K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. I Sem. (R18) Supple. Examinations of February/March - 2021
SUB: Basic Electrical Engineering (ECE & CSE)

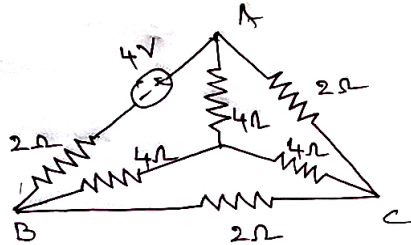Time: 3 Hours   Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I
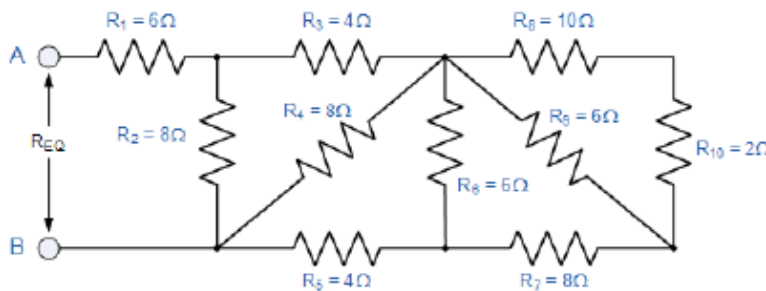
1.   Determine the loop currents for given circuit shown below   14M

(OR)

2.   14M

Determine resistance between the points A & B. Determine the power supplied by voltage source if 25V is connected across A & B.

UNIT – II

3.   A 100Ω resistor is connected in series with a 25mH Inductor across a 200V, 50HZ AC   14M
          Supply.
          Determine (a) Reactance (b) Impedance (c) Current (d) Phase angle (e) Voltage drop across resistance (f) Power Factor.

(OR)

4.   Derive form factor and peak factor for half sine wave function?   14M

UNIT – III

5.   (a)   Derive induced emf equation for DC Generator?   7M

      (b)   What are different types of DC Generator?   7M

(OR)

6.   What are different types of speed control method for DC shunt motor? Explain any one   14M
          method with diagram?

UNIT – IV

7.   Explain the construction of a single phase transformer?   14M

(OR)

8.   What are the main parts of 3 phase induction motor and explain each?   14M

UNIT-V

9.   Explain the working principle of Fuse and Circuit Breaker?   14M

(OR)

10.   What are the different types of underground cables? And explain the significant of earthling?   14M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. I Sem. (R18) Supple. Examinations of February/March - 2021
SUB: Programming for Problem Solving (CE, EEE & ME)

Time: 3 Hours　　　　　　　　　　　　　　　　　　　　　　Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1. (a) Compare and contrast Hardware and Software in detail. — 7M
   (b) Illustrate and explain the various steps involved in creating and running a C program. — 7M

(OR)

2. (a) Explain in detail about Structure of a C program with appropriate syntax and example. — 7M
   (b) Explain briefly about variable, variable declaration, initialization, scope with syntax and examples for each. — 7M

UNIT – II

3. Explain in detail about operators, its precedence and associativity in C programming with examples. — 14M

(OR)

4. (a) Explain while loop, for loop and do-while loop with its appropriate syntax and example program for each. — 8M
   (b) Explain break, continue and go-to with its appropriate syntax and example program. — 6M

UNIT – III

5. Explain in detail about searching and its types. Write a program to find position of an element using binary search technique. — 14M

(OR)

6. (a) Explain the built-in string functions with appropriate syntax and example for each. — 10M
   (b) Write a program to reverse a given string. — 4M

UNIT – IV

7. Explain parameters passing methods in functions. Write C program to swap two numbers by using parameter passing methods. — 14M

(OR)

8. (a) Explain Pointers in C with syntax for declaring and initialization of pointer variable. — 7M
   (b) Explain briefly about chain of pointers. — 7M

UNIT-V

9. Define Structure. Write syntax to define, declare and initialize structure and to access members of structure with suitable example program. — 14M

(OR)

10. (a) Explain Union. Write a C program to calculate total and average of student marks using Union. — 10M
    (b) Compare and contrast structure and union with appropriate syntax. — 4M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. I Sem. (R18) Supple. Examinations of February/March - 2021
SUB: Mathematics-I (Common to all Branches)

Time: 3 Hours   Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1. (a) Reduce the matrix $\begin{bmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & -7 \end{bmatrix}$ into normal form and hence evaluate its rank   **7 M**

    (b) Find the Eigen values and Eigen vectors of the matrix $\begin{pmatrix} 5 & 4 \\ 1 & 2 \end{pmatrix}$ **7 M**

(OR)

