducer ?
  - (c) Write about electrical amplifying elements.



- (d) Write working principle of Bimetallic thermometer.
- (e) Write concept of elastic transducer.
- (f) What is calibration?

**UNIT - I**

- 2. Write in detail about processing and conditioning. 15
- 3. What is instrument ? Explain the applications of instrument systems. 15

**UNIT - II**

- 4. (a) What are Analog transducers ? 8
- (b) Write about Eddy current. 7
- 5. (a) What is linear variable differential transformer ? 10
- (b) Write about photo-conductive transducers. 5

**UNIT - III**

- 6. (a) Explain pneumatic load cell. 8
- (b) Write about torque transducer. 7

3116-2300-(P-3)(Q-9)(21) (2)

- 7. Write short note on the following :
  - (a) Pressure thermometer 8
  - (b) Total radiation pyrometer 7

**UNIT - IV**

- 8. (a) Write about basic elements of control systems. 8
- (b) Explain high pressure transducer. 7
- 9. Write about :
  - (a) Pitot-Static tube meter. 8
  - (b) Hot-wire Anemometer. 7

3116-2300-(P-3)(Q-9)(21) (3)



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**3084**

**B. Tech. 4th Semester (Civil)  
Examination – July, 2021  
MATERIAL TESTING AND EVALUATION  
Paper : PCC-CE-210-G**

*Time : Three hours ]*

*[ Maximum Marks : 75*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

*Note : Attempt five questions, selecting one question from each unit and question no. 1 is compulsory.*

1. Define any six of the following : 2.5 × 6 = 15

- (i) Define low heat cement
- (ii) Define hydrophobic cement
- (iii) Define Permeability of concrete
- (iv) Define Polymer concrete
- (v) Differentiate between quick lime and hydrated lime
- (vi) Define admixtures
- (vii) Name various types of steel
- (viii) Define hot-mix plant



UNIT - I

- 2. (a) Name and explain the various engineering materials which are used in construction field in detail. 10
- (b) Differentiate between PCC and RCC. 5
- 3. Write down the names of various tests conducted on cement. Explain any *two* tests in detail. 15

UNIT - II

- 4. (a) What is Workability? Name various tests used for measurement of workability. Explain any *two* tests in brief. 10
- (b) Write a short note on Prestressed concrete. 5

- 5. (a) Describe basic considerations and importance of mix design. Explain briefly IS guidelines for mix design. 10
- (b) Write down various principles of concrete mix design. 5

UNIT - III

- 6. (a) Name the various tests that can be conducted on a steel rod. Explain the tensile test on a steel rod in detail. 9

- (b) Write short note on any *one* tests of steel : 6

- (i) Bending test
- (ii) Torsion test

- 7. (a) Explain elasticity of steel along with its principle and characteristics. 9

- (b) Write a short note on plastic deformation of metals. 6

UNIT - IV

- 8. (a) Explain necessity of heavy construction equipments. 5

- (b) Define the term heavy construction. Also explain the precautions taken care during the construction of a dam in detail. 10

- 9. (a) Describe elastic and plastic deformation of materials in detail. 8

- (b) Define the following : 7

- (i) Fatigue of material
- (ii) Shrinkage
- (iii) Creep



Roll No. ....

**3018**

**B. Tech. 4th Semester (EE)  
Examination – July, 2021**

**BIOLOGY**

**Paper : BSC-BIO-201-G**

*Time : Three Hours ]*

*[ Maximum Marks : 75*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

*Note : Attempt five questions in all, selecting one question from each Unit. Question Number 1 is compulsory. All questions carry equal marks.*

1. Write the short notes on the following :  $1.5 \times 10 = 15$

- (a) Father of biology
- (b) Central Dogma
- (c) Gene
- (d) Allele



- (e) Enzyme
- (f) Starch
- (g) Glycoprotein
- (h) Cholesterol
- (i) Clone
- (j) Golden rice

#### UNIT - I

2. What is biology ? Why should an engineer study biology ? 15

3. Write the short notes on any two : 7.5 × 2 = 15

- (a) Cell theory
- (b) Mendel's laws of inheritance
- (c) Economic importance of microorganism

#### UNIT - II

4. Write the short notes on any two : 7.5 × 2 = 15

- (a) Amino acids
- (b) Structure and function of lipids
- (c) Types and function of RNA

3018-1500-(P-3)(Q-9)(21) ( 2 )

5. What is nucleic acid ? Describe the Watson and Crick model of DNA in detail. 15

#### UNIT - III

6. Write the short notes on : 7.5 × 2 = 15

- (a) Restriction enzymes
- (b) Steps of gene cloning

7. What are the transgenic animals ? What is the importance of transgenic animals in modern era ? 15

#### UNIT - IV

8. Write the short notes on : 7.5 × 2 = 15

- (a) Enzyme technology
- (b) Role of biotech in medicine

9. What is Biotechnology ? What are pre-requirements for the biotechnology ? 15

3018-1500-(P-3)(Q-9)(21) ( 3 )



Roll No. ....

**3090**

**B. Tech. 4th Semester (ECE)  
Examination – July, 2021**

**COMMUNICATION SYSTEM**

Paper : PCC-ECE-202-G

**Time : Three Hours ] [ Maximum Marks : 75**

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt *five* questions in all, selecting *one* question from each Section. Question No. 1 is *compulsory*.

All questions carry equal marks.

1. Answer the following questions :
- |  |   |
|--|---|
| (a) Discuss brief about classification of signals.         | 4 |
| (b) Compare FM with AM.                                    | 3 |
| (c) Discuss thermal noise and give thermal noise equation. | 4 |
| (d) State PCM technique and its disadvantages.             | 4 |

3090125(P-3)(Q-9)(21)

P. T. O.



### SECTION - I

2. (a) What are limitations & advantages of communication system? 7  
(b) Discuss radio frequency spectrum. 8
3. Write short notes on :  
(i) Noise quieting effect 8  
(ii) Sources of noise 7

### SECTION - II

4. Write in detail about various methods employed for generation of AM waves. 15
5. (a) Discuss vector representation of FM. 8  
(b) Compare various AM systems. 7

### SECTION - III

6. (a) Discuss FM transmitter using reactance modulator. 8  
(b) What is super heterodyne receiver? 7

3090- (P-3)(Q-9)(21) (2)

7. Explain the following :

- (i) TDM 8  
(ii) PPM 7

### SECTION - IV

8. (a) Discuss channel capacity of PCM system. 7  
(b) Discuss differential pulse code modulation. 8
9. (a) Discuss carrier and symbol synchronization in digital communication. 8  
(b) Explain MSK. 7

3090- (P-3)(Q-9)(21) (3)



Roll No. ....

**57532**

**BBA 4th Semester (N. S.) 2014-17**  
**Examination – July, 2021**

**HUMAN RESOURCE MANAGEMENT**

Paper : BBAN-402

Time : Three Hours ] [ Maximum Marks : 80

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Section – A is compulsory. Attempt four questions from Section – B, selecting one question from each Unit.

**SECTION – A**

1. Explain the following in brief :

- (a) Concept of KPO
- (b) Operative functions of HRM

57532-4,200-(P-3)(O-9)(21)

P. T. O.



- (c) Meaning of Induction
- (d) Qualities of HR Manager
- (e) Job enrichment
- (f) Differentiate Training and Education
- (g) 360° appraisal
- (h) Balance score card

**SECTION – B**

**UNIT – I**

2. "Human Resource Management is an advancement over traditional personnel management". Comment.
3. "Human Resource Policies serve as guide posts to human resource decisions". Explain.

**UNIT – II**

4. Explain the following :
  - (a) Job Specification
  - (b) Job Design
5. What do you understand by selection ? How is it different from recruitment ? Explain in brief the steps involved in selection process.

57532-4,200-(P-3)(Q-9)(21) ( 2 )

**UNIT – III**

6. Examine the need of Executive Development. Explain any *three* methods of Executive Development.
7. What do you mean by Employee Retention ? Discuss the need and importance of Employee Retention.

**UNIT – IV**

8. What is Performance Appraisal ? State its significance and explain the criteria to be used for measurement of performance.
9. What do you mean by wage and salary administration ? Discuss the essentials of a sound wage & salary structure.

57532-4,200-(P-3)(Q-9)(21) ( 3 )



Roll No. ....

**3232**

**B. Tech. 5th Semester (CSE) (Elective - I)  
Examination – March, 2021**

**SOFTWARE ENGINEERING**

**Paper: PEC-CSE-311-G**

**Time : Three Hours ] [ Maximum Marks : 75**

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt five questions in all, selecting one question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

1. (a) What is software engineering ? 2.5
- (b) Explain software crisis. 2.5
- (c) Give a description of prototyping. 2.5
- (d) Explain structural partitioning. 2.5
- (e) Explain stress testing. 2.5
- (f) Explain the term software quality assurance. 2.5

**UNIT – I**

2. Explain project estimation techniques in detail. 15

3232-1,650-(P-2)(Q-9)(21)

P. T. O.

3. Explain project scheduling and tracking. 15

**UNIT – II**

4. Discuss the software requirements specification and reviews analysis modelling. 15

5. Explain cohesion and coupling. 15

**UNIT – III**

6. What are the differences between verification and validation in software development? 15

7. Explain software testing techniques. 15

**UNIT – IV**

8. Define the meaning of software quality and detail the factor which affects the quality not productivity of a software product. 15

9. Explain ISO 9000 quality standards. 15



Roll No. ....

**3237**

**B. Tech. 5th Semester (EE)  
Examination – March, 2021**

**POWER SYSTEM – I**

Paper : PCC-EE-301-G

Time : Three Hours ] [ Maximum Marks : 75

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt *five* questions in all, selecting *one* question from each Section. Question No. 1 is *compulsory*.

All questions carry equal marks. Use of non-programmable calculator is allowed.

1. (a) Define function of relay.
- (b) What is per unit (PU) system ?
- (c) What is theory of interruption ?
- (d) What is Ferranti effect ?

- (e) Explain induction generator.
- (f) Enlist applications of DC transmission.  $2.5 \times 6 = 15$

**SECTION - A**

- 2. Draw and explain the single-line and impedance diagram of power systems. 15
- 3. (a) Explain constant power, constant current and constant impedance representation of load. 7.5
- (b) Explain complex power for single phase load, for parallel loads and three phase load in details. 7.5

**SECTION - B**

- 4. Explain the symmetrical component transformation. Prove that symmetrical component transformation is power invariant. 15
- 5. Explain sequence impedances and networks of synchronous machine. 15

**SECTION - C**

- 6. Discuss the principle of operation of an air blast circuit breaker. What are the advantages and disadvantages of using air as an arc quenching medium? 15

3237-750 -(P-3)(Q-9)(21) (2)

- 7. Distinguish between primary and back up protection. Explain the role of back up protection. List the various methods of providing back up protection. 15

**SECTION - D**

- 8. Explain in details types of DC links. 15
- 9. (a) Explain wind energy generation systems. 7.5
- (b) Write notes on permanent magnet synchronous generators. 7.5

3237-750 -(P-3)(Q-9)(21) (3)



Roll No. ....

