Q.P. Code: 1802103 **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. I Sem. (R18) Supple. Examinations of October 2020

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. (a) Using nodal analysis, determine the potential across the 4- resistor in Figure 1. 7M

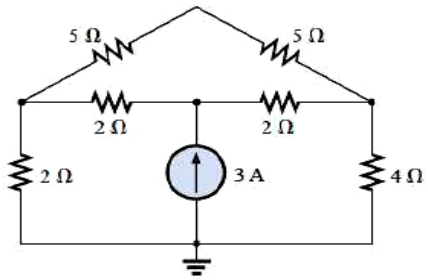

Figure 1

(b) What is the purpose of star-delta transformation? Explain its significance in brief. 7M

(OR)

2. (a) Apply mesh analysis to determine the currents in the network of Figure.2 given below 8M

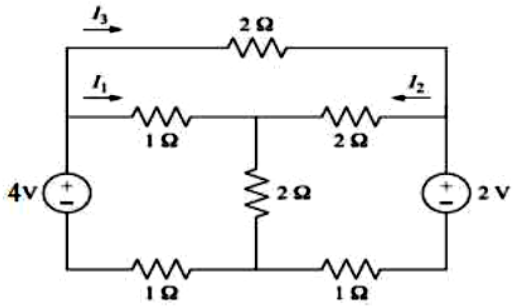

Figure. 2

(b) What are active and passive elements? List out the differences between them. 6M

UNIT – II

3. (a) A capacitor C is connected in series with a 40 Ω resistor across a supply of frequency 60 Hz. A current of 3 A flows and the circuit impedance is 50 Ω. Calculate: (i) the value of capacitance, C, (ii) the supply voltage, (iii) the phase angle between the supply voltage and current, (iv) the potential drop across the resistor, and capacitor.(v)Draw the phasor diagram. 8M

(b) Define i) Impedance ii) Power factor iii) Real power iv) Reactive power 6M

(OR)

4. (a) Three identical coils, each of resistance 10 Ω and inductance 42 mH are connected (i) in star and (ii) in delta to a 415V, 50Hz, 3-phase supply. Determine the total power dissipated in each case. 8M

(b) Define (i) Average value, (ii) R.M.S. value, (iii) Form factor and (iv) Crest factor. 6M

UNIT – III

5. (a) Prove that the emf equation of dc machine is $E_g = \left(\frac{\phi.Z.N.P}{60A}\right)$ 7M

(b) Explain the working principle of operation of a DC Generator with neat diagrams 7M

(OR)

6.	(a)	The useful flux of an 4 pole lap connected DC generator is 30mWb. Determine the number of conductors on the armature periphery if it has no-load voltage of 220 V and rotates at a speed of 800 rpm.	7M
	(b)	Derive the torque equation of a dc motor from its basics.	7M

UNIT – IV

7.	(a)	A 1-phase 6600/230 V, 50 Hz transformer has a core area of 400 cm^2 and a maximum flux density of 1.18 Wb/m^2. Calculate the number of turns in primary & secondary windings.	7M
	(b)	Explain different losses in a single-phase transformer.	7M

(OR)

8.	(a)	What is the principle of working of a squirrel cage Induction motor? Explain with neat diagrams.	7M
	(b)	Explain the constructional details of induction motor with necessary diagrams	7M

UNIT-V

9.	(a)	List and explain various switch gear equipment.	7M
	(b)	Explain MCB with necessary diagrams.	7M

(OR)

10.	(a)	Write a short notes on batteries.	7M
	(b)	Explain the significance of a power converter in electrical circuits.	7M

Q.P. Code: 1805104 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. I Sem. (R18) Supple. Examinations of October 2020

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) Illustrate and explain Software Development Life Cycle. 7M
   (b) Explain in detail about how to write an algorithm. Write an algorithm to find Fibonacci series. 7M

(OR)

2. Explain in detail various Input/output statements available in C with its syntax and examples. 14M

UNIT – II

3. Explain in detail about if – statements and switch- statement with its appropriate syntax and example program for each. 14M

(OR)

4. (a) Differentiate while and do-while loop with its appropriate syntax and example program for each. 7M
   (b) Write the appropriate syntax for jumping statements in C with example. 7M

