R16

II B.TECH. II SEM

SUPPLEMENTARY EXAMINATIONS

MARCH 2022

Narasaraopeta Engineering College (Autonomous)
Kotappakonda Road, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: R16CC2201

II B.Tech II Semester Supple Examinations, March-2022
BUSINESS MANAGEMENT CONCEPTS FOR ENGINEERS
(EEE & ME)

Time: 3 hours   Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) State law of demand and write its determinants?
   (b) Define oligopoly and mention its characteristics.
   (c) Write types of accounting.
   (d) What is scientific management?
   (e) What are the functions of HR manager?
   (f) Write any two differences between PERT and CPM.

                                                 [2+2+2+2+2+2]

PART-B

                                     4 X 12 = 48

2. (a) Briefly explain different types of forecasting techniques?
   (b) Write about degrees and types of elasticity.

3. (a) What are the types of cost analysis in managerial economics?
   (b) Assume that as an investor, you are planning to enter the construction industry as a panel formwork supplier. The potential number of forthcoming projects, you forecasted that within two years, your fixed cost for producing formworks is Rs. 300,000. The variable unit cost for making one panel is Rs. 15. The sale price for each panel will be Rs. 25. If you charge Rs. 25 for each panel, how many panels you need to sell in total, in order to start making money?

4. (a) What are the generally accepted accounting principles?

   (b) What are the types of journal entries? Write Journal Entries for the transactions motioned below:

   Mr. Nirmal has the following transactions in the month of April.

10th April	:	Commenced business with a capital of 1,00,000
11th April	:	Purchased goods from Veeru for 20,000
13th April	:	Purchased Goods for Cash 15,000
14th April	:	Purchased Goods from Abhiram for cash 9,000
16th April	:	Bought Goods from Shyam on credit 12,000
17th April	:	Sold goods worth 15,000 to Tarun

Page 1 of 2

19th April : Sold goods for cash 20,000

20th April : Sold goods to Utsav for cash 6,000

21st April : Sold goods to Pranav on credit 17,000

22nd April : Returned goods to Veeru 3,000

23rd April : Goods returned from Tarun 1,000

25th April : Goods taken by the proprietor for personal use 1,000

26th April : Bought Land for 50,000

27th April : Purchased machinery for cash 45,000

28th April : Bought computer from Intel Computers for 25,000

28th April : Cash sales 15,000

29th April : Cash purchases 22,000

30th April : Bought furniture for proprietor's residence and paid cash 10,000

5. (a) Discuss Douglas McGregor's contribution to management with examples? Analyse its relevance in today's context.

   (b) Write down functions and principles of management.

6. (a) What are the functions of marketing management? Discuss its importance in business organisations.

   (b) What are the methods of inventory management? How is EOQ calculated?

7. (a) Briefly explain about modern capital budgeting techniques.

   (b) The following details are available regarding a project:

Activity	Predecessor activity	Duration (Weeks)
A	–	3
B	A	5
C	A	7
D	B	10
E	C	5
F	D,E	4

Determine the critical path, the critical activities and the project completion time.

***

Time: 3 hours   Subject Code: R16CE2201   Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from **Part-B**

All questions carry equal marks of 12.

PART-A

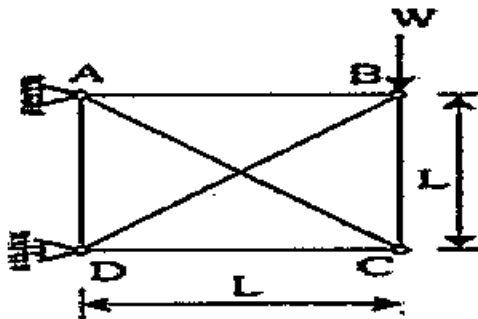1. (a) Define Degree of freedom

   (b) Write moment-curvature equation

   (c) What is the difference between determinate and indeterminate structure

   (d) Write Castigliano's theorems

   (e) Write the various types of Arches

   (f) What is Influence Line?

                                                                    [2+2+2+2+2+2]

PART-B

                                                                    4 X 12 = 48

2. Analyze the truss by method of sections

3 A simply supported beam of span 6m is subjected to a concentrated load of 45 KN at 2m from the left support. Calculate the deflection under the load point. Take $E = 200 \times 10^6$ KN/m^2 and $I = 14 \times 10^{-5}$ m^4.

4. (a) Write the application of conjugate beam method of determinate beams of variable cross sections.

   (b) Explain the difference between Real beam and conjugate beam

5. Define Strain energy. Derive an expression for strain energy for a linear elastic system under axial load.

6. A 3 hinged arch of span 40m and rise 8m carries concentrated loads of 200 kN and 150kN at a distance of 8m and 16m from the left end and an udl of 50 kN/m on the right half of the span. Find the horizontal thrust

7. Draw the influence line diagram for B.M at a point 8m from the left abutment on a bridge girder of span 30m and find the maximum B.M at that point due to a series of wheel loads 80kN, 160kN, 160kN and 160kN at centre to centre distances of 4m, 2.5m, 2.5m and 2.5m respectively. The loads can cross in either direction with the 80kN load leading.