2. Reduce the quadratic form $3x^2 + 2y^2 + 3z^2 - 2xy - 2yz$ to the normal form by orthogonal transformation.   **14 M**

UNIT – II

3. (a) Test for the convergence of the series $\dfrac{1}{1.2.3} + \dfrac{3}{2.3.4} + \dfrac{5}{3.4.5} + \ldots\ldots$ **7 M**

    (b) Show tha $1 + \dfrac{2^p}{2!} + \dfrac{3^p}{3!} + \dfrac{4^p}{4!} + \ldots\ldots$ is convergent for all values of p.   **7 M**

(OR)

4. (a) Test for the convergence of the series $\sum\left(\sqrt{n^2+1} - \sqrt{n^2-1}\right)$ **7 M**

    (b) Test for the convergence of the series $\dfrac{2}{3.4}x + \dfrac{3}{4.5}x^2 + \dfrac{4}{5.6}x^3 + \ldots\ldots \ (x>0)$ **7 M**

UNIT – III

5. (a) Using Maclaurin's series, expand $\log(1 + e^x)$ up to the term containing x^4 **7 M**

    (b) Find the radius of curvature at any point of the cardioid $r = a(1 - \cos\theta)$ **7 M**

(OR)

6. (a) Obtain the Taylor's series expansion of $Sin\ x$ in powers of $x - \dfrac{\pi}{4}$ **7 M**

    (b) Find the coordinates of the center of curvature of the rectangular hyperbola $xy = c^2$ **7 M**

UNIT – IV

7. (a) If $u = x^2 - y^2, v = 2xy\ and\ x = r\cos\theta,\ y = r\sin\theta$ then find $\dfrac{\partial(u,v)}{\partial(r,\theta)}$ **7 M**

    (b) If $u = \log(x^3 + y^3 + z^3 - 3xyz)$, prove that $\left(\dfrac{\partial}{\partial x} + \dfrac{\partial}{\partial y} + \dfrac{\partial}{\partial z}\right)^2 u = \dfrac{-9}{(x+y+z)^2}$ **7 M**

(OR)

8. (a) A rectangular box open at the top is to have volume of 32 cubic ft. Find the dimensions of the box requiring least material for its construction.   **14 M**

UNIT-V

9. Show that $\beta(m,n) = \dfrac{\Gamma(m)\Gamma(n)}{\Gamma(m+n)}$ where m>0, n>0   **14 M**

(OR)

10. Express the function $f(x) = x$ as a half range Sine and Cosine series in $0 < x < 2$.   **14 M**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. I Sem. (R18) Supple. Examinations of February/March - 2021
SUB: Engineering Physics (ECE)

Time: 3 Hours   Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1. (a) Derive an expression for the energy of a body executing simple harmonic motion and show that it is directly proportional to the square of the amplitude and inversely proportional to the square of the period.   **10M**

    (b) A particle performing simple harmonic motion has a maximum velocity of 0.4 m/S and a maximum acceleration of 0.8 m/Sec^2. Calculate the amplitude and the period of oscillator.   **4M**

(OR)

2. (a) Discuss about the amplitude for linear combination of simple harmonic oscillator of same frequency.   **6M**

    (b) What are damped oscillations? Solve the differential equation of a damped harmonic oscillator and discuss the case when it is under damped.   **8M**

UNIT – II

3. (a) Describe the arrangement to observe Newton`s rings by reflected light and obtain an expression for the wavelength of light   **10M**

    (b) In Newton`s rings experiment, the diameter of the 4th and 12th dark rings are 0.40 cm and 0.70 cm respectively. Find the diameter of 20th dark ring.   **4M**

(OR)

4. (a) Distinguish between Fresnel and Fraunhofer diffraction. Discuss Fraunhofer diffraction due to a single slit and deduce the position of maxima and minima.   **10M**

    (b) Calculate the angles at which the first dark fringe and next bright fringe are formed in the Fraunhofer diffraction pattern of slit 0.3 mm wide (wavelength=5890Å)   **4M**

UNIT – III

5. (a) Explain stimulated and spontaneous emission of radiation and derive Einstein coefficients.   **6M**

    (b) Describe the construction and working of a ruby laser.   **8M**

(OR)

6. (a) What is population inversion and explain the conditions for laser action. Write the properties and applications of laser beam.   **6M**

    (b) Describe the construction and working of a Nd-YAG laser.   **8M**

UNIT – IV

7. (a) Derive Schrödinger's time independent wave equation. Write the physical significance of wave function.   **10M**

    (b) Explain the Heisenberg's uncertainty principle   **4M**

(OR)