UNIT – III

5. (a) Write syntax to declare and initialize 1D and 2D arrays. 4M
   (b) Write brief note on searching and its types. Write a program to find position of an element using binary search technique. 10M

(OR)

6. (a) Define string. Explain string handling functions with appropriate syntax and example for each. 10M
   (b) Write a program to check a given string is palindrome or not. 4M

UNIT – IV

7. (a) Differentiate Call by value and Call by reference. Write C program to swap two numbers by using parameter passing methods. 8M
   (b) Write short note on the various storage classes available in C. 6M

(OR)

8. (a) Define Pointer. Write syntax for declaring and initialization of pointer variable. 6M
   (b) Write a C program to read and print an array using pointers. 8M

UNIT-V

9. (a) Define Structure. Write syntax to define, declare and initialize structure and to access members of structure. 7M
   (b) Write a C program to create student mark list using Structure. 7M

(OR)

10. (a) Explain array of structures with syntax and example. 8M
    (b) Explain Union. Write a C program to calculate total and average of student marks using Union. 6M

Q.P. Code: 1821101 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. I Sem. (R18) Supple. Examinations of October 2020

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) Determine the rank of the matrix $A=\begin{bmatrix}1 & 1 & 2\\ 1 & 2 & 3\\ 0 & -1 & -1\end{bmatrix}$. 7M

   (b) Find the values of k such that the system of equations $x+ky+3z=0,\ 4x+3y+kz=0,\ 2x+y+2z=0$ has non-trivial solution. 7M

(OR)

2. Determine diagonal matrix orthogonally similar to the real symmetric matrix $A=\begin{bmatrix}3 & -1 & 1\\ -1 & 5 & -1\\ 1 & -1 & 3\end{bmatrix}$. 14M

UNIT – II

3. Examine the convergence of the series 14M

   $(i)\ \frac{x}{1+x}+\frac{x^2}{1+x^2}+\frac{x^3}{1+x^3}+...\infty$.

   $(ii)\ \left(\frac{2^2}{1^2}-\frac{2}{1}\right)^{-1}+\left(\frac{3^3}{2^3}-\frac{3}{2}\right)^{-2}+\left(\frac{4^4}{3^4}-\frac{4}{3}\right)^{-3}+...\infty$.

(OR)

4. (a) Test the convergence of the series $\sum_{n=1}^{\infty}\frac{1}{\sqrt{n}+\sqrt{n+1}}$. 7M

   (b) Test for convergence of $1+\frac{2^p}{2!}+\frac{3^p}{3!}+\frac{4^p}{4!}+...\infty,\ p\in R$. 7M

UNIT – III

5. (a) Expand $\log_e x$ in powers of $(x-1)$ and hence evaluate $\log_e 1.1$ correct to 4 decimal places. 7M

   (b) Find the volume of the largest possible right circular cylinder that can be inscribed in a sphere of radius a. 7M

(OR)

6. (a) Find the radius of curvature at the point $\left(\frac{3a}{2},\frac{3a}{2}\right)$ of the Folium $x^3+y^3=3axy$. 7M

   (b) Show that the parabolas $y=-x^2+x+1,\ x=-y^2+y+1$ have the same circle of curvature at the point $(1,1)$. 7M

UNIT – IV

7. (a) If $x = a\cosh\xi\cos\eta,\ y = a\sinh\xi\sin\eta$, show that $\dfrac{\partial(x,y)}{\partial(\xi,\eta)} = \dfrac{1}{2}a^2\left(\cosh 2\xi - \cos 2\eta\right)$. 7M

(b) Applying Lagrange's method of undetermined multipliers, find the dimensions of the rectangular box requiring least material for its construction when the box open at the top is to have a volume of 32 cubic feet. 7M

(OR)

8. (a) Show that $\dfrac{1}{2}\dfrac{\partial u}{\partial x} + \dfrac{1}{3}\dfrac{\partial u}{\partial y} + \dfrac{1}{4}\dfrac{\partial u}{\partial z} = 0$, where $u = f(2x-3y,\ 3y-4z,\ 4z-2x)$. 7M

(b) Show that the function $f(x,y) = x^3 + y^3 - 63(x+y) + 12xy$ is maximum at $(-7,-7)$ and minimum at $(3,3)$. 7M