Subject Code: R16CE2202

II B.Tech II Semester Supple Examinations, March-2022
HYDRAULICS AND HYDRAULIC MACHINERY
(CE)

Time: 3 hours   Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) what is Most Economical open channel   CO1, K1
   (b) what is dimensional homogeneity and give one example CO2, K2
   (c) define over all efficiency of a pump, write down the expression   CO5, K1
   (d) Write down the force exerted by the fluid jet on a stationery plate CO3, K2
   (e) Draw the main components of Kaplan Turbine   CO4, K2
   (f) What is run of river plant   CO6, K1

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) Find the energy loss that can occur in a hydraulic jump in terms of depths   CO1, K3
   (b) Show that for a channel of circular section the depth of flow d = 0.95 D for maximum
       discharge, where d = depth of flow and D = diameter of circular channel   CO1, K3

3. (a) The discharge (Q) through a rotating machine such as pump, turbine or compressor depends
       on the shaft work(gH), power supplied (P), speed of rotation (N), characteristic length (D),
       mass density (ρ) and viscosity (μ) of the fluid. using Buckingham's π-theorem, obtain a set of
       dimensionless parameters.   CO2, K3

4. (a) Jet of water 100mm diameter having velocity of 30m/s, strikes normally a flat smooth plate.
       Determine the thrust on the plate (a) if the plate is at rest (b) if the plate is moving in the
       same direction as the jet with a velocity of 5m/s. Also find the work done per second on the
       plate in each case and the efficiency of the jet when the plate is moving   CO3, K3

5. (a) Discuss about the Pelton wheel turbine, derive the expressions for work done and efficiency
       of the turbine   CO4, K2

6. (a) explain under what headings the centrifugal pumps are classified?   CO5, K2
   (b) State the difference between closed, semi closed and open impeller   CO5, K2

7. (a) When a run-of-river plant operates as a peak load station with a weekly load factor of 20%, all
   its capacity is firm capacity. What will be the minimum flow in the river so that the station may
   serve as the base load station?. It is given that Rated installed capacity of generator = 12,000kW,
   Operating head = 20m, Plant efficiency = 85%. Estimate the daily load factor of the plant, if the
   stream flow is 15cumec   CO6, K3

Narasaraopeta Engineering College (Autonomous)
Kotappakonda Road, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: R16CE2203

II B.Tech II Semester Supple Examinations, March-2022
ENGINEERING GEOLOGY
(CE)

Time: 3 hours   Max Marks: 60

'Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a)Define frost action, What is the role of freezing of water in weathering process?
   (b)Describe the physical properties of minerals Streak.
   (c)What are Strike-Slip Faults
   (d)Define epicentre and focus
   (e) What are principles of Exploration Geophysics?
   (f) What are the Effects of Tunnels?

                                                          [2+2+2+2+2+2]

PART-B

                                                          4 X 12 = 48

2. (a) Define weathering? Explain frost action and thermal effects in weathering.
   (b) Describe briefly different process are responsible for physical and chemical weathering.

3. (a)what are the physical properties which are helpful in identifying the minerals
   (b) What is igneous rock? explain the classification of igneous rocks with examples

4. (a) What are the parts of FAULTS and give their types with neat sketches.
   (b) What is meant by STRIKE, DIP and OUTCROP.

5. (a) Write short note on i) cone of depression ii) geological controls of ground water movement.
   (b) Discuss about the preventive measures for landslides?

6. (a) Write the principle, parameters, methods and their applications of magnetic method.
   (b) Write the Principle of seismic method of prospecting.

7. (a) What are the geological considerations for successful reservoir?
   (b) Write the purpose of tunnelling and Explain geological consideration in tunnelling

***

Subject Code: R16CE2204
II B.Tech II Semester Supple Examinations, March-2022
SURVEYING-II
(CE)
Time: 3 hours   Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B.**
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) What is meant by balancing in theodolite surveying?
   (b) Explain closing errors in theodolite surveying.
   (c) Distinguish between compound and reverse curves.
   (d) List the functions of transition curves.
   (e) Define Fixed and movable hair tacheometers.
   (f) What is Hydrographic Survey?

                                                          [2+2+2+2+2+2]

PART-B

                                                          4 X 12 = 48

2. (a) Examine with neat sketch the essentials of a transit theodolite. What are the different errors in theodolite work? How they are eliminated?   [07]
   (b) Explain the different between tangential and stadia tacheometry. How will you determine the stadia constants?   [05]

3. (a) Two observations were taken upon a vertical staff by means of a theodolite, the reduced level of its trunnion axis being 160.95. In the case of the first, the angle of elevation was 4°36' and the staff reading 0.75. In the case of second observation, the staff reading was 3.45 and the angle of elevation 5°48'. Calculate the reduced level of the staff station and Collect the elevation of the top of a chimney from the following data.   [09]

Instrumentation station	Reading in BM	Angle of elevation	Remarks
A	0.862	18°36`	RL of BM= 421.380m
B	1.222	10°12`	Distance B=50m

   Stations A and B and top of chimney are in the same vertical plane.
   (b) Explain in detail the errors in theodolite survey.   [03]

4. (a) A simple curve is to have a radius of 300m. The tangents intersect at chainage of 1192 m and the deflection angle at intersection is 50.5°. Find the tangent distance, chainage of beginning and end length of long chord, degree of curve and the number of full and sub chord.   [08]
   (b) Briefly describe the obstructions in curve ranging.   [04]

5. (a) Explain the different types of vertical curves. Give the steps in design of vertical summit curve. [06]

(b) Prepare step by step by procedure to set out a transition curve. [06]

6. (a) Describe the theory and use of Jeffcott Direct Reading Tacheometer. [06]

(b) Elaborate the principle and use of substance bar and Beaman's stadia arc. [06]

7. (a) What is a three point problem in hydrographic surveying? List the various solutions for the problem? Explain in detail. [06]

(b) What are the important precautionary measures and maintenance of Total Station instruments? [06]

***

Subject Code: R16CE2205

II B.Tech II Semester Supple Examinations, March-2022
HYDROLOGY AND IRRIGATION ENGINEERING
(CE)

Time: 3 hours   Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) Define Hyetograph ?
   (b) Write short note on Evapotranspiration?
   (c) Distinguish between ridge canal and contour canal?
   (d) Explain about factors affecting duty?
   (e) Write about balancing depth of cutting.
   (f) What are the Types of canals?