**3209**

**B. Tech. 5th Semester (ME)  
Examination – March, 2021**

**MANUFACTURING TECHNOLOGY-I**

Paper : PCC-ME-305-G

Time : Three hours ] [ Maximum Marks : 75

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is *compulsory*. All questions carry equal marks.

2.5 × 6 = 15

1. Write about :

- (a) Cutting speed
- (b) Forward slip
- (c) Auto-collimator.
- (d) Working Principle of Capstan Lathe.
- (e) Purpose of gating system.
- (f) Brazing.

### UNIT - I

2. Write about tool life relationship. Also discuss about Taylor equation of tool life. 15
3. Write about :
- (a) Economics of metal machining 8
  - (b) Power calculations in drills. 7

### UNIT - II

4. Write about :
- (a) Theory of Forging 8
  - (b) Broaching Fixtures 7
5. (a) Discuss about micro and macro deviation. 8
- (b) Write about evaluation of surface finish. 7

### UNIT - III

6. Discuss with neat sketches various operations that can be performed on milling machine. Also write about indexing in milling operation. 15
7. Write in detail about types of pattern and allowances. 15

3209- 1350 -(P-3)(Q-9)(21) (2)

### UNIT - IV

8. Explain the different welding defects and remedies in detail. 15
9. Write about :
- (a) Cold working processes 8
  - (b) Shearing and Punching. 7

3209- 1350 -(P-3)(Q-9)(21) (3)



Roll No. ....

**3216**

**B. Tech. 5th Semester (ECE)  
Examination – March, 2021**

**ELECTROMAGNETIC WAVES**

Paper : PCC-ECE- 301-G

Time : Three hours ]

[ Maximum Marks : 75

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt *five* questions in all, Selecting *one* question from each Unit. Question No. 1 is *compulsory*. All questions carry equal marks.

1. Write short answer of the following :
- (a) What are Electromagnetic Waves ?
  - (b) Define and briefly explain Reflection Coefficient.
  - (c) Define Phase Velocity.
  - (d) Explain Total Internal Reflection.
  - (e) What are Transverse Electromagnetic waves ?
  - (f) What is Monopole Antenna ? 2.5 × 6 = 15

### UNIT - I

2. Give applications of Transmission lines as impedance matching unit and as circuit elements. 15
3. (a) Explain Admittance Smith Chart. 8  
(b) Describe impedance Transformation on lossless and low loss transmission lines. 7

### UNIT - II

4. (a) Describe Maxwell's equations. 10  
(b) Write a short note on Wave Polarization. 5
5. (a) Explain Reflection and Refraction at Dielectric Interface. 8  
(b) Describe the principle of Total Internal Reflection. 7

### UNIT - III

6. (a) Compare 2-wire Transmission Lines with Waveguides. 7  
(b) Describe Attenuation in relation with Waveguides. 8
7. What are Rectangular Waveguides ? Describe Modal Propagation in Rectangular Waveguides in detail. 15

### UNIT - IV

8. Explain the Radiation mechanism from Hertz dipole and also describe power radiated by it. 15
9. Write short notes on any *two* : 8 + 7 = 15  
(a) Receiving Antenna  
(b) Dipole Antenna  
(c) Radiation Parameters of Antenna



Roll No. ....

**3218**

**B. Tech. 5th Semester (ECE)  
Examination – March, 2021**

**COMMUNICATION ENGINEERING**

Paper : PCC-ECE-305-G

[ Maximum Marks : 75 ]

Time : Three hours ]

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt *five* questions in all, selecting **one** question from each Section. Question No. **1** is *compulsory*. All questions carry equal marks.

1. Explain the following : 2.5 × 6 = 15

- (a) Correlation
- (b) Entropy
- (c) Noise
- (d) Probability density function
- (e) Statistical Average
- (f) Error function

### SECTION - A

2. What do you mean by Fourier Series ? How it is different from the Fourier Transform ? Explain with the help of taking suitable example of each. 15
3. Derive the Convolution theorem. Also describe the different applications of the convolution in communication in detail. 15

### SECTION - B

4. (a) Describe and derive the Shannon-Hartley Theorem. Where is it being used ? Explain in detail. 10  
(b) Differentiate discrete and continuous channel in detail. 5
5. (a) Describe and derive the Shannon-Fano Coding by considering a suitable example in detail. 10  
(b) What do you mean by maximization of entropy of a continuous message ? Explain. 5

### SECTION - C

6. Discuss the following :  
(a) Probability of Joint Occurrence 8  
(b) Probability distribution function. 7
7. What is the concept of Probability ? What is/are the representation of random signals ? Explain. 15

### SECTION - D

8. Explain the following in detail :  
(a) Ergodic Processes 8  
(b) Central Limit Theory 7
9. Discuss the following in detail :  
(a) Linear Block Code Vs Cyclic Codes 5  
(b) Optimum Filter 5  
(c) Covariance relation among the spectral densities. 5



UNIT – IV

8. Find the transfer function from the given state model : 15

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -3 & -2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 2 \end{bmatrix} 4(t); y = [1 \ 0] \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

9. (a) Compare classical Transfer function method and state variable method. 7.5  
(b) Obtain the solution of homogeneous state equation. 7.5

Roll No. ....

3238

B. Tech. 5th Semester (EE)  
Examination – March, 2021

CONTROL SYSTEM

Paper : PCC-EE-305-G

Time : Three Hours ] [ Maximum Marks : 75

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

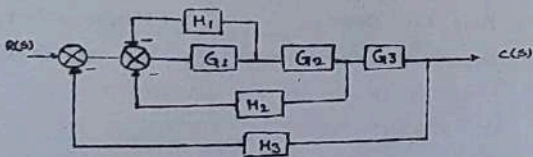
Note : Attempt five questions in all, selecting one question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

1. (a) Define the transfer function.  $2.5 \times 6 = 15$   
(b) State and explain the Mason's gain formula.  
(c) Explain the term disturbance rejection with respect to the controller design.  
(d) Define controllability and observability.

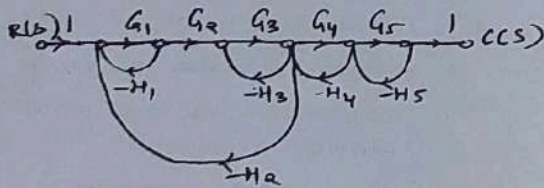
- (e) State advantages, disadvantages and applications of lag compensators.
- (f) State the rules of Block diagram reduction technique.

**UNIT - I**

2. (a) Deduce the overall transfer function of the following block diagram using block diagram reduction technique. 7.5



- (b) Develop the transfer function from the given signal flow graph applying Mason's gain formula. 7.5



3. Consider a unity feedback control system with the following feedforward control system. 15

$$G(s) = \frac{K}{s(s^2 + 4s + 8)}$$

Plot the root loci of the system.

**UNIT - II**

4. For the given transfer function 15

$$G(s)H(s) = \frac{2}{s(1+0.5s)(1+0.05s)}$$

Determine phase crossover frequency, gain margin, gain crossover frequency, phase margin.

5. Sketch the polar plot for  $\frac{20}{s(s+1)(s+2)}$ . 15

**UNIT - III**

6. Explain the design specifications in frequency domain. 15
7. (a) Summarize the Integral and Derivative controller action on the output of the controller. Support with suitable diagrams. 7.5
- (b) Write short note on analog implementation of controllers. 7.5



Roll No. ....

**3217**

**B. Tech. 5th Semester (ECE)  
Examination – March, 2021**

**COMPUTER ORGANIZATION & ARCHITECTURE**

Paper : PCC-ECE- 303-G

*Time : Three hours ] [ Maximum Marks : 75*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is *compulsory*. All questions carry equal marks.

**1.** Write short notes on : 2.5 × 6 = 15

- (a) Virtual memory
- (b) Microoperations
- (c) Addressing modes
- (d) Stack organization

- (e) Hazards
- (f) Cache memory

**UNIT - I**

- 2. Describe various types of Codes in detail. 15
- 3. (a) What is Register Transfer Language ? Explain with suitable example. 8
- (b) Explain Arithmetic Microoperations in detail. 7

**UNIT - II**

- 4. (a) Explain Input-output Instruction in detail. 8
- (b) Compare RISC and CISC in detail. 7
- 5. (a) Explain Instruction format of a CPU. 8
- (b) Define various types of Computer Registers. 7

**UNIT - III**

- 6. (a) Define Amdahl's law in detail. 7
- (b) Explain SIMD array processors in detail. 8
- 7. Explain various types of pipeline in detail. 15

**UNIT - IV**

- 8. (a) Describe the concept of DMA. 8
- (b) Compare Hardware and Software Interrupts. 7
- 9. (a) Explain the concept of Memory Hierarchy. 8
- (b) Define various types of Memory in detail. 7



Roll No. ....

**3239**

**B. Tech. 5th Sem. (EE)  
Examination – March, 2021**

**MICROPROCESSOR & MICROCONTROLLER**

Paper : PCC-EE-309-G

Time : Three Hours ] [ Maximum Marks : 75

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt *five* questions in all, selecting *one* question from each Section. Question No. 1 is *compulsory*.

1. Explain the following :
- |                                   |     |
|-----------------------------------|-----|
| (a) Maximum Mode of 8086          | 2.5 |
| (b) USART                         | 2.5 |
| (c) Clocking                      | 2.5 |
| (d) Real Time Application of 8051 | 2.5 |
| (e) DAC                           | 2.5 |
| (f) D/A Interface                 | 2.5 |

3239-750-(P-3)(Q-9)(21)

P. T. O.

**SECTION – A**

2. What do you mean by architecture ? Describe the architecture of 8086 processor along with its different features and memory interfacing. 15
3. How Instruction Set Works ? Explain the instruction set of 8086 microprocessor in detail. How many addressing modes are being used in this ? Explain. 15

**SECTION – B**

4. Explain the following peripheral devices in detail :  
(a) Timer/Counter. 10  
(b) DMA Controller. 5
5. Draw and describe the architecture of Interrupt Controller along with its pin diagram in detail. 15

**SECTION – C**

6. Discuss the following :  
(a) Different Types of Microcontroller 8  
(b) CISC Vs RISC. 7

7. What are the different features of microcontrollers ? Explain the following : 15  
(a) Timers  
(b) Peripherals  
(c) I/O Pins

**SECTION – D**

8. What do you mean by interfacing ? Explain the interfacing of 8051 microcontroller with : 15  
(a) LCD  
(b) Key Board
9. Explain the following in 8051 microcontroller :  
(a) Architecture 5  
(b) Registers 5  
(c) Addressing Modes 5



7. Discuss in detail the design of the field system for non salient pole alternator. 15

**SECTION - D**

8. (a) Discuss the factors which govern the choice of number of poles in a d.c. machine. 7.5  
(b) Design a 4 pole, 10KW, 220V, 1000rpm., d.c. shunt motor with respect to the following  
1. Output coefficient  
2. The diameter and length of armature  
Assume : Specific magnetic loading = 0.45 Tesla  
Specific electric loading = 17500 ampere conductor per meter  
Ratio of gross axial length to pole pitch = 0.68 7.5
9. (a) Define the following terms : 15  
(i) Optimization  
(ii) Standardization.  
(b) Discuss any one approach of CAD in designing of electrical machines with proper flow chart. 15

Roll No. ....