UNIT-V

9. (a) Compute the value of $(i)\ \Gamma\left(\dfrac{1}{4}\right)\Gamma\left(\dfrac{3}{4}\right)\ (ii)\ \beta\left(\dfrac{9}{2},\dfrac{7}{2}\right)$. 7M

(b) Show that $\displaystyle\int_0^1 \frac{x^2}{\sqrt{1-x^4}}\,dx \times \int_0^1 \frac{1}{\sqrt{1+x^4}}\,dx = \frac{\pi}{4\sqrt{2}}$. 7M

(OR)

10. If $f(x) = \begin{cases} \pi x, & 0 < x < 1 \\ \pi(2-x), & 1 < x < 2 \end{cases}$ 14M

using half range cosine series show that $\dfrac{1}{1^4} + \dfrac{1}{3^4} + \dfrac{1}{5^4} + \ldots\infty = \dfrac{\pi^4}{96}$.

Q.P. Code: 1822102 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. I Sem. (R18) Supple. Examinations of October 2020
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) What is the criterion for the motion to be simple harmonic? Write down the differential equation for simple harmonic motion and obtain the relation for angular frequency and time period. 8M
   (b) How is the period of SHM changed when the mass and elastic constant are changed by the same ratio? 6M

(OR)

2. (a) A damped oscillator is subjected to a damping force proportional to its velocity. Set up differential equation for the oscillation. 8M
   (b) Discuss the under damped, over-damped and critically damped motions of the oscillator. 6M

UNIT – II

3. (a) Explain the Young`s double slit experiment and obtain the conditions for maxima and minima. 6M
   (b) Explain the formation of Newton`s rings in reflected light and derive the equation for the radius of curvature of a plane-convex lens. 8M

(OR)

4. (a) Discuss the Fraunhofer`s diffraction at a single slit and obtain the condition for maxima and minima. 6M
   (b) Discuss the theory of plane diffraction grating and derive the equation for principal maxima and minima. 8M

UNIT – III

5. (a) Distinguish between spontaneous and stimulated emission of radiation. Describe the construction and working of a He-Ne laser. 10M
   (b) Write the applications of lasers. 4M

(OR)

6. (a) What is population inversion and derive the relation between various Einstein`s Coefficients. 8M
   (b) Describe the construction and working of a semiconductor diode laser. 6M

UNIT – IV

7. (a) Explain the concept of de Broglie hypothesis and write the properties of matter Waves. 8M
   (b) Explain Heisenberg's uncertainty principle. Calculate the de Broglie wave length of a neutron moving with a velocity of $6x10^{6}$ m/sec. Given h = $6.63x10^{-34}$J.Sec and mass of neutron is $1.675x10^{-27}$ kg. 6M

(OR)

8. (a) Derive Schrödinger's time independent and time dependent wave equation and explain the significance of wave function (ψ). 10M
   (b) Calculate the energy required for an electron to jump from ground state to the second excited state in a potential well of width L. 4M

UNIT-V

9. (a) What are the assumptions of classical free electron theory and derive an expression for conductivity of metals based on free electron theory. 10M
   (b) Find the mobility of electrons in copper if there are $9x10^{28}$ valance electrons/m^3 and the conductivity of copper is 6x107 mho/m? 4M

(OR)

10. (a) Differentiate the intrinsic and extrinsic semiconductors with their energy band diagram. Derive an equation for carrier concentration in an intrinsic semiconductor at equilibrium. 10M
    (b) Explain drift and diffusion. 4M

Q.P. Code: 1822104 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. I Sem. (R18) Supple. Examinations of October 2020

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)	Discuss the theory of Newton's rings with relevant diagram?	10M
	(b)	Explain the principle of superposition of waves	4M
		(OR)	
2.	(a)	Give Theory of Fraunhofer diffraction due to single slit	10M
	(b)	Explain the importance of diffraction grating	4M

UNIT – II

3.	(a)	Mention the important difference between laser beam and ordinary light beam?	6M
	(b)	Derive Einstein's coefficients &Deduce the relation between Einstein's coefficients?	8M
		(OR)	
4.	(a)	Explain construction working principle of He-Ne laser. Write few advantages.	10M
	(b)	Explain the characteristics of laser	4M