                                    [2+2+2+2+2+2]

PART-B

                                    4 X 12 = 48

2. (a) Explain methods of computing average rainfall
   (b) Describe the hydrological cycle with a neat sketch.

3. (a) Define Infiltration? Explain briefly about Double-ring Infiltrometer with neat sketches?

   (b) Derive Horton's equation of infiltration

4. (a) Write broad outline of the National Policy on floods and flood management.

   (b) What is unit hydrograph? Discuss its uses and explain how a 6-hour unit hydrograph can be determined from a given 3-hour unit hydrograph.

5. (a) Write the advantages and disadvantages of irrigation
   (b) Explain the environmental impacts of irrigation

6. (a) Explain functions of irrigation soils
   (b) Explain physical properties of soil

7. Explain the following with neat sketched:
a) Sewage Irrigation
b) Tubewell Irrigation
c) Infiltration galleries

                    ***

Subject Code: R16EE2205

II B.Tech II Semester Supple Examinations, March-2022
ELECTRICAL MACHINES-II
(EEE)

Time: 3 hours   Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B.**
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) How can the direction of 3 phase induction be reversed?
   (b) What is reason for inserting additional resistance in rotor circuit of a slip ring induction motor?
   (c) Short-pitch winding is preferred over full pitch winding in an Alternator. Justify the statement.
   (d) Why is the MMF method of estimating the voltage regulation is considered as the optimization method?
   (e) When does a synchronous motor get over excited?
   (f) Why an induction motor is called as rotating transformer?

                                                             [2+2+2+2+2+2]

PART-B

                                                             4 X 12 = 48

2. (a) The power input to the rotor of a 3-Φ, 50 HZ, 6 pole induction motor is 80KW .The rotor e.m.f. makes 100 complete alternations per minute. Find :
   1) Slip
   2) Motor Speed
   3) Mechanical power developed
   4) Torque developed
   (b) Derive the equation for torque developed by an induction motor.   [6+6]

3. (a) Discuss the theory of star – delta starter.
   (b) Explain any two techniques used for speed control of induction motor from rotor side control.
                                                             [6+6]

4. Find the no load phase and line voltages of a star connected 3 phase, 6 pole alternator which runs at 1200 rpm, having flux per pole of 0.1wb sinusoidally distributed. It's stator has 54 slots having double layer winding. Each coil has 8 turns and the coil is chorded by 1 slot.   [12]

5. A 3.3 KV alternator gave the following results

Field current (A)	16	25	37.5	50	70
OC Voltage (KV)	1.55	2.45	3.3	3.75	4.15

A field current of 18 A is found to cause the full load current to flow through the winding during short circuit test. Predetermine the full load voltage regulation at i) 0.8 pf lag and ii) 0.8 pf lead by MMF method.   [12]

6. (a) Describe the effect of varying excitation upon the armature current and power factor of a three phase Synchronous motor when input power to the motor is maintained constant.
(b) Illustrate the phenomenon hunting and the use of damper winding. [6+6]

7. (a) Brief the operation of single phase induction motor with double field revolving theory.
(b) A 220 V, 6 pole , 50 Hz, single winding , single phase induction motor has the following equivalent circuit parameters as referred to the stator
R_{1m} = 3.0 Ohm, X_{1m}= 5.0 Ohm, R_2=1.5 ohm, X_2 = 2.0 Ohm.
Neglect the magnetising current. When the motor runs at 97% of the synchronous speed, compute the total torque [6+6]

***

Subject Code: R16EE2206

II B.Tech II Semester Supple Examinations, March-2022
ANALOG ELECTRONICS
(EEE)

Time: 3 hours   Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) Write the closed loop gain of negative feedback system.
   (b) Write a short notes on RC low pass circuit.
   (c) Why a high-pass RC circuit is called differentiator?
   (d) Define Multi-Vibrators and list types of Multi-Vibrators
   (e) Mention the advantages of active filter over a passive filter?
   (f) How many levels are possible in a two-bit DAC? What is the resolution if the output range is 0 to 3V?

$$[2+2+2+2+2+2]$$

PART-B

$$4 \times 12 = 48$$

2. (a) Derive the expression for input resistance R_{if} and output resistance R_{of} for voltage series feedback amplifier
   (b) Explain the characteristics of the negative feedback amplifier

3. (a) Explain the operation of positive clamper circuit using diode.
   (b) State and prove clamping circuit theorem with relevant circuit and waveforms

4. (a) Draw the circuit diagram of a practical anti log amplifier and obtain an expression for its output voltage.
   (b) Explain the various methods of biasing Op-Amp.

5. (a) Explain the operation of Astable Multivibrator and derive the expression for time-period of output square wave.
   (b) Draw the circuit diagram of a Wien bridge oscillator and derive the expression for frequency of oscillation and condition for sustained oscillations

6. (a) Design a first order band pass filter with lower cutoff frequency of 100Hz and a higher cutoff frequency of 1KHz. The pass band gain should be 4. Calculate the 'Q' of the filter
   (b) Compare LPF, HPF, Band pass, Band reject and All pass filters.