**3240**

**B. Tech. 5th Semester (EE)  
Examination – March, 2021**

**COMPUTER AIDED ELECTRICAL MACHINE DESIGN**

Paper : PCC-EE-313-G

Time : Three Hours ] [ Maximum Marks : 75

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt *five* questions in all, selecting *one* question from each Section. Question No. 1 is *compulsory*. All questions carry equal marks.

1. (a) List the limitations of Electrical machine design.  
(b) Discuss the effects on the performance of a three phase squirrel cage Induction motor when Air gap length is increased.  
(c) Explain the term 'Window Space Factor' as used for transformer design.

- (d) Explain the limitations of Computer Aided design.
- (e) Discuss the term output coefficient in case of DC machine.
- (f) Enlist the advantages of Computer Aided design.

$$2.5 \times 6 = 15$$

#### SECTION - A

2. (a) Discuss Modern trends in design and manufacturing techniques. 7.5
- (b) Explain the factors influencing the size of rotating electrical machine. 7.5
3. (a) Define the following: 7.5
- (i) Specific electric loading
- (ii) Specific Magnetic loading
- (b) Discuss the factors on which choice of specific electric and specific magnetic loading depends. 7.5

#### SECTION - B

4. (a) Deduce an expression for a 3 phase induction motor showing the relationship between the output, its main dimensions, speed, the specific electric and magnetic loading, efficiency and power factor. 7.5

3240-600-(P-4)(Q-9)(21) (2)

- (b) Design the following information for a 30KW, 440V, 3 phase, 6 pole, 50Hz delta connected Squirrel cage induction motor.

1. Main dimensions.
2. Number of turns per phase in the stator winding
3. Number of stator slots
4. Number of conductors per slot.

Assume specific magnetic loading = 0.48 tesla

Specific electric loading = 26000 ampere

Conductor per meter

Full load efficiency = 88 per cent

Full load power factor = 0.86 7.5

5. Discuss in detail the stator design of three phase induction motor. 15

#### SECTION - C

6. (a) Derive an output equation for a 3phase transformer. Explain why stepped core is used in transformer? 7.5
- (b) Deduce an expression between volts per turn and K. V.A. rating of a transformer. 7.5

3240-600-(P-4)(Q-9)(21) (3)

P. T. O.



Roll No. ....

**3224**

**B. Tech. 5th Semester (ECE)  
(Open Elective-I)  
Examination – March, 2021**

**OBJECT ORIENTED PROGRAMMING WITH C++**

Paper : OEC-ECE- 317-G

Time : Three hours ] [ Maximum Marks : 75

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt *five* questions in all, selecting *one* question from each Section. Question No. 1 is *compulsory*.

All questions carry equal marks.

1. Write short notes on :  $5 \times 3 = 15$

- (a) Member Function
- (b) Pure Virtual Function
- (c) Early binding Vs Late binding
- (d) Abstract classes
- (e) Preprocessor directives

### SECTION - A

2. What do you mean by object-oriented Paradigm ? How object-oriented programming is different from procedural-programming ? 15
3. (a) Explain concept of objects and classes in C++ with the help of example. 8  
(b) Differentiate between inside the class definition and outside the class definition in C++ with the help of suitable example. 7

### SECTION - B

4. (a) What are different access specifiers available in C++ ? Explain it. 7  
(b) Discuss Abstract classes with suitable example. 8
5. (a) What is constructor ? Explain different type of constructors in C++. 10  
(b) What is significance of making a constructor in a derived class ? 5

### SECTION - C

6. (a) Define inheritance. Explain various types of inheritance with example. 9  
(b) Differentiate between Implicit type conversion and Explicit type conversion in C++. 6

7. (a) What is operator overloading ? Explain the conditions where operator overloading is necessary. 8  
(b) Write a program to overload '+' binary operator using member function. 7

### SECTION - D

8. What do you mean by Exception Handling ? How exceptions are handled in C++ ? Illustrate with example. 15
9. (a) Distinguish between the Virtual functions and Pure Virtual functions. Give suitable examples. 10  
(b) Write short note on Virtual Destructors. 5



Roll No. ....

**3231**

**B. Tech. 5th Semester (CSE)  
Examination – March, 2021**

**PROGRAMMING IN JAVA**

Paper : PCC-CSE-309-G

Time : Three Hours ] [ Maximum Marks : 75

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is *compulsory*. All questions carry equal marks.

1. (a) Array.
  - (b) Class and method.
  - (c) How dead Thread can be restored ?
  - (d) What is difference between yielding and sleeping ?
  - (e) Explain standard data types in Java.
  - (f) IO applets.
- 2.5 × 6 = 15

### UNIT – I

2. (a) Define Inheritance. Explain types of inheritance in Java. How can we implement Multiple inheritance in Java with example. 10  
(b) Define type casting in Java. 5
3. (a) Explain the structure of JVM. 8  
(b) Explain Static method, Static variable and block in detail with example. 7

### UNIT – II

4. (a) Describe polymorphism with help of example. 8  
(b) Compare features of Java with C++. 7
5. (a) Create a program in Java to implement method overriding. 10  
(b) Define wrapper classes in Java. 5

### UNIT – III

6. (a) What is applet ? Explain life cycle of applet. 8  
(b) Create class Package and then create an instance of your own class outside the package. 7
7. (a) Explain the concept of thread in Java. Explain with suitable example. 8  
(b) What is exception handling in Java. Explain with suitable example. 7

### UNIT – IV

8. (a) Describe and design JDBC. 7  
(b) Explain concept the JDBC programming concept in detail. 8
9. Write notes on : 15  
(a) Query execution  
(b) Features of Java 9



Roll No. ....

**3206**

**B. Tech. 5th Semester (Civil Engg.)  
Examination – March, 2021**

**ENGINEERING GEOLOGY**

Paper : PCC-CE-311-G

Time : Three hours ] [ Maximum Marks : 75

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt any five questions. Question No. 1 is compulsory. Attempt one question from each Section. All questions carry equal marks.

1. (a) Define the term soil erosion.
- (b) Describe briefly the layers of interior of earth.
- (c) Define weathering.
- (d) What is meant by seismic zone ?
- (e) Explain in short the application of Geophysical survey.

- (f) Explain in detail about chemical weathering.
- (g) Describe the term landslide.
- (h) Write about Mohorovicic and Guttenburg discontinuity.
- (i) Explain about plate tectonics and name a few secondary tectonic plates.
- (j) Write short note on exfoliation and exudation.

1.5 × 10 = 15

#### SECTION - A

- 2. (a) What is Engineering Geology ? Discuss its role in Civil Engineering projects. 10
- (b) How are different rocks identified in the field ? 5
- 3. Explain with neat Sketches major geological features produced by wind on earth surface. 15

#### SECTION - B

- 4. Give an account of different types of rocks among igneous, sedimentary and metamorphic groups which occur more frequently and abundantly in nature. 15
- 5. What is the significance of faults ? Explain types of faults with neat sketches. 15

3206- (P-3)(Q-9)(21) (2)

#### SECTION - C

- 6. (a) What are the influencing factors for a successful reservoir ? And explain. 7
- (b) Explain methods of artificial recharge of groundwater. 8
- 7. A Write a short note on uses of remote sensing techniques during Geological investigation. 15

#### SECTION - D

- 8. (a) What are the effects of tunneling on the ground ? 10
- (b) Describe the purpose of tunnels. 5
- 9. Discuss the causes, classification and preventions of landslides. 15

3206- (P-3)(Q-9)(21) (3)



Roll No. ....

**3245**

**B. Tech. 5th Semester (EE) (Elective - II)  
Examination – March, 2021**

**ELECTRICAL ENGINEERING MATERIALS**

Paper : OEC-EE-01-G

**Time : Three Hours ] [ Maximum Marks : 75**

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is **compulsory**. All questions carry equal marks.

- 1.** (a) Explain the factors affecting resistivity of electrical materials. **2.5 X 6**  
(b) Explain the significance of loss tangent.  
(c) Classify Magnetic materials.  
(d) State the different types of semiconductors.  
(e) Explain thermal properties of metals.  
(f) Explain the Einstein relation in brief.

**UNIT - I**

2. Explain the following : 15  
(a) Thermionic emission  
(b) Field emission
3. (a) Deduce the equation of motion of an electron. Further derive the equation of current carried by electron. 7.5  
(b) Explain the effect of temperature on electrical conductivity of metals. 7.5

**UNIT - II**

4. Explain the following : 15  
(a) Ferroelectricity  
(b) Piezoelectricity
5. (a) Explain dielectric properties of polymeric system. 7.5  
(b) Explain the requirements of good insulating materials. 7.5

**UNIT - III**

6. Explain the following : 15  
(a) Diamagnetism  
(b) Para magnetism
7. (a) Describe the term magnetic resonance. 7.5  
(b) Explain the factors affecting the hysteresis loss. 7.5

**UNIT - IV**

8. (a) Write a short note on Hall Effect. 7.5  
(b) Write a note on diffusion and deduce the equation of total current density of electrons. 7.5
9. Explain the conductors, semiconductors and insulators with respect to the conduction and valence bands. 15



(b) Differentiate between NP hard and NP complete problem. 8

9. Explain NP hard and NP completeness of SAT problem. 15

Roll No. ....

**3230**

**B. Tech. 5th Semester (CSE)**

**Examination – March, 2021**

**DESIGN AND ANALYSIS OF ALGORITHMS**

Paper : PCC-CSE-307-G

*Time : Three Hours ]*

*[ Maximum Marks : 75*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt *five* questions in all, selecting *one* question from each Section. Question No. 1 is *compulsory*. All questions carry equal marks.

1. Explain the following (any *five*) :

- (a) What is algorithm ? Explain characteristics of algorithms. 3
- (b) What is the time complexity of Merge sort and selection sort ? 3

- (c) Explain P and NP class. 3
- (d) Explain Divide and conquer technique. 3
- (e) Explain Greedy algorithm. 3
- (f) What is multistage graph? 3
- (g) Write the applications of Branch and Bound problem. 3

**SECTION – A**

- 2. (a) What is Stack? Explain basic operations of stack and write algorithm of insert and delete. 8
- (b) Define the time complexity. Explain asymptotic notation. 7
- 3. (a) Explain the procedure of Quicksort with an example. Also analyze it in best, average and worst case. 10
- (b) Explain Binary Search with example. What is the complexity of binary search? 5

**SECTION – B**

- 4. (a) Explain 0/1 Knapsack. 10

Solve using 0/1 knapsack with capacity 20:

Objects	OBJ1	OBJ2	OBJ3
Profit	25	24	15
Weight	18	15	10

- (b) Explain Greedy algorithm. Write its applications. 5

- 5. (a) Define Dynamic programming. Explain Travelling Sales man problem by taking suitable example. 10
- (b) Write a short note on fractional knapsack problem. 5

**SECTION – C**

- 6. (a) Explain Backtracking with algorithm. 7
- (b) Define N-Queen problem and write all the steps to solve this. 8
- 7. (a) Discuss branch and bound strategy. 8
- (b) Explain Travelling Sales man problem using Branch and bound strategy. 7

**SECTION – D**

- 8. (a) What is the relationship among P, NP and NP complete problems? Show with the help of a diagram. 7



Roll No. ....

