## IV B.Tech I Semester Supple. Examinations, April-2023

**Sub Code: 19BCE7TH01    ESTIMATION SPECIFICATIONS AND COSTING**

Time: 3 hours                                        (CE)                          Max. Marks: 60

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks   (5 X 12 = 60M)

| Q.No | | | Questions | KL | CO | M |
|---|---|---|---|---|---|---|
| 1 | a | | **Unit-I** | | | |
| | | i) | Identify the recommendations for degree of accuracy on measurements. | K2 | CO1 | 6M |
| | | ii) | Mention the units of measurement for Steel reinforcement, plastering, flooring and painting | K3 | CO1 | 6M |
| | | | OR | | | |
| | b | i) | Discuss briefly the data required for approximate estimation? | K2 | CO1 | 6M |
| | | ii) | List the differences between the detailed and Abstract estimates? | K2 | CO1 | 6M |
| 2 | a | | **Unit-II** | | | |
| | | | Discuss the method of estimation for a framed RCC building with a suitable example. | K3 | CO2 | 12M |
| | | | OR | | | |
| | b | i) | Determine the methods to be adopted to calculate the volume. | K2 | CO2 | 6M |
| | | ii) | List the factors that affect the estimation of the final cost of the building. | K2 | CO2 | 6M |
| 3 | a | | **Unit-III** | | | |
| | | i) | Calculate the quantity of earthwork for the construction of an approach road length = 1 km, width of formation = 10 m, Height of embankment = 60 cm, side slope = 1:2 | K3 | CO3 | 6M |
| | | ii) | Describe in detail about rate analysis for canal work. | K2 | CO3 | 6M |

**Unit-III**

*(continued)*

| 3 | b | | | K4 | CO3 | 6M |
|---|---|---|---|---|---|---|

i) Estimate the cost of earthwork for a portion of a road from the following data. The road width at the formation surface is 8m. Side slopes 2:1 in banking and 1.5:1 in cutting. The length of the chain is 30m.

| Chainage | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 30 |
|---|---|---|---|---|---|---|---|---|---|---|
| Ground level | 71.20 | 71.25 | 70.90 | 71.25 | 70.80 | 70.45 | 70.20 | 70.35 | 69.10 | 69.70 |
| Formation level | 70.00 | | | | Upward gradient of 1in 200 | | | | | |

Take the rates of earthwork as Rs.275/cu.m. in banking and Rs. 350/cu.m. in cutting.

| 3 | b | ii) | Discuss in detail about preparing rate analysis for road works. | K2 | CO3 | 6M |
|---|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| | | Unit-IV | | | |
| 4 | a | i) Find the number of standard modular bricks required for flat brick soling for a one-kilometer length of 4 m wide road. | K3 | CO4 | 6M |
| | | ii) A property fetches a net income of Rs.900.00 deducting all outgoings. Workout the capitalized value of the property if the rate of interest is 6% per annum. | K2 | CO4 | 6M |
| | | OR | | | |
| | b | i) An old building has been purchased by a person at a cost of Rs.30,000/- excluding the cost of the land. Evaluate the amount of the annual sinking fund at 4% interest assuming the future life of the building as 20 years and the scrap value of the building as 10% of the cost of purchase. | K4 | CO4 | 6M |
| | | ii) Explain in detail about various methods of Valuation | K2 | CO4 | 6M |
| 5 | | Unit-V | | | |
| | a | i) Elaborate about 'out turn of works'? | K2 | CO5 | 6M |
| | | ii) Explain the detailed estimate for the 1st Class Brickwork in the foundation of work given in Fig-1. | K4 | CO5 | 6M |
| | | OR | | | |
| | b | i) Discuss the important particulars in tender documents and describe them? | K2 | CO5 | 6M |
| | | ii) Explain the Detailed Estimate for the 1st Class Brickwork in the Super Structure of work given in Fig-1. | K4 | CO5 | 6M |

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome    M:Marks

**SECTION ON ABCD**

**PLAN**

Fig. 1

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3

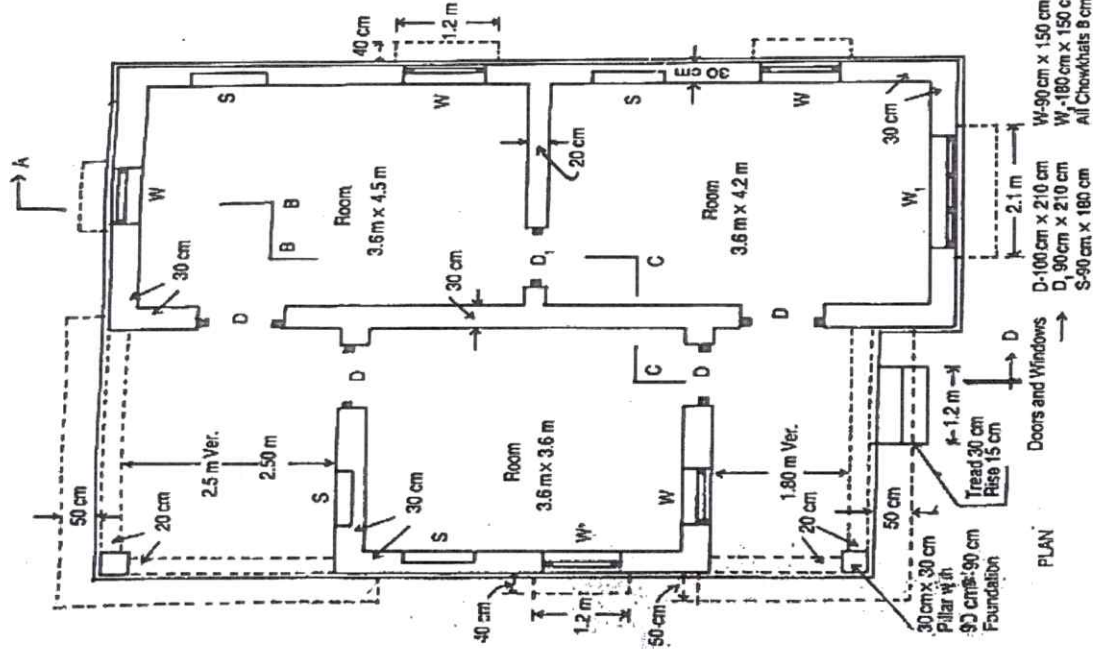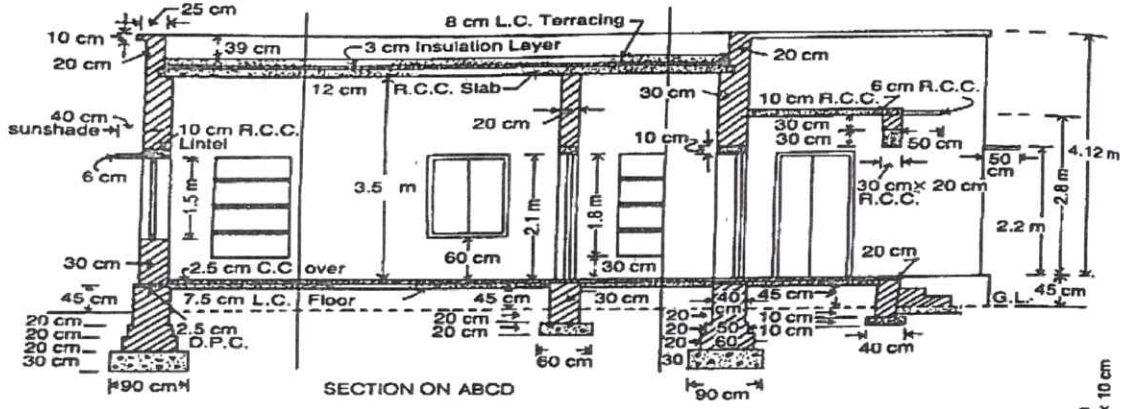## IV B.Tech I Semester Supple. Examinations, April-2023

**Sub Code: 19BCE7TH02**     **ENVIRONMENTAL ENGINEERING**

Time: 3 hours                                    (CE)                    Max. Marks: 60

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks   (5 X 12 = 60M)

| Q.No | | Questions | KL | CO | M |
|---|---|---|---|---|---|
| | | **Unit-I** | | | |
| 1 | a | i) List the roles of environmental engineer | K2 | C01 | 6M |
| | | ii) The population for a certain town is given below. Find out the population in the years 2020 and 2030 by the geometrical increase method. | K3 | C01 | 6M |
| | | OR | | | |
| | b | i) Discuss in detail the population forecasting methods. | K2 | C01 | 6M |
| | | ii) Define Water demand and types of water demand. What are the factors affecting water demand? | K2 | C01 | 6M |
| | | **Unit-II** | | | |
| 2 | a | Explain the various joints used in water supply pipes. Describe any two with neat sketches. | K2 | C02 | 12M |
| | | OR | | | |
| | b | i) Explain any two types of intakes using detailed illustrations. | K3 | C02 | 6M |
| | | ii) List of factors governing the selection of the intake structure. | K2 | C02 | 6M |
| | | **Unit-III** | | | |
| 3 | a | i) Discuss the physical, and chemical characteristics of water. Mention the standards for potable water. | K2 | C03 | 6M |
| | | ii) List the different types of water pollution? And explain them briefly | K2 | C03 | 6M |
| | | OR | | | |
| | b | i) Explain the biological characteristics of water? | K2 | C03 | 6M |
| | | ii) Explain the specifications for drinking water quality standards as per Indian standards. | K2 | C03 | 6M |
| | | **Unit-IV** | | | |
| 4 | a | i) Explain the mechanism of flocculation and coagulation | K2 | C04 | 6M |
| | | ii) Briefly discuss the different kinds of pipe materials and pipe joints used for water distribution? | K2 | C04 | 6M |
| | | OR | | | |
| | b | i) Explain the concept of disinfection and its methods | K2 | C04 | 6M |
| | | ii) Discuss the standard procedure for the operation and maintenance of reverse Osmosis units. | K2 | C04 | 6M |
| | | **Unit-V** | | | |
| 5 | a | i) Explain the mechanism of flocculation and coagulation | K2 | C05 | 6M |
| | | ii) Discuss the concept of layouts of Distribution networks. | K2 | C05 | 6M |
| | | OR | | | |
| | b | i) Explain the various components of water distribution | K2 | C05 | 6M |
| | | ii) Analysis of Distribution networks | K2 | C05 | 6M |