7. (a) Draw and explain the successive approximation ADC
   (b) Draw and explain in detail about R2R DAC

***

Subject Code: R16ME2202
II B.Tech II Semester Supple Examinations, March-2022
THEORY OF MACHINES-I
(ME)

Time: 3 hours   Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) Distinguished between mechanism and machine
   (b) What is degree of freedom of a mechanism? How it is determined?
   (c) What is instantaneous center of rotation? How do you know the number of instantaneous centers in mechanism?
   (d) What is displacement diagram? Why it is necessary to draw it before drawing a cam profile?
   (e) What do you mean by braking or the fixing torque of a gear in an epicyclic gear train?
   (f) What is the function of a governor? How does it differ from that of a flywheel?
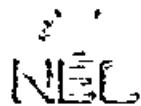
   [2+2+2+2+2+2]

PART-B

                                                                      4 X 12 = 48

2. (a) What are centripetal and tangential components of acceleration? When do they occur? How are they determined? [05]

   (b) In a slider crank mechanism, the lengths of the crank and the connecting rod are 200 mm and 800 mm respectively. Locate all the I-centers of the mechanism for the position of the crank when it is turned 30° from the inner dead center. Also find the velocity of the slider and the angular velocity of the connecting rod if the crank rotates at 40 rad/sec. [07]

3. (a) What is Kutzback's criterion for degree of freedom of plane mechanisms? In what way Gruebler's criterion is different from it? [04]

   (b) How are Withworth quick return mechanism and crank & slotted-lever mechanism are different from each other – explain with schematic diagram? [08]

4. A flat-faced mushroom follower is operated by a uniformly rotating cam. The follower is raised through a distance of 25 mm in 120° rotation of the cam, remains at rest for the next 30° and is lowered during further 120° rotation of the cam. The raising of the follower takes place with cycloidal motion and the lowering with uniform acceleration and deceleration. However, the uniform acceleration is 2/3 of the uniform deceleration. The least radius of the cam is 25 mm which rotates at 300 rpm.

   Draw the cam profile and determine the values of the maximum velocity and maximum acceleration during rising and maximum velocity and uniform acceleration and deceleration during lowering of the follower. [12]

5. A spring controlled governor of the Hartnell type with a central spring under compression has balls each of mass 2 kg. The ball and sleeve arms of the bell crank levers are respectively 100 mm and 60 mm long and are at right angles. In the lowest position of the governor sleeve, the radius of rotation of the balls is 80 mm and the ball arms are parallel to the governor axis. Find the initial load on the spring in order that the sleeve may begin to lift at 300 r.p.m. If the stiffness of the spring is 30 kN/m, what is the equilibrium speed corresponding to a sleeve lift of 10 mm?

[12]

6. Determine a suitable train of wheels to satisfy the requirements of a clock, the minute hand of which is fixed to a spindle and the hour hand to a sleeve rotating freely on the sample spindle. The pitch is same for all the wheels and each wheel has at least 11 teeth. The total number of should be as small as possible. [12]

7. The turbine rotor of a ship has a mass of 20 tonnes and a radius of gyration of 0.75 m. Its speed is 2000 r.p.m. The ship pitches 6° above and below the horizontal position. One complete oscillation takes 18 seconds and the motion is simple harmonic. Calculate: (i) the maximum couple tending to shear the holding down bolts of the turbine, (ii) the maximum angular acceleration of the ship during pitching, and (iii) the direction in which the bow will tend to turn while rising, if the rotation of the rotor is clockwise when looking from rear. [12]

***

Narasaraopeta Engineering College (Autonomous)

Kotappakonda Road, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: R16ME2203

II B.Tech II Semester Supple Examinations, March-2022
APPLIED THERMODYNAMICS
(ME)

Time: 3 hours   Max Marks: 60

Question Paper Consists of Part-A and Part-B.
Answering the question in Part-A is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) How spark advance influences the performance of a gasoline engine?
   (b) What do you understand by valve overlap? Explain its significance
   (c) List the engine variables which influence SI engine knock
   (d) Define the terms: Brake power, frictional power and indicated power
   (e) What is a positive displacement machine? Give on example
   (f) write advantages of centrifugal compressor over axial flow compressors

                                                                    [2+2+2+2+2+2]

PART-B

                                                                    4 X 12 = 48

2. (a) Briefly explain i) time loss factor ii) heat loss factor iii) exhaust blowdown factor   (6M)
   (b) Define volumetric efficiency and discuss various factors that influence volumetric efficiency
                                                                                                      (6M)

3. (a) With the help of a neat sketch explain the working of a simple carburettor.   (6M)
   (b) Compare wet sump and dry sump lubrication systems   (6M)

4.(a) Briefly explain the stages of combustion in SI engines elaborating the flame front propagation
                                                                                                      (6M)
   (b) Describe various types of combustion chambers used in CI engines with the help of neat
       figures   (6M)

5. (a) Explain the procedure of preparing heat balance sheet of an engine   (4M)
   (b) In a test for four-cylinders, four-stroke engine has a diameter of 100 mm, stroke = 120 mm,
       speed of engine = 1800 rpm, fuel consumption of 0.2 kg/min, calorific value of fuel is 44000
       kJ/kg. Difference in tension on either side of brake pulley = 40 kg, Brake circumference is
       300 cm. If the mechanical efficiency is 90%. Cooling water used = 818 kg; Rise in
       temperature of cooling water = 10°C. Exhaust gas temperature = 345°C. Room temperature =
       25°C; Calculate (i) Brake-thermal efficiency, (ii) Indicated thermal efficiency, (iii) Brake
       specific fuel consumption (iv) Heat balance sheet   (8M)

6. (a) State how are the air compressors classified and enumerate the applications of compressors
                                                                                                      (4M)
   (b) With the help of a neat sketch, describe the working of roots blower and also derive the
       expression for efficiency of roots blower   (8M)

7. (a) Draw the velocity diagrams of an axial-flow compressor (4M)
    (b) A multistage axial flow compressor delivers 18 kg/s of air. The inlet stagnation condition is 1 bar and 20°C. The power consumed by the compressor is 4260 kW. Calculate:
    (i) Delivery pressure.
    (ii) Number of stages.
    (iii) Overall isentropic efficiency of the compressor.
     Assume temperature rise in the first stage is 18°C. The polytropic efficiency of compression is 0.9 and the stage stagnation pressure ratio is constant. (8M)