**3222**

**B. Tech. 5th Semester (ECE) (Elective-I)  
Examination – March, 2021**

**LINEAR APPLICATIONS**

Paper : PEC-ECE- 313-G

*Time : Three hours ] [ Maximum Marks : 75*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is *compulsory*. All questions carry equal marks.

**1.** Answer the following in brief :  $2.5 \times 6 = 15$

- (a) What is level translator ?
- (b) Give ideal characteristics of Op-Amp.
- (c) What is peaking Op-Amp ? equivalent circuit.
- (d) Explain summing and scaling Op-Amp. equivalent circuit.
- (e) Explain high frequency Op-Amp. equivalent circuit.
- (f) Explain basic differentiator.

### UNIT - I

2. Explain working of differential amplifier. Derive equation for DC analysis, AC analysis for single input balanced output differential amplifier. 15
3. (a) Explain the concept of current mirror. 5  
(b) Explain practical characteristics of Op-Amp. 10

### UNIT - II

4. Explain voltage shunt feedback amplifier. Derive equation for closed loop voltage gain, input resistance and output resistance. 15
5. (a) Write note on features of compensating networks. 5  
(b) What is slew rate? What are its causes? Derive slew rate equation. 10

### UNIT - III

6. (a) Explain instrumentation amplifier. 10  
(b) Write note on differential input and output amplifier. 5

7. (a) Explain frequency response of basic and practical integrator. 10  
(b) Explain voltage to current converter. 5

### UNIT - IV

8. Explain pin diagram and internal structure working of 555 timer. 15
9. (a) Explain astable operation of 555 timer. 10  
(b) Explain block diagram of PLL. 5



Roll No. ....

**3229**

**B. Tech. 5th Semester (CSE)  
Examination – March, 2021**

**FORMAL LANGUAGES AND AUTOMATA**

**Paper : PCC-CSE-305-G**

*Time : Three Hours ]*

*[ Maximum Marks : 75*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

*Note : Attempt five questions in all, selecting at least one question from each Section. Question No. 1 is compulsory.*

1. Explain the following Questions :  $6 \times 2.5 = 15$
- (a) Any *two* differences between DFA and NFA.
  - (b) Define PDA.
  - (c) Give an example of an undecidable problem.
  - (d) What are Limitations of FSM ?
  - (e) Define Computability.
  - (f) Define unrestricted Grammer.

**SECTION - A**

2. (a) For the following non-deterministic finite automata, make equivalent deterministic finite automata. 10

	a	b
$\rightarrow Q_0$	$Q_0, Q_1$	$Q_2$
$Q_1$	$Q_0$	$Q_1$
$Q_2$	-	$Q_0, Q_1$

- (b) Prove that regular sets are closed under concatenation. 5
3. What are Mealy/Moore machines? Explain, can these machines work like one another? If yes, then explain with an example to convert Moore to Mealy machine. 15

**SECTION - B**

4. (a) Prove that a Language is regular if and only if it is accepted by finite automata. 7.5
- (b) Define leftmost and rightmost derivation. Explain by taking suitable examples. 7.5
5. State and prove Arden's Method. 15

**SECTION - C**

6. (a) Define Chomsky normal form. Simplify the following CFG and convert it into CNF 7.5
- $S \rightarrow ASB/e$
- $A \rightarrow aAS/a$
- $B \rightarrow SbS/A/bb$

- (b) Show that the language

$$L = \{WW^R \mid W \in \Sigma(a,b)^*\} \text{ is not regular.}$$

7. Construct a PDA accepting  $\{a^m b^n \mid m, n \geq 1\}$  by null store. Construct the corresponding CFG accepting same set. 15

**SECTION - D**

8. Discuss the halting problem and PCP problem of Turing machines. 15
9. (a) What are primitive recursive functions? Show that the following is primitive recursive: 8
- $$R(x, y) = x - y$$
- (b) What do you mean by computability? Explain in detail. 7

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Roll No. ....

**3228**

**B. Tech. 5th Semester (CSE)  
Examination – March, 2021**

**COMPUTER NETWORKS**

**Paper : PCC-CSE-303-G**

Time : Three Hours ]

[ Maximum Marks : 75

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

*Note : Attempt five questions in all, selecting one question from each Section. Question No. 1 is compulsory.*

1. Write short note on : 2.5 × 6 = 15
- (a) ARP
  - (b) Subnetting
  - (c) Types of Cipher
  - (d) Token Ring
  - (e) Framing in data link layer
  - (f) BOOTP

**SECTION - A**

- 2. (a) What is OSI model ? Explain the working of OSI model in details. 7.5
- (b) What do you mean by Sliding Window Protocol ? Explain. 7.5
- 3. (a) Give a brief description about Computer Network and its historical development. 7.5
- (b) Explain Data link layer functions and services in detail. 7.5

**SECTION - B**

- 4. Explain the following in detail : 15
  - (a) DHCP
  - (b) IPv4
- 5. (a) What do you mean by MAC ? Explain its functions in details. 7.5
- (b) Explain different network devices in details. 7.5

**SECTION - C**

- 6. Explain Link State and Distance Vector Routing with the help of example. 15

3228-1-650-(P-3)(Q-9)(21) ( 2 )

- 7. Explain the following in detail : 15

- (a) DNS
- (b) SNMP

**SECTION - D**

- 8. What do you mean by Cryptography ? Explain its working with proper diagram. 15
- 9. Explain the following : 15
  - (a) QoS Improving Techniques
  - (b) WAN Architecture

3228-1-650-(P-3)(Q-9)(21) ( 3 )



- (b) Write short note on 'waste plastic in bituminous mixes'. 7

**SECTION - D**

8. (a) Classify the different types of traffic signs and mention the objective of each type of sign with neat sketches. 8
- (b) What are the different techniques used in an intelligent transportation system ? Describe in detail. 7
9. Write short notes on the following related to intelligent transportation systems : 15
- (i) Parking space inventory survey
  - (ii) OD studies with its significance
  - (iii) Methods of counting traffic volume
  - (iv) Objectives of intelligent transportation systems

Roll No. ....

**3202**

**B. Tech. 5th Semester (Civil Engg.)  
Examination – March, 2021**

**HIGHWAY ENGINEERING-I**

Paper : PCC-CE-303-G

Time : Three Hours ]

[ Maximum Marks : 75

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Question No. 1 is compulsory. Attempt one question from each Section. All questions carry equal marks. Assume missing data, if any, suitably.

1. Describe the following : 2.5 × 6 = 15
- (a) Classification of highways
  - (b) Right of way and camber
  - (c) Fundamental principles of alignment
  - (d) Subgrade soil and its function
  - (e) PLEV theory
  - (f) Methods of maintaining accident records

### SECTION - A

2. (a) What is the scope of highway engineering ?  
Explain different road development plans in India. 8
- (b) Briefly explain different highway projects including PMGSY. 7
3. (a) What is the necessity of highway planning ?  
Explain in brief the modern methods of laying highway alignment being adopted at present with its merits and demerits. 8
- (b) Briefly describe the factors affecting highway alignment. 7

### SECTION - B

4. (a) What is head on collision ? Calculate the minimum sight distance required to avoid a head on collision of two cars approaching from the opposite directions at 90 and 60 kmph. Assume a reaction time of 2.5 seconds, coefficient friction 0.7 and brake efficiency of 50% in either case. 8

3202- (P-4)(Q-9)(21) (2)

- (b) Briefly explain traffic separators and traffic barriers. 7

5. (a) The radius of horizontal circular curve is 100 m. The design speed is 50 kmph and the design coefficient of lateral friction is 0.15. (i) Calculate the super elevation required if full lateral friction is assumed to developed (ii) Calculate the coefficient of friction needed if no super elevation is provided. 8
- (b) What is the necessity of road widening on horizontal curves ? Explain the factors on which the design of widening depends. 7

### SECTION - C

6. (a) What are the different tests on aggregates ? Describe any two in detail. 8
- (b) Describe in detail the evaluation of soil strength by different tests. 7
7. (a) Explain in detail the requirements specifications of materials and the construction methods for bituminous concrete layer. 8

3202- (P-4)(Q-9)(21) (3) P. T. O.



Roll No. ....

**3244**

**B. Tech. 5th Semester (EE) (Elective - I)  
Examination – March, 2021**

**HIGH VOLTAGE ENGINEERING**

**Paper : PEC-EE-07G**

*Time : Three Hours ]*

*[ Maximum Marks : 75*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

*Note : Attempt five questions in all, selecting at least one question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.*

1. (a) State Paschen's law for breakdown in gases.

2.5 × 6 = 15

(b) Explain difference between 'photo-ionization and photo-electric emission.

(c) Define front time and tail times of impulse wave.

(d) Why are capacitance voltage divider preferred for high ac voltage measurement ?

(e) Define Disruptive discharge voltage and Withstand voltage.

- (f) Define 'complex permittivity'. How is lossy dielectric represented?

#### UNIT - I

2. (a) Define Townsend's first and second ionization coefficients. How is the condition for breakdown obtained in Townsend discharge? 7.5  
(b) Explain the experimental set-up for the measurement of pre-breakdown current in gas. 7.5
3. (a) What are common liquid insulants used in electrical apparatus? Briefly explain their physical properties. 7.5  
(b) Explain the various theories that explain breakdown in solid dielectric. 7.5

#### UNIT - II

4. (a) Draw and explain different circuits that produce impulse wave. 7.5  
(b) Explain the different schemes for cascade connections of transformers for producing very high ac voltages. 7.5
5. Explain the principle and construction of an electrostatic voltmeter for very high voltages. What are its merits and demerits for high-voltage ac measurement? 15

3244- (P-3)(Q-9)(21) (2)

#### UNIT - III

6. (a) Explain the different theories of charge formation in clouds. 7.5  
(b) Explain the importance of switching overvoltage in EHV power system. How is protection against overvoltage achieved? 7.5
7. (a) Explain the phenomenon of measurement of Dielectric constant and loss factor. 7.5  
(b) Explain how partial discharge in an insulation system or equipment can be detected and displayed. 7.5

#### UNIT - IV

8. Explain the different test done on isolator and circuit breaker in EHV system. 15
9. (a) Explain the terms : 7.5  
(i) with stand voltage  
(ii) flashover voltage  
(iii) 50% flash over voltage  
(iv) wet and dry frequency test referred to high voltage testing
- (b) Explain importance of RIV measurement for EHV power apparatus. 7.5

3244- (P-3)(Q-9)(21) (3)



## SECTION - D

8. A purlin is to be designed to support a GI sheet as roofing material for a truss spaced at 3.5 m c/c. Purlin along the principal rafters are arranged at a distance of 1.35 m c/c. The pitch of truss is 0.2 m. Design a section for the purlin. Assume basic wind speed as 44 m/s. 15
9. (a) Explain in details design steps of bearing stiffeners. 5
- (b) Differentiate between welded and riveted plate girders. 10

Roll No. ....