Population table (Q1 a ii):

| Year | 1970 | 1980 | 1990 | 2000 | 2010 |
|---|---|---|---|---|---|
| Population | 75,000 | 1,10,000 | 1,50,000 | 2,00,000 | 2,42,000 |

KL: Blooms Taxonomy Knowledge Level  CO: Course Outcome     M:Marks

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### IV B.Tech I Semester Supple. Examinations, April-2023

**Sub Code: 19BCE7PE07**  **PRESTERESSED CONCRETE**

Time: 3 hours  (CE)  Max. Marks: 60

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks  (5 X 12 = 60M)

| Q.No | | | Questions | KL | CO | M |
|---|---|---|---|---|---|---|
| | | | **Unit-I** | | | |
| 1 | a | | i) Explain about the assumptions made in the design of pre-stressed concrete members. | K1 | CO 1 | 6M |
| | | | ii) Mention the basic difference between mild steel, high yield strength deformed steel and high tension steel? | K2 | CO 1 | 6M |
| | | | **OR** | | | |
| | b | | i) Mention the basic difference between mild steel, high yield strength deformed steel and high tension steel? | K1 | CO 1 | 6M |
| | | | ii) Explain with neat sketches, Fressinet system of post tensioning. | K2 | CO 1 | 6M |
| | | | **Unit-II** | | | |
| 2 | a | | Explain about the post - tensioning systems and their limitations. | | | 12M |
| | | | **OR** | | | |
| | b | | i) State and explain the various losses of pre-stress in pre-tensioned and post-tensioned members. | K3 | CO2 | 6M |
| | | | ii) Explain about the Freyssinet system of prestressing concrete members with neat sketches. | K3 | CO2 | 6M |
| | | | **Unit-III** | | | |
| 3 | a | | i) A Prestressed pretensioned beam of 200mm wide and 300mm deep is used over an span of 10m is prestressed with a wires of area 300mm$^2$ at an eccentricity of 60mm carrying a prestress of 1200 N/mm$^2$ Find the percentage of loss of stress, Ec= 35kN/mm$^2$ Shrinkage of concrete = 300 x 10$^{-6}$ , creep coefficient =1.6 | K3 | CO2 | 8M |
| | | | ii) Explain shrinkage of concrete in PSC members. | K3 | CO2 | 4M |
| | | | **OR** | | | |
| | b | | A post tensioned cable of a beam 10 m long is initially tensioned to a stress of 1200 N/mm$^2$ at one end. If the tendons are curved so that the slope is 1 in 12 at each end with an area of 600 mm$^2$, calculate the loss of prestress due to friction, given the following data: coefficient of friction between duct and cable = 0.55, friction coefficient for wave effect is 0.0015/m. During anchoring if there is a slip of 3mm at the jacking end, calculate the final force in the cable and the percentage loss of prestress due to friction and slip. Es=210 kN/mm$^2$. | K3 | CO3 | 12M |
| | | | **Unit-IV** | | | |
| 4 | a | | i) A pre tensioned T- section has a flange which is 300mm wide 200mm thick .the rib is 150 mm wide by 350 mm deep. the effective depth of the cross section is 500mm. Given Fp=1600 N/mm$^2$, Estimate the ultimate moment capacity of the T-section  using the Indian standard code provisions | K3 | CO4 | 12M |

| | | | | | |
|---|---|---|---|---|---|
| | | OR | | | |
| | b | A post tensioned bridge girder with unbounded tendons is of base section of overall dimensions 1200 mm wide by 1800 mm deep with wall thickness of 150 mm. The high tensile steel has an area of 4000 mm$^2$ and its located at an effective depth of 1600 mm. The effective prestress in steel after loss is 1000 N/mm$^2$ and the effective span of the girder is 24m. if Fck=40 N/mm$^2$ and Fp= 1600 N/mm$^2$ . Estimate the ultimate flexural strength of the section. | K3 | CO4 | 12M |
| 5 | | Unit-V | | | |
| | a | i) How do you estimate the ultimate shear strength of PSC sections with flexure shear cracks? | K2 | CO5 | 4M |
| | | ii) The support section of prestressed concrete beam, 100 mm wide by 250 mm deep, is BT1 required to support an ultimate shear force of 80 KN. The compressive prestress at the centroidal axis is 5 N/mm$^2$. The characteristic cube strength of concrete is 40 N/mm$^2$. The cover to the reinforcement is 50 mm. if the characteristic tensile strength of stirrups is 415 N/mm$^2$, design suitable shear reinforcement in the section using IS code recommendations. | K3 | CO5 | 8M |
| | | OR | | | |
| | b | i) Define End block. What is the transmission length? | K2 | CO5 | 6M |
| | | ii) Explain with sketches the effect of varying the ratio of depth anchorage to the depth of end block on the distribution of bursting tension. | K2 | CO5 | 6M |

KL: Blooms Taxonomy Knowledge Level  CO: Course Outcome    M:Marks

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# NARASARAOPETA ENGINEERING COLLEGE
## (AUTONOMOUS)

## IV B.Tech I Semester Supple. Examinations, April-2023

**Sub Code: 19BCE7PE12    PHOTOGRAMMETRY AND REMOTE SENSING**

Time: 3 hours                                     (CE)                     Max. Marks: 60

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks   (5 X 12 = 60M)

| Q.No | | | Questions | KL | CO | M |
|---|---|---|---|---|---|---|
| | | | **Unit-I** | | | |
| 1 | a | | i) Define photogrammetry. List the applications of photogrammetry. | K1 | 1 | 5M |
| | | | ii) The distance between two points measures 24.62 mm on a map whose scale is 1/24000. The distance between the same two points appearing on a vertical aerial photograph measures 32.05 mm. What is the scale of the photograph? If the focal length of the camera lens is 152.4 mm, what is the flying height above the ground in metres? | K4 | 1 | 7M |
| | | | **OR** | | | |
| | b | | i) Distinguish between maps and aerial photographs. | K2 | 1 | 5M |
| | | | ii) A and B are two camera stations 200m apart. Stereo-pairs were taken with optical axis at right angles to the camera baseline. In the photograph exposed at A, a point P was found to be 20 mm to the right and 8 mm above the crosslines. The same point was 32 mm to the left and 12 mm above the cross lines in the photograph taken from B. If the focal length of the camera lens was 180 mm, find the coordinates of P with respect to origin at A. | K5 | 1 | 7M |
| | | | **Unit-II** | | | |
| 2 | a | | An area of $100 \times 100$ km$^2$ is to be surveyed by aerial photographs. The following data is available: Focal length of camera = 200 mm; least count of interval meter = 0.5 s; size of photograph = $200 \times 200$ mm; average scale of photograph = 1:15000; average elevation of terrain = 400m; longitudinal overlap = 60%; side overlap = 30%; velocity of aircraft = 300 km/h. Determine (i)Flying height; (ii) Spacing of flight lines; (iii)Ground distance between exposure; (iv) Exposure interval; (v) Number of photographs required. | K3 | 2 | 12M |
| | | | **OR** | | | |
| | b | | i) Define the following terms: altitude; exposure station; tilt and tip; principal point; plumb point; oblique photograph | K1 | 2 | 6M |
| | | | ii) Discuss the procedure to evaluate the ground length from tilted photographs. | K2 | 2 | 6M |

| | | | KL | CO | M |
|---|---|---|---|---|---|
| | | **Unit-III** | | | |
| 3 | a | i) What is aero triangulation? Briefly explain the different types of aero triangulation. | K1 | 2 | 6M |
| | | ii) A photographic survey was carried out to a scale of 1:20000. Find the error in the height where given that there is an error of 0.15 mm in measuring the parallax of the point. Given, f = 200 mm, size of photograph is 250×250 mm and overlap is 60%. | K4 | 2 | 6M |
| | | **OR** | | | |
| | b | i) Define stereoscopic vision? Differentiate between lens and mirror stereoscope. | K2 | 1 | 6M |
| | | ii) In a pair of overlapping vertical photographs, the base distance B = 600 m. If the altitude of the horizontal flight was 750 m above the mean sea level, what will be the height of chimney, if its base is 200 m above the mean sea level and the difference of parallax between its top and bottom is 12.8 mm? Given that the focal length of the camera was 180 mm. | K4 | 2 | 6M |
| 4 | | **Unit-IV** | | | |
| | a | i) Atmospheric Windows are useful in Remote Sensing. Why? | K1 | 3 | 4M |
| | | ii) What are the general processes involved in electromagnetic remote sensing? | K2 | 3 | 8M |
| | | **OR** | | | |
| | b | i) Define Scattering? Explain Rayleigh and Mie scattering. | K2 | 3 | 4M |
| | | ii) What are the different types of resolutions used as parameters of sensor? | K1 | 4 | 8M |
| 5 | | **Unit-V** | | | |
| | a | i) Differentiate between along-track and across-track scanning. | K2 | 4 | 6M |
| | | ii) Write a note on land use/ land cover classification and analysis. | K2 | 5 | 6M |
| | | **OR** | | | |
| | b | i) Write a brief note on different types of platforms. | K1 | 4 | 6M |
| | | ii) Enumerate the applications of remote sensing in the water resources management. | K2 | 5 | 6M |

KL: Blooms Taxonomy Knowledge Level          CO: Course Outcome          M:Marks

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## IV B.Tech I Semester Supple. Examinations, April-2023