8. (a) Solve Schrodinger wave equation for a particle in a one dimensional infinite potential well and obtain energy eigen values and eigen functions   **10M**

    (b) If an electron is moving in an infinite one dimensional potential well of width 2 nm calculate the first order energy eigen value   **4M**

UNIT-V

9. (a) Write the assumptions of free electron theory? Obtain an expression for the electrical conductivity of a metal on the basis of Drude-Lorentz classical free electron theory. What are the successes and failures of free electron theory?   **10M**

    (b) The conductivity of a semiconductor is 4x10^{-2} ohm^{-1}cm^{-1} and electron mobility is 100 cm^2/V-Sec. Calculate the charge carrier concentration. (Given e = 1.6x10^{-19} C)   **4M**

(OR)

10. (a) What are intrinsic and extrinsic semiconductors? Give two examples for each type of semiconductors. Define the position of Fermi-level with neat diagram in each type of semiconductors.   **7M**

    (b) Describe the construction of a p-n junction with neat energy band diagram and explain the forward and reverse current voltage characteristics.   **7M**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. I Sem. (R18) Supple. Examinations of February/March - 2021
SUB: Engineering Physics (CSE)

Time: 3 Hours   Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT – I

1. (a) Explain Young's double slit experiment?   10M

   (b) In a Newton's rings experiment, the diameter of the 8th ring was 0.35 cm and the diameter of   4 M
   18th ring was 0.65 cm. If the wavelength of the light used is 6000Å then find the radius of
   curvature of the plano convex lens?

(OR)

2. Explain Fraunhofer diffraction due to a single slit   14M

UNIT – II

3. (a) Explain the characteristics of lasers?   6M

   (b) Derive the relation between various Einstein's coefficients?   8M

(OR)

4. (a) Explain the construction and working of Nd-YAG Laser?   10M

   (b) Explain various applications of Lasers?   4M

UNIT – III

5. Describe Kronig-Penny model to understand the behavior of electrons in a varying periodic   14M
   potential field of a crystal?

(OR)

6. (a) Explain free electron theory?   8M

   (b) Explain about metals, semiconductors and insulators?   6M

UNIT – IV

7. (a) Distinguish between p-type and n-type semiconductors?   6M

   (b) Explain Drift and Diffusion?   8M

(OR)

8. (a) What is PN junction? and Explain forward and reverse bias?   8M

   (b) Explain semiconductor materials of interest for optoelectronic devices?   6M

UNIT-V

9. What are Nano materials? and Explain the physical, chemical, optical and magnetic properties   14M
   of Nano materials

(OR)

10. (a) Describe the synthesis of Nano materials by ball milling method?   8M

    (b) Explain various applications of Nano materials?   6M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. I Sem. (R18) Supple. Examinations of February/March - 2021
SUB: Engineering Chemistry (CE, EEE & ME)

Time: 3 Hours   Max. Marks: 70
Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1. Explain crystal field theory and write notes on crystal field splitting of energy levels in tetrahedral complexes.   14M

(OR)

2. (a) Derive Schrodinger wave equation.   7M

   (b) Write notes on particle in one dimensional box.   7M

UNIT – II

3. (a) Write short notes on orbital energies of atoms.   8M

   (b) Write short notes on i) oxidation states ii) electro negativity.   6M

(OR)

4. (a) Explain about soft and hard acids and bases with examples.   8M

   (b) Write short notes on i) atomic radius   ii) electron affinity.   6M

UNIT – III

5. Define corrosion. Explain the various factors influencing the corrosion process.   14M

(OR)

6. (a) Write short notes on ionic and vanderwals interaction.   7M

   (b) Derive Nernst equation & write its applications.   7M

UNIT – IV

7. (a) Define spectroscopy. Explain the principles of spectroscopy   7M

   (b) Write short notes on fluorescence and its applications.   7M

(OR)

8. Explain rotational and vibrational spectroscopy of diatomic molecules.   14M

UNIT-V

9. (a) Describe the SN^1 reaction mechanism with suitable examples.   7M

   (b) Write notes on classification of isomers.   7M

(OR)

10. Explain briefly elimination reactions (E_1 & E_2) with examples.   14M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. I Sem. (R18) Supple. Examinations of February/March - 2021
SUB: English (CE, EEE & ME)

Time: 3 Hours   Max. Marks: 70

Answer any FIVE Questions
All questions carry Equal Marks.