**3205**

**B. Tech. 5th Semester (Civil Engg.)  
Examination – March, 2021**

**DESIGN OF STEEL STRUCTURE**

Paper : PCC-CE-309-G

Time : Three hours ]

[ Maximum Marks : 75

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt any *five* questions. All questions carry equal marks. Question No. 1 is **compulsory**. Attempt *one* question from each Section. Assume suitable data where required or missing. Use of code IS 800-1984 and Steel Table is allowed.

1. (a) What is Necking of steel sections ?  
(b) Write the formula to calculate the efficiency of Bolt Joint.  
(c) List some of the pinned connection used in steel structures.



(d) State the possible failure modes of an axially loaded column.

(e) What is difference between lacing and battens ?

(f) What is difference between laterally restrained and un-restrained sections ?

(g) Define the term - Pitch of a rivet.

(h) Differentiate nominal diameter and gross diameter of bolt.

(i) What are the different types of bracings used in a braced building ?

(j) Write types of stiffeners.

$$1.5 \times 10 = 15$$

### SECTION - A

2. The plates of a tank 8 mm thick are connected by a single bolted lap joint with 20 mm diameter bolts at 50 mm pitch. Calculate the efficiency of the joint. Assume Fe 410 plate and grade 4.6 bolts. 15

3. A double riveted cover butt joint is used for connecting two plates of 12 mm thickness. The joint is double riveted with cover plates each 8 mm thick. The load to be transferred by the joint is 500 kN. Design the joint and rivets on packing. 15

### SECTION - B

4. Design a built up column with two channels placed back-to-back and separated apart. The column is of 6 m effective length and supports a factored load of 1500 kN. Also design the bolted lacing system. Assume  $f_y = 250$  MPa. 15

5. (a) Differentiate between web buckling & web crippling. 5

(b) Write in details design procedure for gusset plate. 10

### SECTION - C

6. An ISLB600@976.1 N/m has been used as a simply supported beam over a span of 7.2 m. Determine the safe uniform load that the beam can carry in flexure if the compression flange of the beam is restrained against lateral buckling. 15

7. A conference hall 8 m x 12 m is provided with a 120 mm RCC slab over rolled steel I beams spaced 4 m centre to centre. The super imposed load is 4 kN/m<sup>2</sup> and floor finish of 1.5 kN/m<sup>2</sup>. Design one of the beam as laterally supported. 15



UNIT - IV

8. Write about :
- (a) Types of Friction 8
  - (b) Friction circle. 7
9. Write about :
- (a) Material for belts 8
  - (b) Chain drives. 7

3210-1350-(P-4)(Q-9)(21) (4)

Roll No. ....

3210

B. Tech. 5th Semester (ME)  
Examination – March, 2021

KINEMATICS OF MACHINE

Paper : PCC-ME-307-G

Time : Three hours ]

[ Maximum Marks : 75

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

*Note : Attempt five questions in all, selecting one question from each Unit. Question No. 1 is compulsory. All question carry equal marks.*

1. Write about : 2.5 × 6 = 15
- (a) Kinematic link.
  - (b) Kinematic inversion.
  - (c) Advantages of gear drive.
  - (d) Cam

3210-1350-(P-4)(Q-9)(21)

P. T. O.

- (e) Gear train.
- (f) Law of Friction.

**UNIT - I**

- 2. Explain Pantograph in detail with its diagram of original position and displaced position. Also mention the uses of pantograph. 15
- 3. State and prove Kennedy's theorem. How is it useful in locating various instantaneous centres of a mechanism? 15

**UNIT - II**

- 4. Draw the profile for disc cam off set 20 mm to the right of the centre of cam shaft. The base circle diameter is 75 mm and diameter of roller is 10 mm. The follower is to move outward a distance of 40 mm with S.H.M in 140° of cam rotation to dwell for 40° of cam rotation to move inward with 150° of cam rotation with uniform acceleration and retardation. Calculate the maximum

3210-1350-(P-4)(Q-9)(21) (2)

- velocity and acceleration of the follower during each stroke if cam shaft rotates at 90 rpm. 15
- 5. Two 20° involute spur gears have a module of 10 mm. The addendum is one module. The larger gear has 50 teeth and the pinion 13 teeth. Does the interference occur? If it occurs, to what value should the pressure angle be changed to eliminate interference? 15

**UNIT - III**

- 6. In an epicyclic gear train an annular wheel A having 54 teeth meshes with a planet wheel B which gears with a sun wheel C, the wheel A and C being coaxial. The wheel B is carried on a pin fixed on one end of arm P which rotates about axis of wheels A and C. If wheel A makes 20 r.p.m. in clockwise sense and arm rotates at 100 r.p.m. in anticlockwise direction and the wheel C has 24 teeth. Determine r.p.m. and sense of rotation of C. 15
- 7. Derive Freudenstein's equation. 15

3210-1350-(P-4)(Q-9)(21) (3)

P. T. O.



- (b) What are the various factors which affect the selection of a type of pump and for selection of site ? 8

**SECTION - D**

8. What are the requirements of a good distribution system describe in brief various layouts of distribution systems ? 15
9. Write short notes on sources of water pollution, types, and the effects of water pollution. 15

Roll No. ....

**3204**

**B. Tech. 5th Semester (Civil Engg.)  
Examination – March, 2021**

**WATER SUPPLY AND TREATMENT**

Paper : PCC-CE-307-G

Time : Three hours ]

[ Maximum Marks : 75

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Question No. 1 is compulsory. Attempt five questions in all, selecting one question from each Section. All questions carry equal marks.

1. (a) What is the necessity of water supply schemes in the present-day community ?  
(b) Why is population forecast necessary in the design of public water supply schemes ?  
(c) What do you understand by the biological examination of water ? Why is it necessary ?



(d) Write a short note on handling and storing of coagulants.

(e) Define disinfection, what is its use ?

(f) Enumerate the different types of pumps used in the water supply.  $2.5 \times 6 = 15$

### SECTION - A

2. (a) Draw a flow diagram of water supply engineering and describe in short what are the Essentials of a water supply scheme ? 7

(b) What do you mean by the term water demand ? What would be the average water demand for our University ? If the design population is 10000 estimates the maximum hourly, maximum daily, and maximum monthly water demand. 8

3. (a) Discuss the different chemical tests to be made for determining the suitability of drinking water from a particular source. 10

(b) What are the common impurities mostly found in natural water ? Explain their effect on the quality of water. 5

3204-

-(P-4)(Q-9)(21) (2)

### SECTION - B

4. Write short notes on :

$3 \times 5 = 15$

(a) aeration unit

(b) sedimentation unit

(c) coagulation and flocculation

(d) filtration unit

(e) mixing devices

5. (a) Why is the softening of water necessary ? Describe the Procedure of the lime-soda process for water softening. 7

(b) Describe with the help of neat sketches the removal of iron and manganese from the water. 8

### SECTION - C

6. (a) What measure precautions are taken in handling and laying water pipelines ? 7

(b) Discuss the comparative merits and demerits of cast iron pipe steel pipes and concrete pipes. 8

7. (a) What is the total lift of the pump ? How will you calculate the total horsepower required for a pump ? 7

3204-

-(P-4)(Q-9)(21) (3)

P. T. O.



Roll No. ....

**3219**

**B. Tech. 5th Semester (ECE)  
Examination – March, 2021**

**DIGITAL SIGNAL PROCESSING**

**Paper : PCC-ECE-307-G**

*Time : Three hours ]*

*[ Maximum Marks : 75*

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*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

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*Note: Attempt five questions in all, selecting one question from each Section. Question No. 1 is compulsory. All questions carry equal marks.*

1. Explain the following : 2.5 × 6 = 15

(a) Check the signal for causal or non-causal  
 $Y(n) = 0.5x(n) - x(n-2)$ .

(b) Explain in brief the application of DSP.

(c) What is nyquist rate ?

(d) Explain in brief the disadvantages of DSP.

(e) Discuss the advantages of FIR filters over IIR filters.

(f) What do you understand by ROC ?

### SECTION - A

2. The analog signal is given by :

$$X(t) = 5\cos 2000\pi t + 3\sin 6000\pi t + 2\cos 12000\pi t$$

Determine the nyquist rate of this signal. If the sampling rate  $f_s = 5000$  samples/s, find the discrete time signal  $x(n)$  after sampling.

Also Derive an expression for sampling theorem. 15

3. (a) Find the inverse z transform of : 8

$$x(z) = \frac{z}{3z^2 - 4z + 1}$$

$$\text{for (a) } |z| > 1 \quad \text{(b) } |z| < \frac{1}{3} \quad \text{(c) } \frac{1}{3} < |z| < 1$$

(b) Explain the analysis of linear shift invariant system using z transform. 7

### SECTION - B

4. Explain the DIT FFT Algorithm. 15

5. (a) State and prove the properties of DFT. 7

(b) Explain the linear filtering using DFT. 8

3219-800-(P-3)(Q-9)(21) (2)

### SECTION - C

6. (a) Compare the IIR and FIR filters. 8

(b) Design IIR filter by using Butterworth filter. 7

7. (a) Design FIR filter using window technique. What is gibbs phenomenon in this ? 10

(b) Distinguish between ideal and practical filters. 5

### SECTION - D

8. What is MDSP ? Derive an expression for the design of interpolator and decimator. 15

9. Write short notes on :

(a) Parametric and non-parametric spectral estimation. 8

(b) Digital filter bank 7

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3219-800-(P-3)(Q-9)(21) (3)



UNIT - IV

8. Find the transfer function from the given state model : 15

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -3 & -2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 2 \end{bmatrix} 4(f); y = \begin{bmatrix} 1 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

9. (a) Compare classical Transfer function method and state variable method. 7.5  
(b) Obtain the solution of homogeneous state equation. 7.5

Roll No. ....

3238

B. Tech. 5th Semester (EE)  
Examination - March, 2021

CONTROL SYSTEM

Paper : PCC-EE-305-G

Time : Three Hours ]

[ Maximum Marks : 75

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt five questions in all, selecting one question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

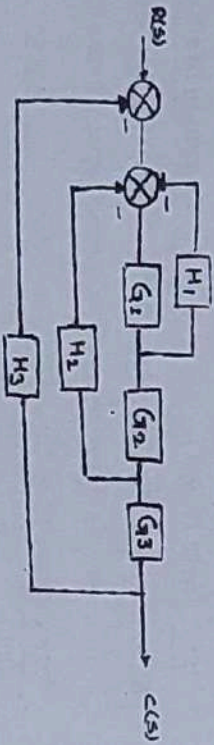
- 1. (a) Define the transfer function. 2.5 × 6 = 15
- (b) State and explain the Mason's gain formula.
- (c) Explain the term disturbance rejection with respect to the controller design.
- (d) Define controllability and observability.

(e) State advantages, disadvantages and applications of lag compensators.