**Sub Code: 19BEE7TH01**  **SWITCHGEAR AND PROTECTION**

Time: 3 hours  (EEE)  Max. Marks: 60

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks (5 X 12 = 60M)

| Q.No | | Questions | KL | CO | M |
|---|---|---|---|---|---|
| | | **Unit-I** | | | |
| | a | i) Describe the essential properties of arc by drawing the static and dynamic characteristics? | 2 | 1 | 6M |
| | | ii) Derive the expression for re-striking voltage transient of a circuit breaker? | 3 | 1 | 6M |
| 1 | | **OR** | | | |
| | b | i)List out and explain the ratings of circuit breaker by drawing short circuit current wave? | 2 | 1 | 6M |
| | | ii) In a system having 220kV, the line to ground capacitance 0.034 micro farads, inductance 4.7H. Find the voltage appearing across pole of circuit breaker if a magnetizing current of 6.9 instantaneous, is interrupted. Determine also the value of resistance to be used across the contacts to eliminate the re-striking voltage? | 3 | 1 | 6M |
| | | **Unit-II** | | | |
| | a | i) Draw the characteristics and compare various types of over current relays? Write their applications? | 2 | 2 | 6M |
| | | ii) List out the components used for the operation of static relays? Explain the role of each component. | 2 | 2 | 6M |
| 2 | | **OR** | | | |
| | b | i) Compare the operational differences of differential relay and percentage differential relays with characteristics? | 2 | 2 | 6M |
| | | ii)Develop and explain the characteristics of impedance and reactance relays? | 2 | 2 | 6M |
| | | **Unit-III** | | | |
| | a | i) Draw the circuit diagram and explain the protection of inter turn faults of the generator? | 2 | 3 | 6M |
| | | ii) Describe with the help of neat diagram, the connections of differential protection of a transformer. A three phase 33/6.6kV star delta connected transformer is protected by differential system, the CTs on the low voltage side are having the ratio of 400/5A. Find the CTs ratio on the high voltage side? | 3 | 3 | 6M |
| 3 | | **OR** | | | |
| | b | i) With the help of neat diagram, explain the operation of gas actuated relays used for transformer protection? | 2 | 3 | 6M |
| | | ii) A 3 phase 16MVA, 6.6kV generator is delivering a load of 9MW at 0.86 power factor. Find the value of neutral resistance if 14% of the winding is un protected. The relay setting is 16% and the per phase reactance is 8%? | 3 | 3 | 6M |
| 4 | | **Unit-IV** | | | |
| | a | i) Draw the diagram and explain the time graded system of transmission line protection and write its draw backs? | 2 | 4 | 6M |
| | | ii) Draw the circuit diagram and explain the protection of bus bars by using the differential relay? | 2 | 4 | 6M |

| | | | | | |
|---|---|---|---|---|---|
| | | OR | | | |
| | b | i) Draw the diagram and explain the current graded system of transmission line protection and write its draw backs? | 2 | 4 | 6M |
| | | ii) Elaborate the features and operational advantages of carrier current protection system? | 2 | 4 | 6M |
| 5 | | Unit-V | | | |
| | a | i) What is meant by insulation co-ordination? Explain with relevant characteristics? | 2 | 5 | 6M |
| | | ii) Compare the un grounded and grounded neutral systems with phasor diagrams? | 2 | 5 | 6M |
| | | OR | | | |
| | b | i) Draw the diagram and explain the operational characteristics of valve type lightning arrester? | 2 | 5 | 6M |
| | | ii) A 220kV, 3 phase 50Hz transmission line of 212km length consists of three conductors of effective diameter 18mm arranged in equilateral triangular shape with 4.5m spacing and regularly transposed. Find the inductance and kVA rating of the arc suppression coil of the system? | 3 | 53 | 6M |

KL: Blooms Taxonomy Knowledge Level    CO: Course Outcome M:Marks

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**IV B.Tech I Semester Supple. Examinations, April-2023**

Sub Code: 19BEE7TH02     **POWER SYSTEM OPERATION AND CONTROL**

Time: 3 hours                           (EEE)               Max. Marks: 60

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks   (5 X 12 = 60M)

| Q.No | | Questions | KL | CO | M |
|---|---|---|---|---|---|
| | | **Unit-I** | | | |
| 1 | a | i) Draw incremental fuel cost curve and explain it. | K3 | CO1 | 4M |
| | | ii) A constant load of 250 MW is supplied by two 200 MW generators, for which the respective incremental fuel costs are : $$\frac{dC_1}{dP_1} = 0.1P_1 + 25$$ $$\frac{dC_2}{dP_2} = 0.12P_1 + 10$$ with power $P_G$ in MW and costs C in Rs/hr. Determine (i) The most economical division of load between the generators. (ii) The saving in Rs/ day there by obtained compared to equal load sharing between two generators. | K4 | CO1 | 8M |
| | | **OR** | | | |
| | b | i) Derive the expression for general transmission line loss formula. | K4 | CO1 | 8M |
| | | Ii) What is penalty factor? Explain its significance. | K3 | CO1 | 4M |
| | | **Unit-II** | | | |
| 2 | a | A two-plant system having a steam plant near the load centre and a hydro plant at a remote location. The load is 520MW for 15 hrs a day and 330 MW, for 9 hrs a day. The characteristics of the units are $$C_1 = 120 + 45P_{GT} + 0.075P_{GT}^2 \text{ hr}$$ $$W_2 = 0.6P_{GH} + 0.00283P_{GH}^2 \text{ m}^3/\text{sec}$$ Loss co-efficient, $B_{22} = 0.001$ MW$^{-1}$ Find the generation schedule, daily water used by hydro plant and daily operating cost of thermal plant for $y_j = 80$ Rs./ m3-hr | K4 | CO2 | 12M |
| | | **OR** | | | |
| | b | i) Explain the constraints for Unit Commitment solution method. | K2 | CO2 | 6M |
| | | ii) What are the advantages of dynamic programming method? | K3 | CO2 | 6M |
| | | **Unit-III** | | | |
| 3 | a | i) Develop the mathematical modelling of speed governing system. | K4 | CO3 | 6M |
| | | ii) Describe the necessity of keeping frequency constant. | K3 | CO3 | 6M |
| | | **OR** | | | |
| | b | Describe clearly about proportional plus integral load frequency control system with a block diagram. | K4 | CO3 | 12M |
| | | **Unit-IV** | | | |
| 4 | a | Explain the load frequency control of a two area system and develop its block diagram. | K4 | CO4 | 12M |
| | | **OR** | | | |
| | b | i) Discuss the importance of combined load frequency control and economic dispatch control with a neat block diagram. | K2 | CO4 | 6M |
| | | ii) What is meant by tie-line bias control in two area LFC | K3 | CO4 | 6M |

| | | | | | |
|---|---|---|---|---|---|
| | | Unit-V | | | |
| 5 | a | i) What are the objectives of load compensation? Discuss. | K3 | CO5 | 6M |
| | | ii) Explain the classification and need for FACTS controllers with applications. | K3 | CO5 | 6M |
| | | OR | | | |
| | b | i) What are the specifications of a load compensator? | K3 | CO5 | 6M |
| | | ii) Explain the effect of series compensation on the transmission line performance. | K4 | CO5 | 6M |

KL: Blooms Taxonomy Knowledge Level       CO: Course Outcome     M:Marks

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# NARASARAOPETA ENGINEERING COLLEGE
## (AUTONOMOUS)

IV B.Tech I Semester Supple Examinations, April-2023

Sub Code: 19BEE7TH03   BUSINESS MANAGEMENT CONCEPTS FOR ENGINEERS

Time: 3 hours                                                                         Max. Marks: 60

Note: Answer All FIVE Questions.
All Questions Carry Equal Marks   (5X12=60M)

| Q.No | | Questions | Marks |
|---|---|---|---|
| | | **Unit - I** | |
| 1 | a | Define demand. Explain the determinants of demand. | [12M] |
| | | OR | |
| | b | Discuss various kinds of elasticity demand. | [12M] |
| | | **Unit - II** | |
| 2 | a | Analyse the features of oligopolistic competition | [12M] |
| | | OR | |
| | b | Illustrate the principles of double entry | [12M] |
| | | **Unit - III** | |
| 3 | a | Explain the concept of management. Discuss the importance of it. | [12M] |
| | | OR | |
| | b | Distinguish between Theory X and Theory Y | [12M] |
| | | **Unit – IV** | |
| 4 | a | Explain the concept of Human Resource Management. Discuss the functions of HRM | [12M] |
| | | OR | |
| | b | Discuss the functions of Financial Management with suitable examples. | [12M] |
| | | **Unit – V** | |
| 5 | a | Distinguish between PEMT and CPM | [12M] |
| | | OR | |
| | b | Draw a network diagram. | [12M] |

| Activity | Pre-decision | Duration (Weeks) | | |
|---|---|---|---|---|
| | | a | m | b |
| A | – | 1 | 2 | 3 |
| B | – | 2 | 2 | 8 |

| | | | | |
|---|---|---|---|---|
| C | A | 6 | 7 | 8 |
| D | B | 1 | 2 | 3 |
| E | A | 1 | 4 | 7 |
| F | C, D | 1 | 5 | 9 |
| G | C, D, E | 1 | 2 | 3 |
| H | F | 1 | 2 | 9 |

i) Construct the project network.

ii) Find the critical path and the expected project completion time.

iii) Find the expected duration of the project.