UNIT – III

5.		Describe the salient feature of Kronig-Penny model?	14M
		(OR)	
6.	(a)	Derive the expression Electrical conductivity and Thermal conductivity based on classical free electron theory	7M
	(b)	What is the Fermi level? Explain the Fermi-Dirac distribution function of the electron in a metal. Discuss the variation with temperature	7M

UNIT – IV

7.	(a)	What is fermilevel? Locate its position for intrinsic semiconductor with help of diagram?	7M
	(b)	What is intrinsic semiconductor& extrinsic semiconductor? Mention the expression for intrinsic carrier concentration of intrinsic semiconductor?	7M
		(OR)	
8.	(a)	Explain the I-V characteristics of p-n junction diode	10M
	(b)	Define drift and diffusion current?	4M

UNIT-V

9.	(a)	Explain the physical properties of nano materials	7M
	(b)	Describe the synthesis of nano materials by ball mill?	7M
		(OR)	
10.	(a)	Mention applications of nano materials.	10M
	(b)	What is meant by top-down and bottom-up methods?	4M

Q.P. Code: 1823102 **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. I Sem. (R18) Supple. Examinations of October 2020

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. Show that the energies of a particle in one dimensional box are quantized. 14M

(OR)

2. (a) Explain the crystal field splitting in octahedral complexes with suitable example 7M
   (b) Define doping and summarize the role of doping in silicon 7M

UNIT – II

3. (a) Define the following and explain how they vary in period and group 10M
   i) Electronegativity ii) Ionization energies
   (b) Present your knowledge on the penetration effect of orbitals 4M

(OR)

4. (a) Discuss in detail about oxidation states and coordination numbers 10M
   (b) What is effective nuclear charge? Explain its periodic trends 4M

UNIT – III

5. (a) Explain the types of hardness in water 4M
   (b) What is boiler corrosion? List the reasons for boiler corrosion. How the boiler corrosion can be avoided? 10M

(OR)

6. Define corrosion and discuss the various factors play a vital role in the rate of metallic corrosion 14M

UNIT – IV

7. (a) Define spectroscopy and explain the general principles of spectroscopy. 7M
   (b) Why UV spectroscopy is called electronic spectroscopy? Write the applications of electronic spectroscopy. 7M

(OR)

8. Summarize the principle, selection rules and applications of vibrational spectroscopy of diatomic molecules. 14M

UNIT-V

9. (a) Explain Clemmensen reduction with example. 6M
   (b) Discuss the conformational analysis of cyclohexane. 8M

(OR)

10. (a) Explain enantiomers and diastereomers with examples. 8M
    (b) State and explain Markownikoff's additions with example. 6M

Q.P. Code: 1824103 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. I Sem. (R18) Supple. Examinations of October 2020

SUB: ENGLISH (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)	List eight root words from foreign languages used in English in their direct form and give their meanings.	8M
	(b)	Define each of the following giving suitable examples for each. (i) Noun phrase (ii) Verb phrase (iii) Prepositional phrase	6M
2.	(a)	Define the term 'Suffix'. Write any eight suffixes giving meaning and example word for each suffix.	9M
	(b)	Define the term 'Prefix' Add a suitable ' Prefix' to form antonymous meaning for each of the following words (i) Responsible (ii) Perfect (iii) Conscious (iv) Lodge	5M

UNIT – II

3.	(a)	What parameters have to be kept in mind while drafting a paragraph?	7M
	(b)	Punctuate the following : do you think that i am responsible for everything that goes wrong	3M
	(c)	What are the four main types of sentences?	4M
		(OR)	
4.	(a)	State whether the following sentences are compound or complex: i) All are equal but some are more equal than others. ii) I did not attend the party because I was not feeling well. iii) We tried our best but could not win the game.	3M
	(b)	Write a paragraph in about 150 words on 'Violation of traffic rules in your city'.	5M
	(c)	Explain Simple, complex and compound sentences giving suitable examples.	6M