***

Subject Code: R16ME2204

II B.Tech II Semester Supple Examinations, March-2022
HYDRAULIC MACHINERY AND PNEUMATIC SYSTEMS
(ME)

Time: 3 hours   Max Marks: 60

Question Paper Consists of Part-A and Part-B.
Answering the question in Part-A is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) Describe the efficiency of a jet striking a plate
   (b) Define specific speed & unit speed of a turbine.
   (c) Why priming is required in a centrifugal pump.
   (d) What is meant by NPSH?
   (e) Give the classifications of directional control valves.
   (f) State the difference between pressure relief valve and sequence valve

                                                                    [2+2+2+2+2+2]

PART-B

                                                                    4 X 12 = 48

2. a. Derive the equation for the force of impact of a fluid jet on a normal flat vane moving in the direction of jet and the vane velocity is less than jet velocity.   6Marks

   b. A jet of water having a velocity of 20 m/s strikes a curved vane which is moving with a velocity of 10 m/s. The jet makes an angle of $20°$ with the direction of motion of vane at inlet and leaves at angle $130°$ to the direction of motion of vane at outlet. Calculate i) vane angles so that water enters and leaves without shock ii) Work done per second.   6Marks

3. a. With a neat sketch explain the construction and working of a Francis turbine. 6Marks

   b. The head at the base of the nozzle of a Pelton wheel is 640 m. The outlet vane angle of the bucket is $15°$. The relative velocity at the outlet is reduced by 15% due to friction along the vanes. If the discharge at outlet is without whirl find the ratio of bucket speed to the jet speed. If the jet diameter is 100 mm while the wheel diameter is 1.2 m, find the speed of the turbine in rpm, the force exerted by the jet on the wheel, the Power developed and the hydraulic efficiency. Take Cv=0.97.   6Marks

4. a. Explain the working of a centrifugal pump with a neat sketch.   6Marks

   b. The centrifugal pump has the following characteristics. Outer diameter of impeller = 800 mm; width of the impeller vane at outlet = 100 mm. angle of the impeller vanes at outlet = $40°$.The impeller runs at 550 rpm and delivers 0.98 m3/s under an effective head of 35 m. A 500 kW motor is used to drive the pump. Evaluate the manometric, mechanical and overall efficiencies of the pump. Assume water enters the impeller vanes radially at inlet.   6Marks

5. (a) Which kind of accumulator operates at constant pressure? How can the pressure Changed?
   6Marks
   (b)) Briefly explain any two type of accumulators. 6Marks

6. (a) Describe the basic requirements of pneumatic systems.   6Marks
   (b) Explain the sliding pool type of DCV with a neat sketch.   6Marks

7. (a) What is cascade control? Explain with suitable example circuit.   6Marks
   (b) State the advantages and dis advantages of a pneumatic system.   6Marks

***

c   ◄.

Subject Code: R16ME2205

II B.Tech II Semester Supple Examinations, March-2022
MANUFACTURING TECHNOLOGY
(ME)

Time: 3 hours   Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B.**
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) Distinguish between Primary and secondary manufacturing process

(b) Write about the principles of Gating system?

(c) What is Weldability.

(d) Explain the advantages of brazing?

(e) What is the principle of rolling?

(f) Write short notes on forward extrusion process?

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) List and explain the considerations for selecting pattern materials?
(b) Discuss the normal characteristics desired of a Core in a sand casting.

3. (a) Define gating ratio? Illustrate the steps involved in designing a gating system?
(b) Explain in detail the defects of casting?

4. (a) Distinguish gas welding and gas cutting. Illustrate with few examples.
(b) Explain the causes of welding defects and their remedies with neat sketch.

5. (a) With neat sketch explain thermit welding and plasma welding.
(b) Explain different types of resistant welding. Explain with neat sketch any one type.

6. (a) Distinguish between hot working and cold working processes with suitable examples and figures.
(b) What are the forces and power requirements in rolling process?

7. (a) What is Extrusion? List the advantages, limitations and applications of Extrusion process
(b) Explain with a neat sketch 'wire drawing' process.

***

Subject Code: R16EC2201

II B.Tech II Semester Supple Examinations, March-2022
SWITCHING THEORY AND LOGIC DESIGN
(ECE)

Time: 3 hours   Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) Why Gray code can be called as a Cyclic code
   (b) How do you develop XOR gate using only NAND gates?
   (c) Differentiate minterm and maxterm
   (d) Write any two merits & demerits of PAL
   (e) How Race around condition can be avoided in Flipflops
   (f) What are the capabilities and limitations of FSM?

                                                                    [2+2+2+2+2+2]

PART-B

                                                                    4 X 12 = 48

2. (a) Develop a 4-bit Binary to Gray code converter using logic gates   [8]
   (b) State and prove De-Morgan's theorem and consensus theorem   [4]

3. (a) Design a circuit with four inputs and one output where the output is 1 if the input is [8]
   divisible by 3.
   (b) Using k-map find minimum sop for the function.   [4]

   $F (a, b, c, d) = \sum m (0, 1, 5, 6, 7, 9, 11, 14)$

4. (a) Design a Full subtractor circuit with only NOR gates.   [8]

   (b) Using 8 to 1 Mux, realize the Boolean function   [4]

   $F (W, X, Y, Z) = W'X'Y'Z' + WXY'Z' + W'X'YZ + WXYZ + W'XYZ$

5. (a) Draw the block diagram and explain in detail about the PROM   [6]
   (b) Realize $F (a, b, c, d) = \sum m (1, 2, 4, 5, 6, 7, 10, 11, 15)$ using PLA. [6]