### IV B.Tech I Semester Supple. Examinations, April-2023

**Sub Code: 19BEE7PE07**     **ELECTRICAL AND HYBRID VEHICLES**

Time: 3 hours                                       (EEE)                          Max. Marks: 60

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks   (5 X 12 = 60M)

| Q.No | | | Questions | KL | CO | M |
|---|---|---|---|---|---|---|
| | | | Unit-I | | | |
| 1 | a | | i) Explain different mathematical components of vehicle motion dynamics | K2 | 1 | 4M |
| | | | ii) Explain the working of Electric vehicle with neat diagram and explain its components in brief | K3 | 1 | 8M |
| | | | OR | | | |
| | b | | i) Explain the significance of Super capacitor and flywheels from the perspective of conventional IC engines and modern day BEVs | K2 | 1 | 6M |
| | | | ii) Differentiate between Battery EV and IC Vehicle in terms of technology used, efficiency and pollution | K4 | 1 | 6M |
| | | | Unit-II | | | |
| 2 | a | | i) Explain the terms in detail: a)Specific Power b)Amp-hour efficiency c)Specific energy d) Battery Life e)Depth of Discharge f) Battery efficiency | K4 | 2 | 6M |
| | | | ii) Differentiate between the Lead-acid Battery and Li-ion Batteries in terms of application and working | K4 | 2 | 6M |
| | | | OR | | | |
| | b | | i) Briefly explain the construction of Lead-acid Battery and list out its features | K4 | 2 | 4M |
| | | | ii) Explain the operation of sodium based batteries | K4 | 2 | 4M |
| | | | iii) Explain the terms in detail: a) Discharge Rate b) Battery Capacity c)State of Charge | K4 | 2 | 4M |
| | | | Unit-III | | | |
| 3 | a | | i) Compare the use of DC and AC machines used in the electric vehicle applications | K4 | 3 | 6M |
| | | | ii) Explain the configuration and control of AC Motor drives in hybrid electric vehicles | K4 | 3 | 6M |
| | | | OR | | | |
| | b | | i) Discuss any two machines from the application perspective of electric vehicles  (a) Brushless DC motor (b) Switched Reluctance motors (c) Induction motors | K4 | 3 | 6M |
| | | | ii) Compare the Speed-Torque characteristics of DC motors and Induction motors for speed control and braking operations in electric vehicle. | K4 | 3 | 6M |
| | | | Unit-IV | | | |
| 4 | a | | i) Discuss different components of tractive force in an electric vehicle | K2 | 4 | 8M |
| | | | ii) Write a short note on sizing the Motor of hybrid vehicles | K4 | 4 | 4M |
| | | | OR | | | |
| | b | | i) Explain the energy flow in a classical battery electric vehicle with a neat block diagram | K4 | 4 | 8M |
| | | | ii) Explain the Importance of Electric Vehicle Drive Train Systems in EHV's | K4 | 4 | 4M |

| | | Unit-V | | | |
|---|---|---|---|---|---|
| 5 | a | i) Explain the Series Parallel configurations in Electric vehicle | K4 | 5 | 6M |
| | | ii) Differentiate between electric vehicle and hybrid electric vehicle with their significance | K4 | 5 | 6M |
| | | OR | | | |
| | b | i) What is the significance of battery sizing in an electric vehicle designing | K4 | 5 | 6M |
| | | ii) Explain the Drive train systems in Hybrid Electrical Vehicle | K4 | 5 | 6M |

KL: Blooms Taxonomy Knowledge Level        CO: Course Outcome    M:Marks

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## IV B.Tech I Semester Supple. Examinations, April-2023

**Sub Code: 19BEE7PE08**  
Time: 3 hours

**POWER QUALITY**  
(EEE)

Max. Marks: 60

Note: Answer All **FIVE** Questions.  
All Questions Carry Equal Marks (5 X 12 = 60M)

| Q.No | | | Questions | KL | CO | M |
|---|---|---|---|---|---|---|
| | | | Unit-I | | | |
| 1 | a | | i) Compare voltage sag, voltage swell, under-voltage and over-voltage from the perspective of power quality, and also explain the concept of point of common coupling. | K2 | 1 | 6M |
| | | | ii) Discuss major power quality issues involved in power system | K3 | 1 | 6M |
| | | | OR | | | |
| | b | | i) Briefly explain about power quality problem evaluation | K2 | 1 | 6M |
| | | | ii) Differentiate between (a) Oscillatory transient and Impulsive transients (b) Blackout and brown out | K4 | 1 | 6M |
| | | | Unit-II | | | |
| 2 | a | | i) Discuss different types of waveform distortions. | K2 | 2 | 6M |
| | | | ii) Define the following terms a) Interharmonics (b) THD and (c) TDD | K2 | 2 | 6M |
| | | | OR | | | |
| | b | | i) Explain different sources of harmonics. | K4 | 2 | 6M |
| | | | ii) Discuss about voltage and current harmonics. | K4 | 2 | 6M |
| | | | Unit-III | | | |
| 3 | a | | i) Discuss the principles of voltage regulation | K4 | 3 | 6M |
| | | | ii) Explain the working of Ferro resonant Transformer | K4 | 3 | 6M |
| | | | OR | | | |
| | b | | Discuss about the following (a) On-line UPS System (b) Static VAR compensator | K4 | 3 | 12M |
| | | | Unit-IV | | | |
| 4 | a | | Explain the following terms (a) STATCOM (b) DVR and (c) UPQC | K2 | 4 | 12M |
| | | | OR | | | |
| | b | | Explain the following terms (a) Solid State Current Limiter (b) Solid State Breaker (SSB) and (c) Solid State Transfer Switch (SSTS) | K4 | 4 | 12M |

| | | Unit-V | | | |
|---|---|---|---|---|---|
| 5 | a | i) Discuss the concept of reclosing and its significance in utility power quality | K4 | 5 | 6M |
| | | ii) Explain the importance of islanding from the perspective of voltage regulation | K4 | 5 | 6M |
| | | OR | | | |
| | b | Explain different types of DG technologies and their importance in power quality | K4 | 5 | 12M |

KL: Blooms Taxonomy Knowledge Level    CO: Course Outcome M:Marks

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2

### IV B.Tech I Semester Supple. Examinations, April-2023

Sub Code: 19BME7TH02      **FINITE ELEMENT METHODS**

Time: 3 hours      (ME)      Max. Marks: 60
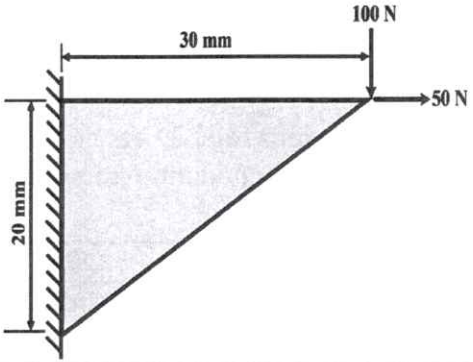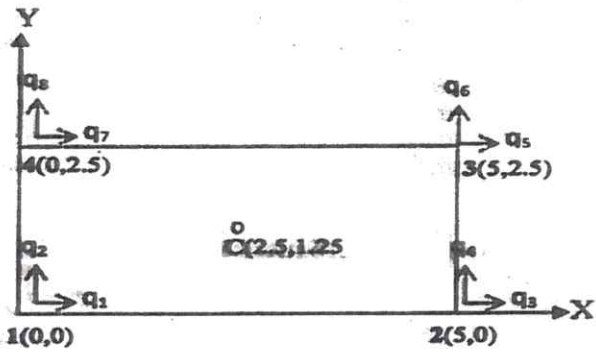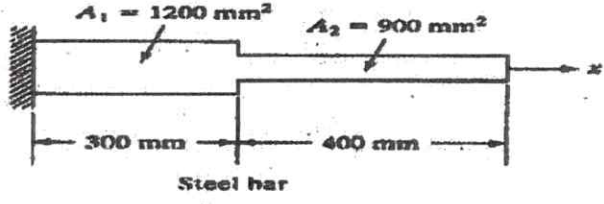
Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks   (5 X 12 = 60M)

| Q.No | | Questions | KL | CO | M |
|---|---|---|---|---|---|
| | | **Unit-I** | | | |
| 1 | a | i) Differentiate plane stress and plane strain body with examples. | K1 | CO1 | 4M |
| | | ii) Explain generalized hook's law and deduce [D] matrix for an isotropic material (3D elements). | K3 | CO1 | 8M |
| | | **OR** | | | |
| | b | i) What are the steps involved in FEA? | K1 | CO1 | 4M |
| | | ii) Derive Strain – Displacement relations for 3-dimensional element. | K3 | CO1 | 8M |
| 2 | | **Unit-II** | | | |
| | a | Derive quadratic shape functions for 1-D bar element and also explain the procedure to obtain the solution of continuum using FEM. | K3 | CO2 | 12M |
| | | **OR** | | | |
| | b | Find the displacement of the midpoint of the rod as shown in figure below. Plot the displacement & Stress curves also.  | K4 | CO2 | 12M |
| 3 | | **Unit-III** | | | |
| | a | For the truss in Fig shown below, a horizontal load of P = 4000lb is applied in the x direction at node (i) Write down the element stiffness matrix for each elemetn. (ii) Assemble the K matrix. (iii) Using the elimination approach, solve for Q. (iv) Evaluate the stress in elements 2 and 3.  | K4 | CO3 | 12M |

x = 0

g | Body force per unit volume, $\rho g = 1$ <br> E = 1 <br> A = 1

x = 5

30 in.
$E = 30 \times 10^6$ psi
$A = 1.5$ in.$^2$ for each member

| | | | | | |
|---|---|---|---|---|---|
| | b | i) Derive the interpolation functions for a beam element | K3 | CO2 | 4N |
| | | ii) A beam element is subjected to an udl of intensity 'P' varying linearly from PL N/m to PR N/m from the left end to the right end of the beam of length L. Derive the expressions for the equivalent nodal point loads | K4 | CO3 | 8N |

**Unit-IV**

| | | | | | |
|---|---|---|---|---|---|
| 4 | a | For the configuration shown in Figure below (triangular element), determine the deflection at the point of load application using a one-element model and stresses in the element.<br>Use the following: E = 70,000 MPa; t = 10 mm; $\upsilon$ = 0.3<br> | K3 | CO4 | 12N |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| | b | Consider a rectangular element as shown in Fig3. Assume plane stress condition, E = 206850 MPa, v = 0.3, and q = [0, 0, 0.05, 0.075, 0.15, 0.8, 0, 0] cm. Evaluate Jacobian J and B matrix at $\xi$=0 and $\eta$=0<br> | K3 | CO4 | 12N |

| 5 | | | | | |
|---|---|---|---|---|---|

**Unit-V**

| | | | | | |
|---|---|---|---|---|---|
| | a | Consider axial vibration of the steel bar shown in Figure. Develop the global stiffness and mass matrices. Determine the lowest natural frequency and mode shapes.<br><br>E=100GPa density=0.025kg/mm3 | K4 | CO5 | 12N |

| | | | KL | CO | M |
|---|---|---|---|---|---|
| b | i)What is the difference between Consistent and lumped mass matrices? What are its applications? | | K3 | CO2 | 4M |
| | ii) Derive mass matrices for Bar, Truss and Beam Elements | | K3 | CO2 | 8M |