UNIT – III

5.	(a)	i) She gave me advice.(Rewrite the sentence using 'advice' as adjective) ii) He goes to Chennai every year .(Rewrite the sentence using 'year' as adverb) iii) Her efforts were successful.(Rewrite the sentence using 'successful' as verb) iv) They pay me monthly.(Convert to the passive voice) v) The glass was broken by me.(Convert to the active voice) vi) I will never forgive you. (Convert to the passive voice) vii) The Police have caught the thief. (Convert to the active voice)	7M
	(b)	Identify the tense forms of the underlined words. i) It <u>will become</u> dark soon. ii) Suma <u>was crossing</u> the road when Kiran noticed her. iii) I <u>went</u> to my native place last week. iv) Deeksha <u>has learnt</u> to dance very quickly. v) I <u>go</u> to church every Sunday. vi) She <u>had been reading</u> nearly for an hour. vii) By next May, <u>we will have built</u> our new house.	7M

(OR)

6. (a) i) The nurse said, 'I am tired today.' (Convert to the Indirect speech) 7M
ii) My friend told me that I had come first in my class.(Convert to the Direct speech)
iii) Kim said to me, 'I know that you are right.' (Convert to the Indirect speech)
iv) Julie told Joe that it might rain that evening' (Convert to the Direct speech)
v)'Just go out of the ward', the doctor told us. (Convert to the Indirect speech)
vi) Ben wished he had a luxury car. (Convert to the Direct speech)
vii) 'You really need to see a lawyer.' (Convert to the Indirect speech)

(b) Write one synonym of each of the following words: 4M
i) Enormous ii) Candid iii) Transparent iv) Quiet

(c) Write one antonym of each of the following words: 3M
i) Expand ii) Sour iii) Sharp

UNIT – IV

7. (a) Rewrite each of the following sentences if necessary by choosing the correct form of the verb that agrees with the subject. 7M
i) The teachers has not come yet.
ii) Even five thousand rupees were a lot of money in the 1970s.
iii) Here X stand for the space variables.
iv) A possible connection between cancer and smoking have been established.
v) The number of deaths are high.
vi) He thinks he know everything.
vii) Everybody have arrived.

(b) Identify and delete the redundant words/phrases and rewrite each of the following sentences. 7M
i) They are constantly working on new innovations in research.
ii) He was the younger of the two twins.
iii) In a moment of hopeful optimism, she made that decision.
iv) Please combine the three departments into one.
v) Would you please repeat that statement again?
vi) She gave me unexpected surprise.
vii) The army advanced forward to attack its enemy.

(OR)

8. (a) Fill in the blanks with appropriate phrasal verbs 5M
i) Mohit _____ (gave up/gave into) smoking following the doctor's advice.
ii)Sudha found it difficult to _____(cope up/cope with) the situation.
iii)Rahul's request for transfer was _____(turned in/ turned down) by his boss.
iv) I _____ (deal with/ deal in) leather goods.
v) you stand by me, please do not _____(back up/ back out) now.

(b) Fill in the blanks with suitable prepositions. 5M
(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.
(v) The book is _____ the table

(c) Fill in the blanks with suitable articles. 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)

UNIT-V

9. (a) What are the steps to be followed for writing a good Précis**?** 7M

(b) Write an essay on 'Junk Food' 7M

(OR)

10. (a) Read the following passage carefully and answer the questions. 6M

At one time in the history of India, most women knew very well how to bring up their infants and they lived a perfectly healthy life, free from diseases. The overall standard of women and children in the country was much better than that of other civilizations of that period. But ever since India was exposed to frequent foreign invasions from foreign nations, the life was unsafe and property unprotected, the people were forced to congregate in towns in such a compact way that it led to awful insanitation and diseases. The traditional knowledge of domestic and personal health and hygiene was ignored. Women were confined indoors for fear of insults and a train of social and unhealthy dangers followed all round. It is a problem how now we can restore the original conditions of healthy and happy life in India. This is a socio-economic problem which needs to be given priority to bring back the original culture and restore welfare of women and children in India.

Questions

1. What was the main cause of poor health conditions of women in India?
2. What question has the writer posed before the readers?
3. Why did life become unsafe and property unprotected?
4. Why were the women confined indoors?
5. When were the women leading a perfectly healthy life?
6. What does the word 'congregate' mean in the passage?

(b) Write the meanings of the following idioms and use them in your own words. 8M

i) Fit as a fiddle ii) Kick the bucket iii) Eat like a bird iv) Acid test
v) Bolt from the blue vi) Bell the cat vii) Once in a blue moon
viii) At the eleventh hour