6. (a) Write the characteristic and excitation tables for JK, RS, T and D flip-flops   [4]
   (b) Design a Modulo-12 up Synchronous counter Using T-Flip Flops and draw the Circuit
   diagram   [8]

7. (a) Explain in detail Mealy state diagram and ASm chart for it with an example   [6]
   (b) Design a 1011 sequence detector using JK flip-flops   [6]

                                    ***

Subject Code: R16EC2202

II B.Tech II Semester Supple Examinations, March-2022
ELECTRONIC CIRCUIT ANALYSIS
(ECE)

Time: 3 hours   Max Marks: 60

Question Paper Consists of Part-A and Part-B.
Answering the question in Part-A is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) Define f_T and derive an expression for it
   (b) What is effect of negative feedback on amplifier gain? Prove it
   (c) List out different types of coupling used in multistage amplifiers
   (d) Show that band width improved with negative feedback
   (e) State and explain barkhausen criterion
   (f) Classify power Amplifiers

                                                            [2+2+2+2+2+2]

PART-B

                                                            4 X 12 = 48

2. (a) Draw the circuit diagram of FET small signal model and explain its operation in detail [6M]
   (b) Explain the concept of Simplified common emitter hybrid model along with circuit diagram [6M]

3. (a) Perform the high frequency analysis of a common drain amplifier [6M]
   (b) Explain various high frequency parameters of a BJT and derive the relation between them. [6M]

4. (a) Derive the expression for input resistance of a Darlington pair circuit. [6M]
   (b) Draw the circuit diagram of RC coupled amplifier and explain its operation in detail [6M]

5. (a) Draw the circuit diagram of a current series feedback amplifier, Derive expressions of input & output impedances, Gain, feedback factor [6M]
   (b) Explain the concept of feedback with block diagram. What are the advantages and disadvantages of negative feedback? [6M]

6. (a) With the help of suitable schematic explain the operation of a Wien Bridge oscillator and derive an expression for its frequency of operation [6M]
   (b) Derive the expression frequency of oscillation and condition for sustained oscillations of a Colpitts oscillator [6M]

7. (a) Explain the operation of class B push-Pull power amplifier along with circuit diagram [6M]
   (b) What is a cross over distortion and explain a remedy for it [6M]

***

Narasaraopeta Engineering College (Autonomous)

Kotappakonda Road, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: R16EC2203

II B.Tech II Semester Supple Examinations, March-2022
PULSE AND DIGITAL CIRCUITS
(ECE)

Time: 3 hours   Max Marks: 60

Question Paper Consists of Part-A and Part-B.
Answering the question in Part-A is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) Show that RC network can act as a differentiator
   (b) Define Storage time and Transition time of a diode?
   (c) Explain the important characteristics of logic families
   (d) Define multivibrator and explain the types of multivibrator
   (e) Describe any two applications of monostable multivibrator
   (f) Explain the important operating principles of sampling gates

                                                        [2+2+2+2+2+2]

PART-B

                                                        4 X 12 = 48

2   (a) Discuss the response of High Pass RC circuit for step, pulse, and ramp input.
    Obtain an expression for the time constant?   [6]

    (b) Establish the relationship between the tilt and time constant for High Pass RC circuit.
    Determine the lower 3dB frequency in terms of percentage tilt?   [3]

    (c) If a square wave of 10KHz is applied to High Pass circuit and the resultant waveform
measured on CRO was tilted from 20V to 12V, determine the lower 3dB frequency of High
Pass circuit?   [3]

3. (a) Draw the circuit diagram of emitter coupled clipper. Draw its transfer characteristics
indicating all intercepts, slopes and voltage levels. Derive with necessary equations?   [8]

    (b) Design a diode clamper circuit to clamp the positive peaks of the input signal at zero level.
The frequency of the input signal is 100 Hz.   [4]

4. (a) Mathematically explain how transistor can be used as a switch   [6]
   (b) Compare RTL, DCTL, TTL, ECL, CMOS logic families.   [6]

5. (a) With neat circuit diagram and wave forms, explain the working of a collector coupled
    Monostable Multivibrator   [6]

    (b) A fixed bias Bi-stable multivibrator circuit uses a DC supply of ±10 V, R_C=2kΩ, R_1=10kΩ
and R_2=47kΩ. NPN silicon transistor with V_{CE}(sat) = 0.1 V, V_{BE} (sat) = 0.6V and h_{FE} (min)=30 are
used   [6]
i. Draw the circuit diagram and show the stable state currents assuming that transistor Q1 is OFF
and Q2 is ON.
ii. Calculate all currents and voltages and verify the device states.

6. (a) Explain the operation of a Schmitt Trigger circuit with the help of neat sketch and how it can be used as a comparator. [6]

(b) Design an Astable multivibrator to produce an unsymmetrical square waveform of duration $T_A = 600\mu s$ and $T_B = 500\mu s$. The square wave amplitude is 10V. Assume hfe(min) = 30, Ic(sat) = 5mA and Vce(sat) = 0V. [6]

7. (a) Explain in detail about transistorized Bootstrap time base generator with neat sketch? [6]

(b) Discuss the recovery time of a sweep circuit. How do you achieve short recovery time? [6]

***

Subject Code: R16EC2204

II B.Tech II Semester Supple Examinations, March-2022
ANALOG COMMUNICATIONS
(ECE)

Time: 3 hours   Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in Part-A is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) What is degree of modulation?
   (b) What are applications of AM systems?
   (c) Compare FM and AM.
   (d) What is pre-emphasis?
   (e) What is self-exited mixer.
   (f) Compare TDM and FDM.