KL: Blooms Taxonomy Knowledge Level        CO: Course Outcome    M:Marks

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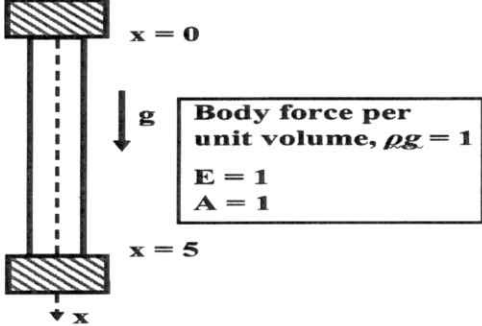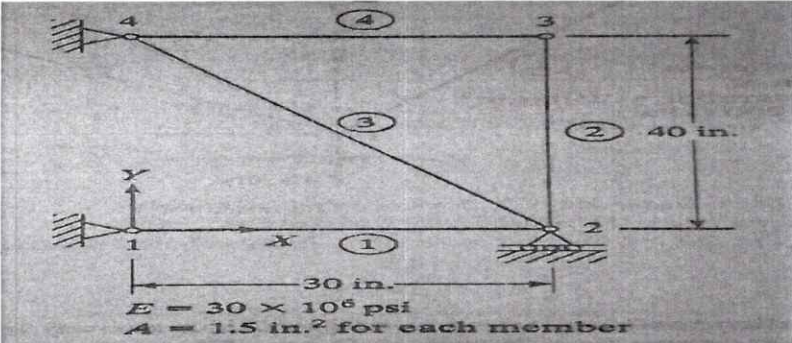**IV B.Tech I Semester Supple. Examinations, April-2023**

Sub Code: 19BME7TH03   INDUSTRIAL ENGINEERING AND MANAGEMENT

Time: 3 hours

(ME)

Max. Marks: 60

Note: Answer All FIVE Questions.
All Questions Carry Equal Marks  (5 X 12 = 60M)

| Q.No | | | Questions | KL | CO | M |
|---|---|---|---|---|---|---|
| | | | **Unit-I** | | | |
| 1 | a | | i) list the responsibilities of an industrial Engineer. | 1 | CO1 | 6M |
| | | | ii) Discuss about the functions of management | 2 | CO1 | 6M |
| | | | **OR** | | | |
| | b | | i) list out the Fayol's principles of management. Discuss in detail. | 1 | CO1 | 12M |
| | | | **Unit-II** | | | |
| 2 | a | | Explain about the Product & Process layouts with neat sketches. | 2 | CO2 | 12M |
| | | | **OR** | | | |
| | b | | i) Discuss in detail factors governing plant location | 2 | CO2 | 6M |
| | | | ii) Outline the importance of preventive and breakdown maintenance. | 2 | CO2 | 6M |
| | | | **Unit-III** | | | |
| 3 | a | | Discuss about the different types of production systems. | 2 | CO3 | 12M |
| | | | **OR** | | | |
| | b | | i) Outline Two handed process chart with an example. | | CO3 | 6M |
| | | | ii) Explain Therbligs in detail by make use of an example. | 2 | CO3 | 6M |
| | | | **Unit-IV** | | | |
| 4 | a | | i) Outline the importance of quality control. | 2 | CO4 | 6M |
| | | | ii) Explain how single sampling differs from double sampling. | 2 | CO4 | 6M |
| | | | **OR** | | | |
| | b | | The following readings were taken for a control chart: | 3 | CO4 | 12M |

| Sample No | $X_1$ | $X_2$ | $X_3$ | $X_4$ |
|---|---|---|---|---|
| 1 | 80.74 | 80.76 | 80.77 | 80.73 |
| 2 | 80.73 | 80.76 | 80.72 | 80.75 |
| 3 | 80.72 | 80.75 | 80.77 | 80.81 |
| 4 | 80.74 | 80.73 | 80.71 | 80.77 |
| 5 | 80.74 | 80.75 | 80.73 | 80.74 |
| 6 | 80.76 | 8075 | 80.74 | 80.74 |
| 7 | 80.78 | 80.77 | 80.76 | 80.80 |
| 8 | 80.78 | 80.77 | 80.80 | 8081 |

(i)    Calculate $\bar{X}$ and R for each sample.

| | | | | | |
|---|---|---|---|---|---|
| | | (iii)    Draw X̄ and R chart.<br><br>For n = 4, $d_2$ = 2.28, $D_4$ = 2.28 and $D_3$ =0. | | | |
| 5 | | Unit-V | | | |
| | a | i) List out the functions of Personnel management. | 1 | CO5 | 6M |
| | | ii) Discuss importance of job evaluation. | 2 | CO5 | 6M |
| | | OR | | | |
| | b | What are the different wage incentive plans? Explain with suitable examples. | 2 | CO5 | 12M |

### IV B.Tech I Semester Supple. Examinations, April-2023

**Sub Code: 19BME7PE09**  **POWER PLANT ENGINEERING**

Time: 3 hours  (ME)  Max. Marks: 60

**Note: Answer All FIVE Questions.**

**All Questions Carry Equal Marks  (5 X 12 = 60M)**

| Q.No | | | Questions | KL | CO | M |
|---|---|---|---|---|---|---|
| | | | **Unit-I** | | | |
| 1 | a | | i) Explain the general lay out of steel power plant with a neat sketch. | K2 | CO1 | 6M |
| | | | ii) Describe the ash handling system in a steam power plant. Explain anyone with a neatSketch. | K4 | CO1 | 6M |
| | | | OR | | | |
| | b | | i) Enumerate and explain the steps involved in handling of the coal? | K4 | CO1 | 6M |
| | | | ii) What is super critical boiler? Explain any one briefly. | K1 | CO1 | 6M |
| | | | **Unit-II** | | | |
| 2 | a | | List the essential components of a diesel power plant and explain them briefly? | K2 | CO2 | 12M |
| | | | OR | | | |
| | b | | i) Illustrate the construction and layout with auxiliaries of gas turbine plant? | K3 | CO2 | 6M |
| | | | ii) What is the importance of combined cycle power plants and explain any one of combined cycle power plant. | K1 | CO2 | 6M |
| | | | **Unit-III** | | | |
| 3 | a | | i) Explain the types of nuclear reactors with a neat sketches | K2 | CO3 | 6M |
| | | | ii) Describe the future of nuclear power in India. | K3 | CO3 | 6M |
| | | | OR | | | |
| | b | | Sketch and explain sodium-graphite reactor and also its advantages. | K2 | CO3 | 12M |
| | | | **Unit-IV** | | | |
| 4 | a | | i) Enumerate advantages and disadvantages of hydro plants? | K4 | CO4 | 6M |
| | | | ii) Explain the working of Geothermal power plant with neat sketch | K2 | CO4 | 6M |
| | | | OR | | | |
| | b | | i) Write about Ocean thermal power plants. Describe one of them. | K3 | CO4 | 6M |
| | | | ii) Explain with a neat sketch a pumped storage hydro plant, state its advantages. | K2 | CO4 | 6M |
| | | | **Unit-V** | | | |
| 5 | a | | i) What is the significance of load curves? | K1 | CO5 | 6M |
| | | | ii) A power plant has the installed capacity of 120MW. Calculate the cost of generation, if  Capital cost = Rs. 120 × 106, rate of interest and depreciation =18% Annual cost of fuel oil, salaries and taxation= Rs. 25 × 106, load factor=40%. | K3 | CO5 | 6M |
| | | | OR | | | |
| | b | | i) What are the capital cost and fixed cost to be considered for cost analysis? | K1 | CO5 | 6M |
| | | | ii) Write the methods of pollution control & explain them with neat sketches. | K3 | CO5 | 6M |

KL: Blooms Taxonomy Knowledge Level  CO: Course Outcome  M:Marks*

### IV B.Tech I Semester Supple. Examinations, April-2023

**Sub Code: 19BEC7TH01**  **MICROWAVE ENGINEERING**

Time: 3 hours  (ECE)  Max. Marks: 60

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks  (5 X 12 = 60M)

| Q.No | | | Questions | KL | CO | M |
|---|---|---|---|---|---|---|
| | | | **Unit-I** | | | |
| 1 | a | | i) Explain rectangular waveguides TM mode analysis. | K3 | 1 | 6M |
| | | | ii) Derive characteristic equation of circular waveguides. | K5 | 1 | 6M |
| | | | OR | | | |
| | b | | i) Explain impossibility of TEM mode. | K3 | 1 | 6M |
| | | | ii) Explain dominant and degenerative modes of circular waveguide. | K3 | 1 | 6M |
| | | | **Unit-II** | | | |
| 2 | a | | Explain probe, loop and aperture coupling mechanisms in detail. | K4 | 2 | 12M |
| | | | OR | | | |
| | b | | i) Explain types of directional couplers in detail. | K3 | 2 | 6M |
| | | | ii) Explain 2 port junction S Matrix calculations. | K4 | 2 | 6M |
| | | | **Unit-III** | | | |
| 3 | a | | i) Explain in detail O-type tubes. | K3 | 3 | 6M |
| | | | ii) Explain Two cavity klystron structure in detail. | K3 | 3 | 6M |
| | | | OR | | | |
| | b | | i) Explain mathematical theory of bunching. | K4 | 3 | 6M |
| | | | ii) Explain reflex klystrons structure and principle of working. | K3 | 3 | 6M |
| | | | **Unit-IV** | | | |
| 4 | a | | i) Explain structure of TWT id detail. | K3 | 4 | 6M |
| | | | ii) Explain Magnetron Hull cut-off and Hartree conditions. | K4 | 4 | 6M |
| | | | OR | | | |
| | b | | i) Explain 8-cavity cylindrical traveling wave tube. | K3 | 4 | 6M |
| | | | ii) Explain nature of four propagation constants. | K4 | 4 | 6M |
| | | | **Unit-V** | | | |
| 5 | a | | i) Explain different blocks of microwave bench and their features. | K3 | 5 | 6M |
| | | | ii) Explain classification of microwave solid state devices. | K3 | 5 | 6M |
| | | | OR | | | |
| | b | | i) Explain bolometer method of microwave power. | K4 | 5 | 6M |
| | | | ii) Explain gun diode RWH theory. | K3 | 5 | 6M |