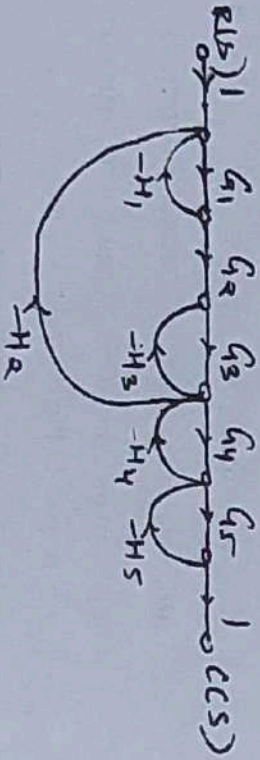
(f) State the rules of Block diagram reduction technique.

UNIT - I

2. (a) Deduce the overall transfer function of the following block diagram using block diagram reduction technique. 7.5



(b) Develop the transfer function from the given signal flow graph applying Masons gain formula. 7.5



3. Consider a unity feedback control system with the following feedforward control system. 15

$$G(s) = \frac{K}{s(s^2 + 4s + 8)}$$

Plot the root loci of the system.

UNIT - II

4. For the given transfer function 15

$$G(s)H(s) = \frac{2}{s(1+0.5s)(1+0.05s)}$$

Determine phase crossover frequency, gain margin, gain crossover frequency, phase margin.

5. Sketch the polar plot for  $\frac{20}{s(s+1)(s+2)}$ . 15

UNIT - III

6. Explain the design specifications in frequency domain. 15

7. (a) Summarize the Integral and Derivative controller action on the output of the controller. Support with suitable diagrams. 7.5

(b) Write short note on analog implementation of controllers. 7.5



Roll No. ....

**3208**

**B. Tech. 5th Semester (ME)  
Examination – March, 2021**

**SOLID MECHANICS**

**Paper : PCC-ME-303-G**

*Time : Three hours ]*

*[ Maximum Marks : 75*

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*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

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*Note : Question No. 1 is compulsory. Attempt total five questions selecting one question from each Section. All questions carry equal marks.*

1. (a) Define Modulus of Resilience.
- (b) What do you understand by term Theory of failure ?
- (c) What is the role of spring ? What are various types of springs ?
- (d) Explain unsymmetrical bending.



- (e) Explain Concentric spring.
- (f) Define and explain the term : unsymmetrical bending and shear centre.

**SECTION - A**

- 2. Prove that the maximum stress induced in a body due to suddenly applied load is twice the stress induced when the same load is applied gradually.
- 3. What do you understand by term Theory of failure ? Explain the important theories of failure.

**SECTION - B**

- 4. What do you mean by Lamé's equation ? How will you derive this equation ?
- 5. Write down the parallel axis theorem for product of inertia & explain each of them.

**SECTION - C**

- 6. A Thick cylinder with internal radius of 8 cm and external radius of 16 cm is subjected to an internal fluid pressure of 80 MPa. Draw the variation of radial and hoop stress in the cylinder wall. Also find out the maximum shear stress in the cylinder wall.

- 7. Prove that the circumferential stress in a rotating cylinder with a pin hole at a centre is two times the maximum circumferential stress in solid cylinder.

**SECTION - D**

- 8. Derive the expression for the stresses in open coiled helical spring subjected to axial load and twisting couples.
- 9. Derive and explain Castigliano's theorem for deflection of ring.



**SECTION – D**

8. (a) What is the role of water in national development? 5  
(b) What are various factors to be considered while planning for water resources? 10
9. (a) Explain long-term water resource planning. 5  
(b) Define reservoir capacity and explain the Empirical-Area reduction method. 10

Roll No. ....

**3201**

**B. Tech. 5th Semester (Civil Engg.)  
Examination – March, 2021**

**HYDROLOGY AND WATER RESOURCE ENGINEERING**

Paper : PCC-CE-301-G

Time : Three hours ]

[ Maximum Marks : 75

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

Note : Question No. 1 is compulsory. Attempt five questions in all, selection one question from each Section. All questions carry equal marks.

1. Write a short note on the following : 2.5 × 6 = 15
- (a) Water budget equation
  - (b) Forms of precipitations
  - (c) Evapotranspiration
  - (d) Unit hydrograph

- (e) Flow duration curve  
(f) Rain gauges

### SECTION - A

2. (a) Explain the hydrological cycle with proper diagrams. 6  
(b) The average normal rainfall of 5 rain gauges in the base stations is 89, 54, 45, 41 and 55 cm. If the error in the estimation of rainfall should not exceed 10%, how many additional gauges may be required? 9

3. A catchment area has seven rain gauge stations. In a year, the annual rainfall recorded by the gauges are as follows: 15

Station :	P	Q	R	S	T	U	V
Rainfall (cm.)	130.00	140.00	120.00	110.00	160.00	100.00	145.00

- (a) Determine the standard error in the estimation of mean rainfall in the existing set of rain gauges.  
(b) For a 5% error in the estimation of the mean rainfall, calculate the minimum number of additional rain gauge stations to be established in the catchment.

3201- (P-4)(Q-9)(21) (2)

### SECTION - B

4. (a) Explain evapotranspiration and factors affecting evapotranspiration. 10  
(b) Explain run-off characteristics of a stream. 5
5. For a catchment in UP, India, the mean rainfall and temperatures are given. Calculate the annual run-off coefficient by Khosla's formula. 15

Month	Jan.	Feb.	March	April	May	Jun	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temp. (°C)	12	16	21	27	31	34	31	29	28	29	19	14
Rainfall (cm.)	4	4	2	0	2	12	32	29	16	2	1	2

### SECTION - C

6. (a) What are the components and factors affecting the shape of the hydrograph? 5  
(b) What are the different methods of estimation of floods? 10

7. What is a unit hydrograph? The Unit hydrograph coordinated if 1 Cm, 1 hr. Unit hydrograph are as follows:

Time (hr.)	0	1	2	3	4	5	6	7	8	9	10
Discharge (m <sup>3</sup> /s)	0	6	12	21	16	10	8	5	2	1	0

- Find Flood hydrograph for a storm of 2cm/h for 1hr. Also, find the area of the catchment in km<sup>2</sup>. 15

3201- (P-4)(Q-9)(21) (3) P. T. O.



Roll No. ....

**3227**

**B. Tech. 5th Semester (CSE)  
Examination – March, 2021**

**MICROPROCESSOR**

**Paper : ESC-CSE-301-G**

*Time : Three Hours ]*

*[ Maximum Marks : 75*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

*Note : Attempt five questions in all, selecting one question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.*

1. Explain the following :

- |                                   |     |
|-----------------------------------|-----|
| (a) Assembly Language Programming | 2.5 |
| (b) BIU                           | 2.5 |
| (c) Directive and Operators       | 2.5 |
| (d) DMA                           | 2.5 |
| (e) Memory Segmentation           | 2.5 |
| (f) HLT instructions              | 2.5 |

UNIT - I

2. What do you mean by Interrupts ? Describe different types of interrupts of 8085 processor and also discuss about the priority of these. 15

3. How Instruction Set Works ? Explain the instruction set of 8085 microprocessor in detail. 15

UNIT - II

4. Explain the following in detail :

(a) Addressing Modes of 8086. 10

(b) Physical Address Computations 5

5. Draw and describe the architecture of 8086 microprocessor along with its pin diagram in detail. 15

UNIT - III

6. Discuss the following :

(a) Flag manipulation Instructions Vs logical Instructions. 8

(b) Branch Instructions with examples. 7

7. What are different kinds of data transfer instructions ? Discuss. Explain the shift and rotate instructions in detail with example. 15

UNIT - IV

8. What do you mean by interfacing ? Explain the interfacing of keyboard and seven segment display in detail. 15

9. What do you mean by PIC ? Explain using suitable architecture along with its applications. 15



Roll No. : .....

Total No. of Questions : 9 ]

[ Total No. of Pages : 3

**3350**

**B.Tech. (EE) 6th Semester (Supplementary)  
Examination, July-2021  
(G Scheme)**

**POWER ELECTRONICS**

**Paper-PCC-EE-306-G**

*Time : Three Hours ]*

*[ Maximum Marks : 75*

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*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

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**Note :-** Attempt *five* questions in all, selecting *one* question from each Section. Question No. 1 is compulsory. All questions carry equal marks.

1. (a) Explain the role of Power Electronics.
- (b) Discuss the characteristic features of GTO.
- (c) Explain  $dv/dt$  protection of SCR.

(d) What is meant by Two Pulse Converter ?

(e) List the function of freewheeling diodes in controlled rectifier.

(f) Define derating factor of series connected SCRs.  $2\frac{1}{2} \times 6 = 15$

**Section-A**

2. (a) Compare IGBT and Power Transistor.

(b) Discuss the merits and demerits of Power Electronics System. List some applications of Power Electronics.  $7\frac{1}{2}, 7\frac{1}{2}$

3. Explain the construction and characteristics of Power Transistor and discuss important operating regions of power transistor. 15

**Section-B**

15 each

4. Sketch the V-I characteristics of an SCR and explain latching current, holding current and break over voltage.

5. With a neat circuit diagram and waveforms explain resistor triggering circuit and RC triggering circuit to Turn ON the SCR.

3350\_900

( 2 )

**RD-3488**

**Section-C**

6. (a) Draw and explain single phase full wave converter in bridge configuration supplying highly inductive load.

(b) Compare Fully Controlled and Half Controlled Converters.  $7\frac{1}{2}, 7\frac{1}{2}$

7. Draw and explain the three phase fully controlled converter operation with RL load and derive the expression for DC output voltage. 15

**Section-D**

15 each

8. Explain the operation of 120-degree mode three-phase Voltage Source Inverter (VSI).

9. Explain in detail how choppers are classified.

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( 3 )

**RD-3488**



Roll No. : .....

Total No. of Questions : 9 ]

[ Total No. of Pages : 3

**3325**

**B.Tech. (ECE) 6th Semester (Supplementary)**  
**Examination, July-2021**  
(G Scheme)

**ENGINEERING ETHICS**

Paper-HUM-ECE-306-G

*Time : Three Hours ]*

*[ Maximum Marks : 75*

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*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

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*Note :-* Students have to attempt *five* questions in total, question No. 1 is compulsory and selecting *one* question from each Unit.

1. (a) What are Virtue Ethics ?
- (b) Explain the meaning of responsibility.
- (c) What is meant by acceptability of Risk ?

(d) What are Human Centered Ethics ?

(e) Explain Truthfulness.

(f) Briefly explain defense industry problem.  
 $2\frac{1}{2} \times 6 = 15$

**Unit-I**

15 each

2. Explain the need of ethics in Engineering.

3. Explain the various ethical theories.

**Unit-II**

4. What do you mean by commitment to safety ?  
Explain the concept of safety and risk. 15

5. (a) Compare Personal and Public Risk.

(b) What do you mean by Acceptability of Risk ? 8,7

**Unit-III**

15 each

6. Explain in detail the concept of Computer Ethics.

7. Explain in detail the concept of whistle-blowing.

**Unit-IV**

8. (a) Explain sentient centered ethics.