1. (a) What is word formation? Discuss various types of word formation? **7M**
   (b) Give **Prefix**: (i)Activate   (ii) Calculate   (iii) Valid   (iv)Proper **7M**
       (v)Honest   (vi) Fold   (vii)Responsible

2. (a) Write one **Synonym** for each of the words: **7M**
      (i) Strange   (ii) Famous   (iii) Seldom   (iv) Enemy
      (v) Concise   (vi) Admire   (vii) Remedy
   (b) Write one **Antonym** for each of the words: **7M**
      (i) Random   (ii) Sick   (iii) Rapid   (iv) Motion
      (v) Smooth   (vi) Ambiguity   (vii) Artificial

3. (a) What is a paragraph? Throw light on the length of a paragraph. **7M**
   (b) Write a paragraph on: Honesty is the best policy **7M**

4. (a) **Interchange of Part of Speech**: **7M**
      (i)Gold (change to 'adjective' form)   (ii) Marriage (change to 'verb' form)
      (iii) Bold (change to 'adverb' form)   (iv) Imagine (change to 'noun' form)
      (v) Colour (change to 'adjective' form)   (vi) Strength (change to 'verb' form)
      (vii) Jealous (change to 'noun' form)
   (b) (i) Joe writes the book.(Convert to the passive voice) **7M**
      (ii) The cricket ball was caught by Jadeja. (Convert to active voice)
      (iii) She will never forgive that boy. (Convert to passive voice)
      (iv) A promise has been broken by him. (Convert to active voice)
      (v) The policeman told Arun that road led to the station.(Change to Direct Speech)
      (vi) Mother said to Prem, "I am going to the market." (Change to Indirect Speech)
      (vii) She said to her brother, "work hard." (Change to Indirect Speech)

5. (a) Fill in the blanks with suitable **prepositions**. **4M**
      (i) This is the person _____ whom I received information.
      (ii) He gave a gift _____ his daughter.
      (iii) Who are you afraid _____ ?
      (iv) He put his arm _____ her.
   (b) Supply appropriate **article** for the following: **4M**
      (i) _____ stitch in time saves nine. (The/A/An)
      (ii) _____ Bible is a sacred book. (The/A/An)
      (iii) _____ father in him forgave the son. (The/A/An)
      (iv) He is _____ M.B.A degree holder. (The/A/An)

   (c) Write a short note on: i) phrase ii) clause giving suitable examples **6M**

6. Give the meaning and make a sentence of your own for each of the **idioms** given below. **14M**
   (i) A close shave   (ii) A storm in a tea cup.   (iii) To turn the other cheek
   (iv) A red letter day   (v) The pros and cons   (vi) By hook or crook   (vii) Give one's ears

7. Write an essay on "Covid-19 Pandemic. **14M**

8. (a) **Precis writing:** 8M

Condense the following passage retaining the main idea and using a minimum number of words:

Whether science is a friend or a foe has been one of the the most raging debates for many decades now. Gradually, however, the debate is giving way to the belief that it does not matter whether it is a friend or foe. We all now understand that it is not just difficult but almost impossible for us to conceive of a world without the machines, motors, and computers that do not just make our life much more comfortable but almost define our existence. At the same time, we we are also aware of the damage that the rapid growth and advancement of science and Technology has caused to the environment. The real issue for us today, therefore, is not whether to see science as a friend or foe but to be able to survive without science and still not leave it.

(b) **Read the following passage and answer the questions:** 6M

It was in Germany and France that the first successful attempts were made to produce an internal-combustion engine driven by petrol. In England people were strangely timid about horseless vehicles. English inventors were handicapped by a quaint old law which forbade any such vehicle to attain a greater speed than four miles an hour, and compelled each one to be preceded by a man carrying a red flag. This law was not repealed until 1896.

The earliest motor cars were looked upon as mere jokes, or as rather dangerous playthings, by everyone except their inventors. Some of them were single-seaters, others would carry two or even three people; but all were noisy, clumsy, queer-looking things. When in 1888, Carl Benz, a German, produced a three-wheeled, internal-combustion car, a great forward stride had been made. Another German, whose name, Daimler, is often seen on motor cars to this day; was experimenting about the same time, and testing a petrol-driven engine,.

It is easy to understand how the introduction of the petrol-driven engine revolutionized road transport throughout the world. Until then the necessary power to push a vehicle along could not be obtained without the cumbersome tanks and boilers and furnaces of the steam engine. The internal-combustion engine is light in weight and small in size by comparison; the fuel is burned in it, so that there is no waste, like the dusty cinders of a coal-fire.

Questions

(i) How did most people regard early motor cars?

(ii) What were all early motorcars?

(iii) What made the English inventors handicapped?

(iv) What does 'repealed' mean?

(v) Which among the following words is as nearly opposite in meaning to 'clumsy' used in

the passage?

(vi) What is incorrect about the internal combustion engine?