                                                                    [2+2+2+2+2+2]

PART-B

                                                                    4 X 12 = 48

2. (a) Draw and explain block diagram of communication systems.   [6 M]
   (b) Explain square law detection.   [6 M]

3. (a) Explain Balanced modulator and Ring modulator.   [6 M]
   (b) Describe VSB modulation and explain generation of VSB modulation wave. [6 M]

4. (a) Explain Narrow band FM and Wide band FM.   [6 M]
   (b) Explain slope detector and phase locked loop.   [6 M]

5. (a) Explain figure of Merit with derivation.   [6 M]
   (b) Explain noise in DSB & SSB system.   [6 M]

6. (a) Explain phase modulated FM transmitter.   [6 M]
   (b) Explain super heterodyne receiver with block diagram.   [6 M]

7. (a) Explain generation and demodulation of PAM wave.   [6 M]
   (b) Explain FDM with block diagram, mention advantages and disadvantages. [6 M]

***

Subject Code: R16EC2205

II B.Tech II Semester Supple Examinations, March-2022
ELECTROMAGNETIC WAVES AND TRANSMISSION LINES
(ECE)

Time: 3 hours   Max Marks: 60

Question Paper Consists of Part-A and Part-B.
Answering the question in Part-A is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) Write the Poisson's and Laplace equations
(b) State Ampere's circuit law
(c) Define Displacement Current Density in detail
(d) Write the applications of Poynting theorem.
(e) What is meant by Total Internal Reflection?
(f) What is the expression for propagation constant in terms of Zoc and Soc.

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) State and explain Coulomb's law. Obtain an expression in vector form
(b) State Gauss's law. Using divergence theorem and Gauss's law, relate the fulx density D to the volume charge density ρ_v. [6+6]

3. (a) Explain the concept of Magnetic vector potential
(b) Derive an expression for magnetic field strength, H, due to a current carrying conductor of finite length placed along the y-axis, at a point in x-z plane and 'r' distant from the origin. Hence deduce expressions for H due to semi-infinite length of the conductor. [6+6]

4. (a) Write Maxwell's equations in different final forms and in word Statements
(b) Explain the concept of Faraday's Law along with one example [6+6]

5. (a) Define uniform plane wave. Prove that uniform plane wave does not have field component in the direction of propagation
(b) Find the relations between E and H in a uniform plane wave. Find the value of intrinsic impedance of free space [6+6]

6. (a) Define Brewster angle and Critical angles. State where these are required
(b) A plane wave travelling in free space has an average Poynting vector of 10 Watts/m2 . Find the average energy density [6+6]

7. (a) For a transmission line, Define the reflection coefficient and derive the expression for the input impedance of in terms of reflection coefficient
(b) A transmission line in which no distortion is present has the following parameters Z0 = 60Ω, α = 20m NP/m, ß = 0.7rad/sec. Determine R,L,G,C and wavelength at 0.1 GHz. [6+6]

***

Narasaraopeta Engineering College (Autonomous)

Kotappakonda Road, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: R16EC2206

II B.Tech II Semester Supple Examinations, March-2022
DATABASE MANAGEMENT SYSTEMS
(ECE)

Time: 3 hours   Max Marks: 60

Question Paper Consists of Part-A and Part-B.
Answering the question in Part-A is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) What is data in dependancy?
(b) Define the term entity?
(c) List out various DML operations with an example to each.
(d) What do you mean by Assertions.
(e) What is functional dependency?
(f) What is Locking?

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) Explain the main components in DBMS and briefly explain what they do?   [6]
(b) Draw and explain the detailed architecture of DBMS.   [6]

3. (a) Develop an ER – diagram for a hospital with a set of patients and a set of medical doctors,
associated with each patient a log of the various tests and examination conducted.   [6]
(b) What is relation? Differentiate relation schema and relation instance.   [6]

4. Explain the following operations in SQL with an example to each: [12]
i) grouping ordering   ii) ordering   iii) Except   iv) Exist

5. (a) a) Explain in detail about various key constraints used in database system.   [6]
(b) Explain the importance of Null values in Relational Model.   [6]

6. (a) What is meant by the closure of functional dependencies? Illustrate with an example. [6]
(b) State 1NF, 2NF & 3NF and explain with examples.   [6]

7. (a) Discuss in detail about cluster and Multilevel indexes.   [6]
(b) Explain in detail about timestamp based concurrency control techniques.   [6]

***

Subject Code: R16CS2201

II B.Tech II Semester Supple Examinations, March-2022
STATISTICAL PROGRAMMING WITH R
(CSE)

Time: 3 hours   Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B.**
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) Write about mean and the variance of a probability distribution.
   (b) Define population and sample.
   (c) Explain the process of adding and deleting rows and columns of a matrix in R.
   (d) Write about any two Boolean operators in R.
   (e) Write test statistic for paired t-test.
   (f) Explain any two math functions in R.

                                                        [2+2+2+2+2+2]

PART-B

                                                        4 X 12 = 48

2. (a) Explain exponential distribution with an example.
   (b) Fit a Poisson distribution with the following data.

X	0	1	2	3	4	5
F	142	156	69	27	5	1

3. (a) Write about NULL and alternative hypotheses.
   (b) What is Central Limit Theorem? Explain its uses with an example.

4. (a) What is a vector in R? Explain operations on vectors.
   (b) What is a list? Explain operations on lists with suitable examples.

5. (a) Describe Binary search implementation using recursion.
   (b) Discuss about loops in R programming with examples.

6. (a) What is ANOVA? Explain with examples.
   (b) Explain about paired two-sample T-Test with example.

7. (a) Describe linear algebra operations on vectors and matrices.
   (b) Explain functions for accessing the keyboard and monitor, reading and writing files.

                            ***

NEC

Subject Code: R16CS2202

II B.Tech II Semester Supple Examinations, March-2022
OPERATING SYSTEMS
(CSE)

Time: 3 hours   Max Marks: 60

Question Paper Consists of Part-A and Part-B.