(b) Explain Ecocentric Ethics. 8,7

3325\_1100

( 2 )

**RD-3471**

9. Write short notes on any two of the following :

(a) Peace Engineering

(b) Global justice

(c) International Rights

8,7

3325\_1100

( 3 )

**RD-3471**



Roll No. : .....

Total No. of Questions : 9 ] [ Total No. of Pages : 3

**3306**

**B.Tech. (Civil) 6th Semester (Supplementary)  
Examination, July-2021  
(G Scheme)  
(Elective-I)**

**WASTE WATER TREATMENT**

**Paper-PEC-CEEL-302-G**

*Time : Three Hours ]*

*[ Maximum Marks : 75*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :-** Attempt five questions in all, selecting one question from each Section. Question No. 1 is compulsory. All questions carry equal marks.

1. Describe the following :

- (a) Sewage
- (b) Dry Weather flow
- (c) Storm water sewers

- (d) Reuse of treated water
  - (e) Coagulations
  - (f) Sewage Farming
- 15

**Section-A**

- 2. (a) What are the sewerage system used now-a-days ?
  - (b) What are the flow variation and their effects on design of sewerage system ?
- 7,8
- 3. (a) Explain in detail different types of sewers.
  - (b) Explain the material used for sewer construction.
- 8,7

**Section-B**

- 4. (a) Explain the principle of house drainage.
  - (b) Explain in detail house drainage plan and ventilation of house drainage.
- 7,8
- 5. (a) What are the guidelines for reuse of treated waste water ?
  - (b) Explain Indian standards for disposal of effluents into Inland Surface sources and on land.
- 8,7

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( 2 )

**RD-3455**

- Section-C**
- 6. (a) Explain the Screening and grit removal units.
  - (b) What are the objectives conventional treatment units ?
- 8,7
- 7. (a) Explain in detail Activated sludge process.
  - (b) Explain the UP-Flow Anaerobic sludge blanket process.
- 7,8

**Section-D**

- 8. (a) What is the digestion and disposal of treated sludge ?
  - (b) Explain the factor affecting the sludge digestion.
- 7,8
- 9. (a) What are the modes of disposal of treated sludge ?
  - (b) Explain in detail self-purification of streams.
- 7,8

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( 3 )

**RD-3455**



Roll No. : .....

Total No. of Questions : 9 ]

[ Total No. of Pages : 3

**3326**

**B.Tech. (ECE) 6th Semester (Supplementary)  
Examination, July-2021  
(G Scheme)**

**CMOS DESIGN**

**Paper-PCC-ECE-308-G**

*Time : Three Hours ]*

*[ Maximum Marks : 75*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

*Note :- Question No. 1 is compulsory. Attempt one question each from Unit-I to Unit-IV.*

1. (a) What are mobility degradation and velocity saturation ?
- (b) Write the various design rules for CMOS.
- (c) Draw circuit for CMOS inverter and explain its working.

(d) What is power gating ?

Unit-IV

15 each

(e) Explain pseudo-nMOS circuit.

3×5=15

Unit-I

15 each

2. Derive equation for drain current for MOSFET. Draw characteristic curve.

3. Explain the various types of capacitance in MOSFET. Draw C-V characteristics.

Unit-II

15 each

4. Explain static CMOS power sources.

5. Explain the various impacts of interconnect modeling.

Unit-III

15 each

6. (a) Explain timing metrics of sequential circuits.

(b) Give differences between latch and registers.

(c) Explain bistability principle.

7. Explain the timing classification of digital systems.

8. Explain array structured memory organization.

9. Explain column and block decoders.

3326\_1100

( 2 )

**RD-3472**

3326\_1100

( 3 )

**RD-3472**



Unit-IV

15 each

8. Explain in what way the gyroscopic couple affects the motion of an aircraft while taking a turn.
9. Explain the gyroscopic couple and centrifugal couple for stability of a two-wheel vehicle while taking a turn.

3315\_1850

( 4 )

RD-3463

Roll No. : .....

Total No. of Questions : 9 ]

[ Total No. of Pages : 4

**3315**

B.Tech. (ME) 6th Semester (Supplementary)

Examination, July-2021

(G Scheme)

**DYNAMICS OF MACHINES**

Paper-PCC-ME-308-G

Time : Three Hours ]

[ Maximum Marks : 75

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :-** Attempt five questions in all, selecting one question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

1. Explain the following :
  - (i) What are free-body diagrams of a mechanism ?

3315\_1850

( 1 )

RD-3463

P.T.O.



(ii) What is meant by static and dynamic unbalance in machinery ?

(iii) What is the function of a governor ?

(iv) Distinguish between brakes and dynamometers.

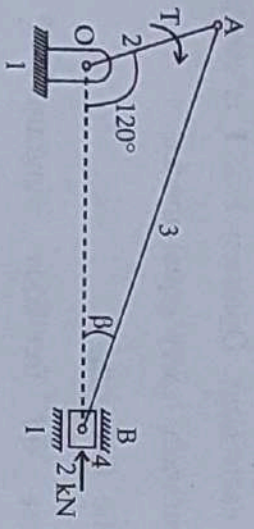
(v) Briefly explain the different types of centrifugal governor.

(vi) What do you mean by spin, precession and gyroscopic planes ?  $2\frac{1}{2} \times 6 = 15$

**Unit-I**

15 each

2. A slider-crank mechanism with the following dimensions is acted upon by a force  $F = 2 \text{ kN}$  at B as shown in Fig.  $OA = 100 \text{ mm}$ ,  $AB = 450 \text{ mm}$ . Determine the input torque on the link OA for the static equilibrium of the mechanism for the given configuration :



3. State and explain D' Alembert's principle.

3315\_1850

( 2 )

**RD-3463**

**Unit-II**

15 each

4. Three masses of 8 kg, 12 kg and 15 kg attached at radial distances of 80 mm, 100 mm and 60 mm respectively to a disc on a shaft are in complete balance. Determine the angular position of the masses of 12 kg and 15 kg relative to the 8 kg mass.

5. Determine the unbalanced forces and couples in case of in-line two-cylinder engine.

**Unit-III**

15 each

6. In a Hartnell governor, the extreme radii of rotation of the ball are 40 mm and 60 mm, and the corresponding speeds are 210 rpm and 230 rpm. The mass of each ball is 3 kg. The lengths of the ball and the sleeve arms are equal. Determine the initial compression and the constant of the central spring.

7. Describe with sketches of belt transmission dynamometer and explain with detail the calculation involved in finding the power transmitted.

3315\_1850

( 3 )

**RD-3463**

P.T.O.



Roll No. : .....

Total No. of Questions : 9 ]

[ Total No. of Pages : 3

**3336**

**B.Tech. (CSE) 6th Semester (Supplementary)  
Examination, July-2021  
(G Scheme)**

**MOBILE AND WIRELESS COMMUNICATION  
Paper-ESC-CSE-308-G**

*Time : Three Hours ]*

*[ Maximum Marks : 75*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

*Note :- Attempt five questions in all, selecting one question from each Unit. Question No. 1 is compulsory  
All questions carry equal marks.*

1. Briefly explain the following terms :

(a) Modulation

(b) Wimax

3336\_2150

( 1 )

**RD-3480**

P.T.O.

- (c) DHCP
  - (d) Wireless local loop
  - (e) File system
- 3×5=15

Unit-I

2. Explain Wireless Communication System with block diagram. 15
3. (a) Differentiate between FDMA and TDMA.  
 (b) Write a short note on Broadcasting techniques. 7½, 7½

Unit-II

4. Describe the protocol architecture of IEEE 802.11 in detail. 15
5. Explain the following :
  - (a) GSM
  - (b) Bluetooth7½, 7½

Unit-III

6. What is Mobile IP ? Explain its goals. Also explain about IP packet delivery. 15

3336\_2150 ( 2 ) RD-3480

7. (a) What do you understand by Snooping TCP ? Explain in detail.  
 (b) Explain operation of mobile ad hoc networks. 7½, 7½

Unit-IV

8. What do you mean by GEO, LEO and MEO ? Describe how these satellites can be used for mobile communication. 15
9. Explain the following :
  - (a) HTML
  - (b) Wireless Transaction Protocol7½, 7½

3336\_2150 ( 3 ) RD-3480



(b) Write short notes on the following :

- (i) Factors affecting bearing capacity
- (ii) Pile spacing and group action of pile
- (iii) Methods of designing raft foundation 6,9

**Section-D**

8. What is Caisson ? Explain in detail the different types of caissons with neat sketches. 15

9. (a) Describe the different methods to rectify the tilts and shifts of well foundation. Also state the recommended values of tilts and shifts as per I.S. 3955.

(b) Describe the following :

- (i) Drilled pier and its types
- (ii) Different components of well foundation in detail 7,8

3304\_1500

( 4 )

**RD-3529**

Roll No. : .....

Total No. of Questions : 9 ]

[ Total No. of Pages : 4

**3304**

**B.Tech. (Civil) 6th Semester (Supplementary)**

**Examination, July-2021**

(G Scheme)

**FOUNDATION ENGINEERING**

Paper-PCC-CE-304-G

Time : Three Hours ]

[ Maximum Marks : 75

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :-** Attempt five questions in all, selecting one question from each Section. Question No. 1 is compulsory. Assume missing data, if any, suitably.

1. Describe the following :

- (a) Objectives and stages of soil exploration
- (b) Types of shallow foundations
- (c) Allowable settlement according to IS code method

3304\_1500

( 1 )

**RD-3529**

P.T.O.



- (d) Floating foundation and its suitability
- (e) Battie pile and its uses
- (f) Grip length

**Section-A**

- 2. (a) What is Soil Sampling and Disturbance ? Describe in detail the different types of soil sampler with their suitability.
- (b) Describe in detail the different methods of boring for sub-surface explorations. 7,8
- 3. (a) What are the different methods of dewatering ? Explain different stages of well point system with neat sketches.
- (b) Describe Pressure-meter Test and Exploration log in detail. 7,8

**Section-B**

- 4. (a) A rectangular footing  $1\text{ m} \times 2\text{ m}$  is placed at a depth of 2 m in saturated clay having unit weight of  $19\text{ kN/m}^3$  and unconfined compressive strength of  $100\text{ kN/m}^2$ . Determine the net ultimate bearing capacity using (i) Terzaghi's theory; (ii) Skempton's theory.

3304\_1500

( 2 )

**RD-3529**

- (b) Describe in detail the different modes of shear failure with neat diagram. 8,7
- 5. (a) What are the different causes of settlement of Foundation ? Describe different methods to determine settlement of foundation in cohesive and cohesionless soil.
- (b) Describe in detail the conventional procedure of proportioning of footing. 8,7

**Section-C**

- 6. (a) What is the necessity of Pile Foundation ? Classify the pile on different bases and explain them in detail.
- (b) Explain the detailed procedure to conduct pile load test with neat diagram. 8,7
- 7. (a) A timber pile was driven by a drop hammer weighing 30 kN with a free fall of 1.2 m. The average penetration was 5 mm. What is the capacity of pile according to Engineering News Formula ?

3304\_1500

( 3 )

**RD-3529**

P.T.O.