KL: Blooms Taxonomy Knowledge Level  CO: Course Outcome  M:Marks

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### IV B.Tech I Semester Supple. Examinations, April-2023

**Sub Code: 19BEC7TH02**  **VLSI DESIGN**

Time: 3 hours  (ECE)  Max. Marks: 60

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks (5 X 12 = 60M)

| Q.No | | Questions | KL | CO | M |
|---|---|---|---|---|---|
| | | Unit-I | | | |
| 1 | a | i) Explain the term output conductance, using necessary equations. | 2 | 1 | 6M |
| | | ii) Derive the relation between drain current and drain to source voltage in MOS device. | 4 | 1 | 6M |
| | | OR | | | |
| | b | i) Compare various IC technologies. | 4 | 1 | 6M |
| | | ii)An nMOS transistor is operating in saturation region with the following parameters. VGS = 5V ; Vtn = 1.2V ; W/L = 110; μnCox = 110 μA/V. Find Transconductance of the device. | 3 | 1 | 6M |
| | | Unit-II | | | |
| 2 | a | i) Analyse the propagation delays in CMOS logic circuits. | 4 | 2 | 6M |
| | | ii) Calculate on resistance of an inverter from VDD to GND. If n- channel sheet resistance Rsn=104Ω per square and P-channel sheet resistance Rsp = 3.5 × 10Ω per square. (Zpu=4:4 and Zpd=2:2). | 3 | 2 | 6M |
| | | OR | | | |
| | b | i) Outline the VLSI design flow with flowchart | 2 | 2 | 6M |
| | | ii) Define inverter delay? Explain. | 2 | 2 | 6M |
| | | Unit-III | | | |
| 3 | a | i) Design a stick diagram for NMOS EX-OR gate. | 4 | 3 | 6M |
| | | ii) Explain the scaling factor? Describe different types of device parameters. | 2 | 3 | 6M |
| | | OR | | | |
| | b | i) Illustrate the lambda-based design rules with neat sketches. | 2 | 3 | 6M |
| | | ii) Design a stick diagram for CMOS NOR gate. | 4 | 3 | 6M |
| | | Unit-IV | | | |
| 4 | a | Realize the following equations using CMOS a) Z= ((A.B.C) +D)'.   b) Z= (((A.B) +C).D)'.   c) Z= ((A.B) +C(A+B))'. | 4 | 4 | 12M |
| | | OR | | | |
| | b | i) Discuss the general arrangement of a 4-bit arithmetic process. | 2 | 4 | 6M |
| | | ii) Explain the design of a 4-bit shifter. | 4 | 4 | 6M |
| | | Unit-V | | | |
| 5 | a | i) Describe the basic architecture of FPGA. | 2 | 5 | 6M |
| | | ii) List out the different configuration modes in FPGA. Briefly discuss about it. | 2 | 5 | 6M |
| | | OR | | | |
| | b | i) Differentiate FinFET | 4 | 5 | 6M |
| | | ii) Explain the FPGA design process. | 2 | 5 | 6M |

KL: Blooms Taxonomy Knowledge Level  CO: Course Outcome  M:Marks

## IV B.Tech I Semester Supple. Examinations, April-2023

**Sub Code: 19BEC7PE06    EMBEDDED & REAL TIME OPERATING SYSTEM**

Time: 3 hours                                          (ECE)                    Max. Marks: 60

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks   (5 X 12 = 60M)

| Q.No | | Questions | KL | CO | M |
|---|---|---|---|---|---|
| | | **Unit-I** | | | |
| 1 | a | i) Explain the classification of an embedded system with examples. | 1 | 1 | 6M |
| | | ii) Explain application-specific and domain-specific embedded systems | 1 | 1 | 6M |
| | | **OR** | | | |
| | b | i) Write the history of embedded system | 2 | 1 | 6M |
| | | ii) Explain the following terms (i) Data Collection  (ii) Data Communication | 3 | 1 | 6M |
| | | **Unit-II** | | | |
| 2 | a | Explain the multiprocessing and multitasking of RTOS | 2 | 2 | 12M |
| | | **OR** | | | |
| | b | i) What is RTOS? Explain about RTOS with examples? | 2 | 2 | 6M |
| | | ii) Explain the terms Simulators, Emulators and Debuggers | 1 | 2 | 6M |
| | | **Unit-III** | | | |
| 3 | a | i) Explain the RPC and sockets of RTOS | 2 | 3 | 6M |
| | | ii) Explain the Task communication of RTOS | 2 | 3 | 6M |
| | | **OR** | | | |
| | b | i) Explain the terms Pipes and  Memory mapped objects | 4 | 3 | 6M |
| | | ii) Explain the concept of Architecture of the Kernel in detail | 4 | 3 | 6M |
| | | **Unit-IV** | | | |
| 4 | a | i) List out different Non- Functional Requirements of RTOS and explain | 5 | 4 | 6M |
| | | ii) Explain the following terms in detail (i) Semaphore        (ii)  Mutex | 5 | 4 | 6M |
| | | **OR** | | | |
| | b | i) Draw and explain the operation of Device drivers | 3 | 4 | 6M |
| | | ii) write short notes on In System Programming in detail | 3 | 4 | 6M |
| | | **Unit-V** | | | |
| 5 | a | i) Explain the different types of Simulators and emulators | 1 | 5 | 6M |
| | | ii) Explain the following terms in detail (i) Logic Synthesis   (ii) RT synthesis | 1 | 5 | 6M |
| | | **OR** | | | |
| | b | i) Explain the concept of Hardware/Software Co-simulation in detail | 2 | 5 | 6M |
| | | ii) Explain the concept of Hardware/ Software Co-Design in detail | 2 | 5 | 6M |

KL: Blooms Taxonomy Knowledge Level        CO: Course Outcome    M:Marks

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## IV B.Tech I Semester Supple. Examinations, April-2023

**Sub Code: 19BEC7PE07**     **IMAGE PROCESSING**

Time: 3 hours     (ECE)     Max. Marks: 60

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks   (5 X 12 = 60M)

| Q.No | | Questions | KL | CO | M |
|---|---|---|---|---|---|
| | | **Unit-I** | | | |
| 1 | a | i) **Illustrate** the concept of image capturing with sensing and Acquisition process. | K2 | 1 | 6M |
| | | ii) **Inspect** properties of Discrete Cosine Transform (DCT) For 2-D Image. | K4 | 1 | 6M |
| | | **OR** | | | |
| | b | i) Relate the relationship between pixels in an image with suitable examples. | K3 | 1 | 6M |
| | | ii) **Generate** the DCT coefficients of the given image: $f(x,y)=\begin{bmatrix} 5 & 1 \\ 0 & 8 \end{bmatrix}$ | K4 | 1 | 6M |
| | | **Unit-II** | | | |
| 2 | a | **Discuss** the operation of Image Enhancements in Frequency domain | K3 | 2 | 12M |
| | | **OR** | | | |
| | b | i) **Explain** histogram equalization and sketch histograms of basic image types. | K5 | 2 | 6M |
| | | ii) **Model** the image restoration and analyse the noise restoration filters. | K3 | 2 | 6M |
| | | **Unit-III** | | | |
| 3 | a | i) **Analyze** RGB to HIS color model. | K4 | 3 | 6M |
| | | ii) **Inspect** color image sharpening. | K4 | 3 | 6M |
| | | **OR** | | | |
| | b | i)**Examine** full color image processing | K4 | 3 | 6M |
| | | ii) **Explain** color image compression. | K5 | 3 | 6M |
| | | **Unit-IV** | | | |
| 4 | a | i) **Explain** image pyramid operation in various aspects | K5 | 4 | 6M |
| | | ii) **Explain** fast wavelets transform with applications | K5 | 4 | 6M |
| | | **OR** | | | |
| | b | i) **Apply** LZW coding for image compression with example. | K3 | 4 | 6M |
| | | ii) **Explain** the importance and types of digital image watermarking | K5 | 4 | 6M |
| | | **Unit-V** | | | |
| 5 | a | i) **Model** the concept of opening and closing operation. | K3 | 5 | 6M |
| | | ii) **Analyse** Hit-or-miss transformation. | K4 | 5 | 6M |
| | | **OR** | | | |
| | b | **Explain** image segmentation and apply region based segmentation and region growing with an example. | K5 | 5 | 12M |

KL: Blooms Taxonomy Knowledge Level     CO: Course Outcome     M:Marks

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# NEC NARASARAOPETA ENGINEERING COLLEGE
## (AUTONOMOUS)