Answering the question in Part-A is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) List any two *operating systems* and briefly discuss.
   (b) Distinguish *process* and *thread*.
   (c) What is *semaphore*?
   (d) What is *virtual memory*?
   (e) Explain resource allocation graph.
   (f) What is *file*? List file attributes.

                                                              [2+2+2+2+2+2]

PART-B

                                                          4 X 12 = 48

2. (a) Explain operating system functions   6M
   (b) Discuss structures of operating systems — — -   6M

3. (a) Illustrate *FCFS* and *SJF* CPU scheduling algorithms 6M
   (b) Explain *Multi thread Programming Models*.   M

4. (a) What is *Critical-Section Problem*? Illustrate *Peterson's Solution for Critical-Section*. 6M
   (b) Explain *Bounded buffer* problem.   6M

5. (a) What are the advantages of *paging*? Explain *simple paging* Memory allocation. 6M
   (b) Illustrate *FIFO* and *optimal page replacement* algorithms 6M.

6. (a) What is *deadlock*? What are the necessary and sufficient conditions for occurrence
   of *deadlock*?   6M
   (b) Explain *banker's algorithm* for Deadlock avoidance. 6M

7. (a) Explain various *file access methods*.   6M
   (b) Explain *disk Scheduling algorithms*   6M

***

Subject Code: R16CS2203

II B.Tech II Semester Supple Examinations, March-2022
FRONT END WEB TECHNOLOGIES
(CSE)

Time: 3 hours   Max Marks: 60

Question Paper Consists of Part-A and Part-B.
Answering the question in Part-A is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) Write about the attributes of anchor element in HTML.
   (b) Describe the use of list-style-type property in CSS.
   (c) Write the process of object creation in JavaScript.
   (d) Define XSLT and write its uses.
   (e) Write the advantages of using jQuery.
   (f) What is jQuery UI?

                                                            [2+2+2+2+2+2]

PART-B

                                                            4 X 12 = 48

2. (a) Explain ordered, unordered lists and nested lists in HTML with suitable examples.   [6]
   (b) Explain in detail about HTML5 Semantic elements.   [6]

3. (a) Compare and contrast internal CSS with external CSS through examples.   [6]
   (b) Describe differences between ID selector and Class selector in CSS.   [6]

4. (a) Explain about Control statements used in JavaScript with examples.   [6]
   (b) Write and explain different types of events used in JavaScript?   [6]

5. (a) Write the code to create a XML Schema file for Online Bookstore (with book details like title, author and price) and attach to a XML file.   [6]
   (b) What is DTD? Explain types of DTDs with examples.   [6]

6. (a) Describe event wrapper methods in JQuery with examples.   [6]
   (b) Write about filter() and slice() methods in JQuery.   [6]

7. (a) Show the use of Accordion and Date Picker in JQuery with help of an example.   [6]
   (b) Write about draggable() and droppable() in JQuery UI.   [6]

***

Subject Code: R16CS2204

II B.Tech II Semester Supple Examinations, March-2022
DATABASE MANAGEMENT SYSTEMS
(CSE)

Time: 3 hours   Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. a) Define the following terms: data, database, DBMS, database system.
   (b) What is an entity type? What is an entity set?
   (c) What is the difference between a key and a superkey?
   (d) What is referential integrity?
   (e) What are the various states of a transaction?
   (f) Write short notes on heap file organization.

                                                        [2+2+2+2+2+2]

PART-B

                                                        4   X 12 = 48

2. (a) Discuss the main characteristics of the database approach and how it differs from traditional file systems?   [6]
   (b) Illustrate 3-schema architecture of the database system.   [6]

3. (a) Design an E-R diagram for Employee database with atleast four entities and considering all constraints.   [6]
   (b) Explain Insert, Delete and Update operation in SQL with examples.   [6]

4. (a) Explain grouping and aggregate operators in SQL with examples.   [6]
   (b) Write about user defined and system defined exceptions in PL/SQL.   [6]

5. (a) State the informal guidelines for relational schema design?   [6]
   (b) Define First, Second and Third normal forms by taking an example.   [6]

6. (a) Discuss the atomicity, durability, isolation, and consistency preservation properties of a database transaction.   [6]
   (b) Briefly discuss 2-Phase locking protocol in concurrency control.   [6]

7. (a) Explain internal hashing and external hashing on disk files.   [6]
   (b) What are the differences among primary, secondary, and clustering indexes? [6]

***

Subject Code: R16CS2205

II B.Tech II Semester Supple Examinations, March-2022
SOFTWARE ENGINEERING
(CSE)

Time: 3 hours

Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in Part-A is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

PART-A

1. (a) What are the various categories of software products?
   (b) What are the different types of requirements?
   (c) What is the purpose of software design?
   (d) Define error, fault and failure with suitable examples.
   (e) What is Project Management?
   (f) What are the various software quality factors?

   [2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) Discuss notable characteristics of software.   [6]
   (b) Illustrate generic representation of process model.   [6]

3. (a) What are the different types of requirements? Explain briefly the purpose and characteristics
       of each type of requirement.   [6]
   (b) Differentiate structured analysis and object-oriented analysis with suitable examples.   [6]

4. (a) Enumerate the characteristics of good software design.   [6]
   (b) Differentiate transform analysis and transaction analysis for structured design with suitable
       examples.   [6]

5. (a) Explain coding principles with suitable examples.   [6]
   (b) Describe the testing process.How testing and debugging processes connected to each other.[6]

6. (a) List various success and failure factors in a software project.   [6]
   (b) Explain COCOMO algorithmic Cost Model.   [6]

7. (a) What are the five levels of Capability Maturity Model? Discuss each level.   [6]
   (b) Define software maintenance. What are the various categories of software maintenance? [6]

***