Unit-IV

8. A centrifugal clutch is to be designed to transmit 15 kW at 900 rpm. The shoes are four in number. The speed at which engagement begins is  $3/4$ th of the running speed. The inside radius of the pulley rim is 150 mm. The shoes are lined with Ferrodo for which coefficient of friction may be taken as 0.25. Determine :
- (a) Mass of shoes
- (b) Size of the shoes
9. (a) Discuss the condition of self-locking and self-energizing brake.
- (b) How does function of brake differ from clutch ? List important factors upon which capacity of brake depends.
- 7,8

3313\_1850

( 4 )

RD-3461

Roll No. : .....

Total No. of Questions : 9 ]

[ Total No. of Pages : 4

**3313**

B.Tech. (ME) 6th Semester (Supplementary)  
Examination, July-2021  
(G Scheme)

DESIGN OF MACHINE ELEMENT-I

Paper-PCC-ME-304-G

Time : Three Hours ]

[ Maximum Marks : 75

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :-** Attempt five questions in all, selecting one question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

1. Explain the following :

- (i) Economical and financial feasibility.
- (ii) Differences between clutches and brake.

3313\_1850

( 1 )

RD-3461

P.T.O.



- (iii) Classification of engineering materials.
- (iv) Selection of belt.
- (v) Self-locking condition of brake.
- (vi) Selection of fits. 2½×6=15

**Unit-I**

- 2. (a) What do you mean by technical feasibility ?  
Explain various types of feasibility study in context of design philosophy.
- (b) Explain problem statement with suitable examples. 10,5
- 3. (a) What are the key parameters for selection of engineering materials ? Explain them.
- (b) What do you mean by factor of safety ? Explain factor of safety for ductile and brittle material. 10,5

**Unit-II**

- 4. A plate 100 mm wide and 12.5 mm thick is to be welded to another plate by means of parallel fillet welds. The plates are subjected to load of 50 kN. Find the length of the weld so that the maximum stress does not exceed 56 N/mm<sup>2</sup>. Consider the joint first under static loading and then under fatigue loading. 15

3313\_1850

( 2 )

**RD-3461**

- 5. A double riveted double cover butt joint in plate 20 mm thick is made with 25 mm diameter rivet at 100 mm pitch. The permissible stress in tension 120 N/mm<sup>2</sup>, shear 100 N/mm<sup>2</sup> and in crushing 150 N/mm<sup>2</sup>. Find joint efficiency taking the strength of rivet in double shear as twice than single shear. 15

**Unit-III**

- 6. (a) What are the factors influencing selection of a belt ? Explain different types of belts.
- (b) Derive expression of length for a open belt drive. 7,8
- 7. Design a muff coupling which is used to connect two steel shaft transmitting 40 kW at 350 rpm. The material for shaft and key is plain carbon steel for which allowable shear stress and crushing stress may be taken as 40 N/mm<sup>2</sup> and 80 N/mm<sup>2</sup> respectively. The material for the cast iron for which the allowable shear stress may be assumed as 15 N/mm<sup>2</sup>. 15

3313\_1850

( 3 )

**RD-3461**

P.T.O.



5. (a) What is the significance of Incremental Cost ( $\lambda$ ) ?

(b) Derive expression for representation of transmission loss by B-coefficients.  $7\frac{1}{2}, 7\frac{1}{2}$

**Section-C**

15 each

6. What are the different methods for Voltage Control ? Explain them in brief.

7. Explain with block diagram of two area load frequency control.

**Section-D**

8. (a) Draw power angle curve and also derive an expression for this.

(b) Define Transient Stability. Discuss various assumptions made during analysis of the system.  $7\frac{1}{2}, 7\frac{1}{2}$

9. What do you understand by equal area criteria and plot a  $\delta$  Vs.  $t$  curve for the stable and unstable system ? 15

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Total No. of Questions : 9 ]

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**B.Tech. (EE) 6th Semester (Supplementary)**

**Examination, July-2021**

(G Scheme)

**POWER SYSTEM-II**

**Paper-PCC-EE-302-G**

**Time : Three Hours ]**

**[ Maximum Marks : 75**

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :-** Attempt five questions in all. Question No. 1 is compulsory. Attempt four more questions from the Sections-A, B, C and D by selecting one question from each Section.

1. (a) What do you mean by control area in Power System ? Explain it.

(b) What are the advantages and disadvantages of GS method ?

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- (c) Define the term ITL.
- (d) What is the significance of Incremental Cost ( $\lambda$ ) ?
- (e) In which condition generator bus is treated as load bus ?
- (f) What is the objective of the economic dispatch problem ?  $2\frac{1}{2} \times 6 = 15$

**Section-A**

15 each

2. Detail the algorithm to perform load flow using NR method and also draw its flowchart.
3. The load flow data for the sample power system are given below. The voltage magnitude at bus 2 is to be maintained at 1.04 p.u. the max and min reactive power limits of the generator at bus 2 are 0.35 and 0.0 p.u. respectively. Determine the set of load flow equation at the end of first iteration by using G-S method :

Bus Code	Impedance	Line charging Admittance
1-2	$0.08 + j 0.24$	0
1-3	$0.02 + j 0.06$	0
2-3	$0.06 + j 0.18$	0

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Schedule of generation of loads :

Bus Code	Assumed Voltage	Generation		Load	
		MW	MVAR	MW	MVAR
1	$1.06 + j 0.0$	0	0	0	0
2	$1.00 + j 0.0$	0.2	0	0	0
3	$1.00 + j 0.0$	0	0	0.6	0.25

**Section-B**

4. Incremental fuel cost in rupees per MWh for a plant consisting of two units are :

$$dC_1/dP_{G1} = 0.20 P_{G1} + 40$$

$$dC_2/dP_{G2} = 0.40 P_{G2} + 30$$

and the generator limits are as follows :

$$30 \text{ MW} \leq P_{G1} \leq 175 \text{ MW}$$

$$20 \text{ MW} \leq P_{G2} \leq 125 \text{ MW}$$

Assume that both units are operating at all times. How will the load be shared between the two units as the system load varies over the full range of the load values ? What are the corresponding value of the plant incremental costs ?

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Roll No. : .....

Total No. of Questions : 9 ]

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**B.Tech. (CSE) 6th Semester (Supplementary)  
Examination, July-2021  
(G Scheme)**

**ARTIFICIAL INTELLIGENCE**

**Paper-PCC-CSE-304-G**

*Time : Three Hours ]*

*[ Maximum Marks : 75*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

*Note :- Question No. 1 is compulsory. Attempt five questions in total by selecting one question from each Unit.*

1. (a) Differentiate between informed and uninformed search.
- (b) Write a short note on Semantic Network.
- (c) What do you mean by term Heuristics ?

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(d) Explain the term Non-monotonic reasoning.

(e) Write a short note on genetic algorithms.  $3 \times 5 = 15$

#### Unit-I

2. (a) Define term Artificial Intelligence. What are applications of AI in the various fields? Explain its applications.

(b) Explain Hill Climbing strategy with example. What are the problems faced while applying this strategy? 7,8

3. (a) What do you mean by Game playing in AI? 7,8

(b) Explain Alpha-Beta pruning with example. What is the need of pruning a game tree? 7,8

#### Unit-II

4. (a) Differentiate between propositional logic and predicate logic.

(b) What do you mean by Skolemization? Explain with the help of example. 8,7

5. Explain the various ways of knowledge representation in AI. Also discuss underlying issues. 15

#### Unit-III

6. (a) Explain how uncertainty is managed in AI.

(b) Explain Dempster shafer theory with the help of example. 5,10

7. (a) Differentiate partial-order plan with total-order plan.

(b) How do we represent states, goals and actions in planning? Explain with example. 7,8

#### Unit-IV

8. What is an Expert System? Explain its architecture in detail. Also, write its applications in the various domains. 15

9. (a) Explain ANN with its architecture. How artificial Neural networks are similar to biological neural networks? 8,7

(b) Explain ANN applications in the various fields.



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Total No. of Questions : 9 ]

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**B.Tech. (ECE) 6th Semester (Supplementary)  
Examination, July-2021  
(G Scheme)**

**COMPUTER NETWORK  
Paper-PCC-ECE-304-G**

*Time : Three Hours ]*

*[ Maximum Marks : 75*

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*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

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*Note :- Question No. 1 is compulsory and attempt one question from each Unit.*

1. Write short notes on the following :

- (a) Packet switching
- (b) Ring topology
- (c) Bridges

- (d) Switches
- (e) IP
- (f) FTP

15

**Unit-I**

- 2. Describe the various network types in detail. 15
- 3. (a) Explain the performance of the transmission media.
- (b) Describe the various layers of TCP/IP protocol. 7½, 7½

**Unit-II**

- 4. Describe the various services of DLC in detail. 15
- 5. (a) What is IEEE 802.11 ? Explain.
- (b) Explain the various ALOHA protocols. 7½, 7½

**Unit-III**

- 6. (a) Explain performance of Network layer services.
- (b) Explain overview of IPv6 in detail. 7½, 7½
- 7. (a) Differentiate between Classless and Classful Addressing.
- (b) What is IGMP ? Explain. 7½, 7½

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**Unit-IV**

- 8. (a) What are Transport Layer Protocols ?
- (b) Compare Connectionless and Connection Oriented Services. 7½, 7½
- 9. (a) What is FTP ? Explain in detail.
- (b) Explain user datagram protocols. 7½, 7½

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Total No. of Questions : 9 ] [ Total No. of Pages : 3

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**B.Tech. (CSE) 6th Semester (Supplementary)**  
**Examination, July-2021**  
(G Scheme)

**COMPILER DESIGN**  
Paper-PCC-CSE-302-G

*Time : Three Hours ]*

*[ Maximum Marks : 75*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

*Note :- Question No. 1 is compulsory. Attempt five questions in total by selecting one question from each Unit.*

1. (a) Write a short note on ambiguous grammar.
- (b) Compiler-compiler
- (c) Differentiate between tokens, patterns and lexemes.

- (d) Role of regular expression
- (e) What is phrase level error recovery ?
- (f) What is register allocation in code generation ? 2½×6=15

Unit-I 15 each

- 2. Explain different phases of compiler.
- 3. What is Finite Automata ? Convert NFA (a|b)\* abb into equivalent QFA.

Unit-II

- 4. (a) What is CFG ?
- (b) Explain how regular expressions are used for token specification. 8,7

- 5. Perform shift-reduce parsing for string id<sub>1</sub> + id<sub>2</sub> \* id<sub>3</sub> for the following grammar :

$$E \rightarrow E + E \mid E * E \mid (E) \mid id \quad 15$$

Unit-III

- 6. (a) Explain syntax directed translation scheme.
- (b) Explain three-address codes, triples and quadruples. 6,9

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- 7. Consider the following grammar :
- $$E \rightarrow E + T \mid T$$
- $$T \rightarrow T * F \mid F$$
- $$F \rightarrow (E) \mid id$$
- and build SLR parsing table for it. 15

Unit-IV

- 8. (a) List the various error recovery strategies.
- (b) Explain the importance of symbol tables in compiler design. 7,8
- 9. Explain the various strategies for code generation. 15

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