### IV B.Tech I Semester Supple Examinations, April-2023

**Sub Code: 19BCS7TH04**  **MACHINE LEARNING**

Time: 3 hours  (CSE)  Max. Marks: 60

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 12 = 60M)

| QNo | | Questions | K L | CO | Marks |
|---|---|---|---|---|---|
| | | **Unit-I** | | | |
| 1 | a | What are the dimensions of a Supervised Machine Learning Algorithm? | K2 | CO1 | 6M |
| | | Explain the procedure of Model Selection and Generalization. | K2 | CO1 | 6M |
| | | **OR** | | | |
| | b | Define a learning system. What are the goals and applications of machine learning? | K2 | CO1 | 6M |
| | | Explain the process of learning a class from examples. | K2 | CO1 | 6M |
| | | **Unit-II** | | | |
| 2 | a | What is Bayes estimator? How it can be used? | K2 | CO2 | 6M |
| | | Discuss about various discriminant functions in Bayesian decision theory. | K2 | CO2 | 6M |
| | | **OR** | | | |
| | b | Distinguish between bias and variance with examples. | K2 | CO2 | 6M |
| | | What is maximum likelihood estimation? Explain with example. | K2 | CO2 | 6M |
| | | **Unit-III** | | | |
| 3 | a | What is multidimensional scaling? Discuss with the help of example data. | K4 | CO3 | 6M |
| | | Explain about FP Growth Algorithm with example. | K4 | CO3 | 6M |
| | | **OR** | | | |
| | b | Explain the procedure of subset selection in dimensionality reduction. | K4 | CO3 | 6M |
| | | What is linear Discriminant Analysis? State its advantages. | K4 | CO3 | 6M |
| | | **Unit-IV** | | | |
| 4 | a | What is K-Means Clustering? How is it useful? | K3 | CO4 | 6M |
| | | Explain the procedure of Expectation-Maximization Algorithm. | K3 | CO4 | 6M |
| | | **OR** | | | |
| | b | Discuss about the learning process in Self-Organizing Maps. | K3 | CO4 | 6M |
| | | What is hierarchical Clustering? How is it performed? | K3 | CO4 | 6M |
| | | **Unit-V** | | | |
| 5 | a | Explain Random Forest Algorithm with Example. | K3 | CO5 | 6M |
| | | How rule extraction can be performed in decision trees. | K3 | CO5 | 6M |
| | | **OR** | | | |
| | b | What is a Univariate Tree? Discuss with example. | K3 | CO5 | 6M |
| | | Explain the process of learning rules in decision tress. | K3 | CO5 | 6M |

KL: Blooms Taxonomy Knowledge Level    CO: Course Outcome    M: Marks

**IV B.Tech I Semester Supple. Examinations, April-2023**

Sub Code: 19BCI7TH01

**DATA SCIENCE**

Time: 3 hours

(CSE, IT)

Max. Marks: 60

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks (5 X 12 = 60M)

| Q.No | | | Questions | KL | CO | M |
|---|---|---|---|---|---|---|
| | | | **Unit-I** | | | |
| 1 | a | i) | Define ndarrays? Explain different data types for ndarrays with examples. | K1 | CO1 | 6M |
| | | ii) | Explain mathematical and statistical methods used in data processing using arrays. | K2 | CO1 | 6M |
| | | | **OR** | | | |
| | b | i) | Define the data scientist life cycle. Explain the role of the data scientist in each phase of the life cycle. | K2 | CO1 | 6M |
| | | ii) | Outline the operations between arrays and scalars in python with examples. | K2 | CO1 | 6M |
| | | | **Unit-II** | | | |
| 2 | a | i) | Compare correlation and covariance in python | K2 | CO2 | 2M |
| | | ii) | Write Python program to plot histogram by assuming your own data and explain the various attributes of histogram. | K2 | CO2 | 10M |
| | | | **OR** | | | |
| | b | i) | What is a DataFrame? Discuss different possible data inputs to the DataFrame constructor. | K2 | CO2 | 6M |
| | | ii) | List different Descriptive and summary statistics of python with examples. | K3 | CO2 | 6M |
| | | | **Unit-III** | | | |
| 3 | a | i) | What is type inference? How type inference is useful in data conversion. Explain. | K2 | CO3 | 6M |
| | | ii) | What is HDF5 format? Explain different interfaces to the HDF5 library in Python. | K2 | CO3 | 6M |
| | | | **OR** | | | |
| | b | i) | How JSON data works with python. Explain in detail. | K3 | CO3 | 6M |
| | | ii) | List different functions to load data from SQL into a DataFrame in Python. | K2 | CO3 | 6M |
| | | | **Unit-IV** | | | |
| 4 | a | i) | Write in detail about combining and merging datasets in Python. | K2 | CO4 | 6M |
| | | ii) | Give the syntax and explain different plotting functions in Python. | K3 | CO4 | 6M |
| | | | **OR** | | | |
| | b | i) | Discuss different data transformation techniques in Python. | K2 | CO4 | 6M |
| | | ii) | Give the syntax and explain Ticks, Labels, and Legends in python. | K3 | CO4 | 6M |
| | | | **Unit-V** | | | |
| 5 | a | i) | Discuss different Groupby operations in python with examples. | K2 | CO5 | 6M |
| | | ii) | Give and explain data aggregation functions. | K2 | CO5 | 6M |
| | | | **OR** | | | |
| | b | i) | List different date and time operations in python with examples. | K3 | CO5 | 6M |
| | | ii) | Discuss in detail about grouping with Dict and Series. | K2 | CO5 | 6M |

KL: Blooms Taxonomy Knowledge Level     CO: Course Outcome     M:Marks***

### IV B.Tech I Semester Supple. Examinations, April-2023

**Sub Code: 19BCI7TH02**　　　　　**DevOps**

Time: 3 hours　　　　　　　　　(IT, CSE)　　　　Max. Marks: 60

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks　(5 X 12 = 60M)

| Q.No | | | Questions | KL | CO | M |
|---|---|---|---|---|---|---|
| | | | **Unit-I** | | | |
| 1 | a | | Explain Phases of Software Development life cycle? | K2 | CO1 | 12M |
| | | | OR | | | |
| | b | | Explain Values and principles of agile software development. | K2 | CO1 | 12M |
| 2 | | | **Unit-II** | | | |
| | a | | i) Briefly illustrate the architecture of DevOps | K2 | CO2 | 6M |
| | | | ii) What Is Deployment in DevOps? | K2 | CO2 | 6M |
| | | | OR | | | |
| | b | | i) Explain about DevOps ecosystem | K2 | CO2 | 6M |
| | | | ii) Provide a detailed explanation of DevOps orchestration. | K2 | CO2 | 6M |
| 3 | | | **Unit-III** | | | |
| | a | | Which seven steps comprise the DevOps adoption process. Explain in Detail? | K2 | CO3 | 12M |
| | | | OR | | | |
| | b | | Discuss DevOps tool stack implementation. | K4 | CO3 | 12M |
| 4 | | | **Unit-IV** | | | |
| | a | | List and explain the metrics for optimizing the DevOps CI/CD pipeline | K2 | CO4 | 12M |
| | | | OR | | | |
| | b | | i) List the benefits of CI/CD | K2 | CO4 | 6M |
| | | | ii) Differentiate Continuous Delivery and Deployment | K2 | CO4 | 6M |
| 5 | | | **Unit-V** | | | |
| | a | | Explain the five stages of the DevOps Maturity Model in detail | K2 | CO5 | 12M |
| | | | OR | | | |
| | b | | i) Explain DevOps maturity assessment | K2 | CO5 | 6M |
| | | | ii) Explain the Key factors of DevOps maturity model | K2 | CO5 | 6M |

KL: Blooms Taxonomy Knowledge Level　　　CO: Course Outcome　　M:Marks

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## IV B.Tech I Semester Supple. Examinations, April-2023

**Sub Code: 19BCI7TH03**     **HUMAN COMPUTER INTERACTION**

Time: 3 hours          (CSE, IT)         Max. Marks: 60

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks   (5 X 12 = 60M)

| Q.No | | | Questions | KL | CO | M |
|---|---|---|---|---|---|---|
| | | | **Unit-I** | | | |
| 1 | a | | i) What is User Interface (UI)? Explain the importance of User Interface. | 1 | 1 | 6M |
| | | | ii) Explain the Benefits of good design of User Interface (UI). | 1 | 1 | 6M |
| | | | **OR** | | | |
| | b | | i) What is a user interface screen and explain elements of screen design? | 1 | 1 | 6M |
| | | | ii) How many types of screen are there and explain it. | 2 | 1 | 6M |
| | | | **Unit-II** | | | |
| 2 | a | | What is the most popular user interface? Explain 5 User Interfaces. | 2 | 2 | 12M |
| | | | **OR** | | | |
| | b | | i) Explain the characteristics, Principles of user interface. | 1 | 2 | 6M |
| | | | ii) What is meant by GUI? Explain Popularity and Advantages of GUI. | 2 | 2 | 6M |
| | | | **Unit-III** | | | |
| 3 | a | | i) What is human-computer interaction and explain with examples? | 2 | 3 | 6M |
| | | | ii) What are the qualities of screen elements? | 2 | 3 | 6M |
| | | | **OR** | | | |
| | | | i) What are the characteristics of good interface What are human factors needed to be considered for design of a HCI? | 2 | 3 | 12M |
| | | | **Unit-IV** | | | |
| 4 | a | | i) Explain various types of statistical graphics that are used in screen design | 1 | 4 | 6M |
| | | | ii) What is statistical graphics in HCI and explain its types. | 2 | 4 | 6M |
| | | | **OR** | | | |
| | b | | i) Explain screen navigation and flow. | 2 | 4 | 6M |
| | | | ii) Discuss technological consideration in interface design | 2 | 4 | 6M |
| | | | **Unit-V** | | | |
| 5 | a | | i) What are icons in HCI and explain four types of textual communication in HCI? | 2 | 5 | 6M |
| | | | ii) What is the importance of color in design where do we use color? | 2 | 5 | 6M |
| | | | **OR** | | | |
| | b | | i) How color might be used more effectively in the interface of an application system that you use? | 2 | 5 | 6M |
| | | | ii) What are device based and screen based controls and How do you select the device based controls explain in detail? | 2 | 5 | 6M |

KL: Blooms Taxonomy Knowledge Level   CO: Course Outcome     M:Marks

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**IV B.Tech I Semester Supple. Examinations, April-2023**

Sub Code: 19BIT7TH04     **AGILE DEVELOPMENT MODEL**

Time: 3 hours                  (IT)          Max. Marks: 60

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks    (5 X 12 = 60M)

| Q.No | | Questions | KL | CO | M |
|---|---|---|---|---|---|
| | | Unit-I | | | |
| 1 | a | i) Describe Agile Project Management in detail. | KL2 | CO1 | 6M |
| | | ii) What is the role of user stories in agile development? How do we test user stories in agile software development? | KL1 | CO1 | 6M |
| | | OR | | | |
| | b | i) What is meant by Test -Driven Development? Explain with an example. | KL2 | CO1 | 6M |
| | | ii) What is meant by lean approach? How does it work? | KL1 | CO1 | 6M |
| | | Unit-II | | | |
| 2 | a | List out the tools for Agile Project management. Also discuss how they help in Agile process. | KL2 | CO2 | 12M |
| | | OR | | | |
| | b | i) Define Agile Scrum. What are its various roles? | KL1 | CO2 | 6M |
| | | ii) Describe burn down charts in scrum with an example. | KL2 | CO2 | 6M |
| | | Unit-III | | | |
| 3 | a | i) Describe Agile lifecycle. What is its impact on testing? | KL2 | CO3 | 6M |
| | | ii) Describe Tools to support the Agile tester? | KL2 | CO3 | 6M |
| | | OR | | | |
| | b | i) Explain the steps in Test-driven development. | KL2 | CO3 | 6M |
| | | ii) Explain Planning and managing testing cycle? | KL2 | CO3 | 6M |
| | | Unit-IV | | | |
| 4 | a | i) What is the need of Refactoring? Explain its types briefly. | KL2 | CO4 | 6M |
| | | ii) What is the role of continuous integration in automated build process in agile? | KL2 | CO4 | 6M |
| | | OR | | | |
| | b | What are the different Agile design practices? Explain its different design principles. | KL2 | CO4 | 12M |
| | | Unit-V | | | |
| 5 | a | i) Explain different phases of Agile ALM. | KL2 | CO5 | 6M |
| | | ii) What is distributed Agile methodology? List out its challenges. | KL1 | CO5 | 6M |
| | | OR | | | |
| | b | i) What are different challenges to Agile methodology? Discuss Risk and Mitigation for it. | KL2 | CO5 | 6M |
| | | ii) Briefly explain Agile rapid development technologies. | KL2 | CO5 | 6M |

KL: Blooms Taxonomy Knowledge Level   CO: Course Outcome    M: Marks

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### IV B.Tech I Semester Supple. Examinations, April-2023

**Sub Code: 19BIT7PE05**  E-COMMERCE
Time: 3 hours  (IT)  Max. Marks: 60

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks  (5 X 12 = 60M)

| Q.No | | | Questions | KL | CO | M |
|---|---|---|---|---|---|---|
| | | | Unit-I | | | |
| 1 | a | | i) Explain the Generic Frame work of the E-Commerce | K2 | CO1 | 6M |
| | | | ii) List and Briefly explain E-Commerce applications | K2 | CO1 | 6M |
| | | | OR | | | |
| | b | | Explain the following are the various e-commerce consumer applications: a) Consumer applications and social interaction b) Needs of the customers c) Customers willingness to pay to satisfy their needs | K2 | CO1 | 12M |
| | | | Unit-II | | | |
| 2 | a | | How the payment transaction sequence is happens in the Electronic cheque system and explain its advantages | K2 | CO2 | 12M |
| | | | OR | | | |
| | b | | i) Discuss in detail about Mercantile Process models? | K2 | CO2 | 6M |
| | | | ii) Explain the business issues that must be addressed before consumer-oriented e-commerce can become widespread | K2 | CO2 | 6M |
| | | | Unit-III | | | |
| 3 | a | | i) Explain about Supply Chain Management (SCM) | K3 | CO3 | 6M |
| | | | ii) Explain the EDI Layered Architecture | K3 | CO3 | 6M |
| | | | OR | | | |
| | b | | i) Explain MIME Advantages and Disadvantages | K3 | CO3 | 6M |
| | | | ii) Explain the supply chain management characteristics in electronic commerce | K2 | CO3 | 6M |
| | | | Unit-IV | | | |
| 4 | a | | i) Explain Digital Document Management: Issues and Concerns | K2 | CO4 | 6M |
| | | | ii) Explain the guidelines that each firm should follow for advertising on the Internet | K4 | CO4 | 6M |
| | | | OR | | | |
| | b | | i) Elaborate about the four different types of Digital documents | K2 | CO4 | 6M |
| | | | ii) Explain about on-line marketing Process with its suitable example? | K4 | CO4 | 6M |
| 5 | | | Unit-V | | | |
| | a | | i) Explain about End-user Retrieval Phase and Publisher Indexing Phase | K3 | CO3 | 6M |
| | | | ii) Discuss applications of digital video? | K2 | CO3 | 6M |
| | | | OR | | | |
| | b | | Explain the following three different paradigms of information search and resource discovery: a) Information search and retrieval b) Electronic directories and catalogs  c) Information filtering | K3 | CO3 | 12M |

## IV B.Tech I Semester Supple. Examinations, April-2023

**Sub Code: 19BCC7OE08**  **AUTOMOTIVE ELECTRONICS**

Time: 3 hours  (ECE) / (EEE)  Max. Marks: 60

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks  (5 X 12 = 60M)

| Q.No | | | Questions | KL | CO | M |
|---|---|---|---|---|---|---|
| | | | **Unit-I** | | | |
| 1 | a | i) | What is the role of electronics in the current automobile industry and what is the field requirement? | K3 | CO1 | 6M |
| | | ii) | What are the components Electronic Fuel Control System? Explain any two components in details. | K2 | CO1 | 6M |
| | | | **OR** | | | |
| | b | i) | What are initial motivations for electronic engine control by government requirements and explain? | K2 | CO1 | 6M |
| | | ii) | What is the basic structure of an automobile? | K3 | CO1 | 6M |
| | | | **Unit-II** | | | |
| 2 | a | i) | Explain about the current conduction in semiconductor. | K3 | CO2 | 6M |
| | | ii) | Explain the operation of a full subtractor with necessary diagrams. What is the difference between half and full subtractor? | K3 | CO2 | 6M |
| | | | **OR** | | | |
| | b | i) | Sketch the piecewise linear characteristics of a diode. What are the approximate cutin voltages for silicon and germanium? | K3 | CO2 | 6M |
| | | ii) | Explain the 3X8 decoder circuit with a neat logic diagram. | K2 | CO2 | 6M |
| | | | **Unit-III** | | | |
| 3 | a | i) | Explain the functional architecture of the computer system. | K2 | CO3 | 6M |
| | | ii) | Explain ROM and RAM with respect to their block diagrams. | K3 | CO3 | 6M |
| | | | **OR** | | | |
| | b | i) | What is register? Explain the different CPU Registers and their functions. | K2 | CO3 | 6M |
| | | ii) | What is parallel processing? Explain any parallel processing mechanism. | K3 | CO3 | 6M |
| | | | **Unit-IV** | | | |
| 4 | a | i) | What is the primary sensor for fuel control and explain? | K2 | CO4 | 6M |
| | | ii) | Which sensor is used to measure the altitude of a drone and explain? | K2 | CO4 | 6M |
| | | | **OR** | | | |
| | b | i) | What is superset of variables sensed in engine control? Explain in details of Mass airflow sensor. | K2 | CO4 | 6M |
| | | ii) | Explain various sensors and actuators depicted in Engine functions and control. | K3 | CO4 | 6M |
| | | | **Unit-V** | | | |
| 5 | a | i) | How to Collision Avoidance by using Radar warning System? | K4 | CO5 | 6M |
| | | ii) | What is GPS navigation system? explain how GPS system could be used to estimate the total fuel consumption? | K3 | CO5 | 6M |
| | | | **OR** | | | |
| | b | i) | What is Telematics? How Does it Work? | K3 | CO5 | 6M |
| | | ii) | How does voice recognition work in a car? | K3 | CO5 | 6M |

**NEC**

Subject Code: 19BCC70E14

**IV B.TECH I SemSupple Examinations, April-2023**
**LOGISTICS AND SUPPLY CHAIN MANAGEMENT**

Time: 3 hours                                                     Max Marks: 60

**Answer FIVE of the following**
**All questions carry equal marks**

5x12=60 M

| S. No | | | Question | KL | CO | Marks |
|---|---|---|---|---|---|---|
| 1 | a) | i) | Write about the Nature and Scope of Logistics Management | K3 | 1 | 12 |
| | | ii) | Illustrate the concept of Supply Chain Management. | | | |
| | | | Or | | | |
| | b) | i) | Demonstrate the various Customer Retention strategies. | | | |
| | | ii) | Illustrate the Basic Value added services | | | |
| 2 | a) | i) | Outline the Competitive Advantage Strategy in Logistics. | K4 | 2 | 12 |
| | | ii) | Analyze the Models in Logistics Management | | | |
| | | | Or | | | |
| | b) | i) | Examining the various Routing Models. | | | |
| | | ii) | Categories Integrated Supply Chains. | | | |
| 3 | a) | i) | Summarize the principles of Logistics Costing | K6 | 3 | 12 |
| | | ii) | Evaluate the objectives of Customer Profitability Analysis. | | | |
| | | | Or | | | |
| | b) | i) | Evaluate the need of Activity Based Costing. | | | |
| | | ii) | Explain the various functions of Total Cost Analysis. | | | |
| 4 | a) | i) | Write a Short note Benchmarking in Logistics | K3 | 4 | 12 |
| | | ii) | Illustrate the Bullwhip Effects. | | | |
| | | | Or | | | |
| | b) | i) | Write about the setting benchmarking priorities. | | | |
| | | ii) | Illustrate the Supplier and distributor benchmarking | | | |
| 5 | a) | i) | Describe the role of Customer Relationship Management in Logistics Management | K6 | 5 | 12 |
| | | ii) | Evaluate the contemporary issues in Global Logistics. | | | |
| | | | Or | | | |
| | b) | i) | Summarize the characteristics of Global Alliances. | | | |
| | | ii) | Describe the key constituents in Transportation Economics. | | | |

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