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R-20 **Code : 20SH1101**

B.TECH. DEGREE EXAMINATION, APRIL 2022

I B.Tech. I Semester

COMMUNICATIVE ENGLISH

(Common to All Branches)

Time : 3Hrs Max. Marks : 60

*Answer **SIX** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks

* * *

SECTION - I

1. (a) What is William Hazzlitt's attitude towards how one should behave with other people?
   (b) Identify the part of speech of the word underlined in the following sentences
   1. She ran **very quickly** to school.
   2. That was an **incredible** sight
   3. He didn't work hard **so** he failed his exam
   4.Make words using following Suffixes
   i) tion ii) ment

2. (a) Write an essay on "Ill effects of Smartphones on youth"
   (b) **Rewrite the following sentences as directed**
   1. Sita is singing a song now. (change it into Interrogative sentence)
   2. Jhon broke the window yesterday. (change it into Negative sentence)
   3. Anand doesn't teach English. (change it into Assertive sentence)
   4. The girl gave her fruits. (change it into Negative sentence)

SECTION – II

3. (a) What are the various words the poet uses to describe the sound of the brook? How does it contribute to the effect of the poem?
   (b) **Fill in the blanks with suitable articles (a/an/the)**
   1. I reserved _____ table for three.
   2. He told me ____ interesting story yesterday.
   3. Some of my friends live in ____ United States of America.
   4. Make words using following Prefixes
   i) un ii) dis

4. (a) Describe the process of making Tea in more than 100 words.
   (b) **Fill in the blanks with suitable linkers from those in brackets**
   1. Tigers won't attack _____(unless/ because) they are hungry.
   2. You should start early, _____(indeed/ otherwise) you are likely to miss the train.
   3. She is beautiful _____(and/ but) not vain.
   4. I will wait for you _____(unless/until) you return.

SECTION – III

5. (a) Describe the conversation between Stronetz and the Prince in The Death Trap. What do you understand from it.

   (b) **Identify suitable pronouns in the following blanks from those in brackets.**

   1. How can you trust a woman such as _____(she/ her)
   2. Sita _____(herself/ itself) opened the door.
   3. The man _____(whom/ who) is honest succeeds in life.
   4. There was no one present except _____(me/ I)

6. (a) You are selected in the class to give a speech on "National Science Day". Prepare speech gathering information on "the importance of Science" in the modern world.

   (b) **Select the correct form the verb shown in brackets.**

   1. One of the boys _____(was/ were) punished.
   2. Mohan as well as his friend ____(is/are) guilty.
   3. Time and tide _____(waits/ wait) for none.
   4. Neither of the girls _____(has/ have) brought her book.

SECTION – IV

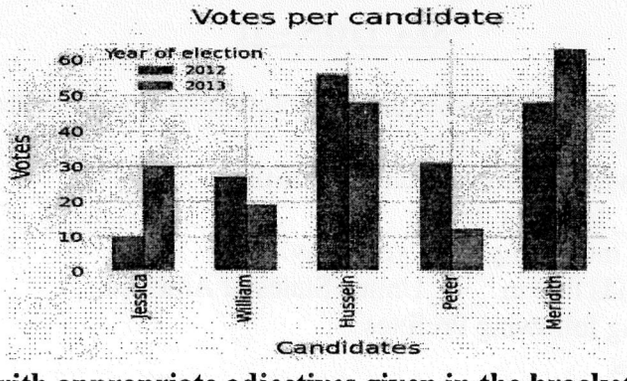
7. (a) Explain, Why Mohammad Yunus established Grameen Bank and how it helped rural women in Bangladesh?

   (b) **Rewrite the following as directed**

   1. Lead is the heaviest of all metals. (Change into comparative degree)
   2. Very few Indian cities are as big as Chennai. (Change into superlative degree)
   3. The mango is sweeter than the Pine-apple. (Change into positive degree)
   4. Write antonyms to the following words.

      i) Barbarian ii) Shallow

8. (a) Read the Bar-graph given below and describing the information in 150 words.



   (b) **Fill in the blanks with appropriate adjectives given in the brackets**

   1. My _____(elder/ older) sister is a journalist
   2. There were _____ (fewer/ less) applicants than expected
   3. She was happy when she got the job but two weeks _____ (latter/ later) she was fired.
   4. The injure were taken to _____(nearest/next) hospital.

SECTION – V

9. (a) Mention three expressions that George Orwell wishes would stop being used. Also explain what these expressions mean.

(b) **Rewrite the following sentences into the passive voice.**

1. Women are washing their clothes
2. This play surprised the visitors.
3. People called him a fool
4. Write the meanings of the following one- word substitutes.

i) Linguist ii) Auto-biography

10. (a) Write a letter to the chairperson of your Municipality, complaining of the insanitary condition of the locality in which you live and asking him to take necessary steps in the matter.

(b) **Rewrite the following sentences as directed.**

1. A farmer is an important person. (add a question tag)
2. Teacher said, "It may rain tomorrow". (Change into Indirect speech)
3. He said to me, "give me your pencil". (Change into Indirect speech)
4. Write the meanings of the following one- word substitutes.

i) Monogamy ii) Bilingual

SECTION – VI

11. (a) **Read the following passage carefully and answer the questions given below**

A certain king once fell ill and doctors declared that only a sudden fright would restore him to health but the king was not a man for anyone to play tricks on, except his fool. One day, when the fool was with him in his boat, he cleverly pushed the king into the water. Help had already been arranged and the king was drawn ashore and put to bed. The fright, the bath and the rest in bed cured the diseased king; but he was so angry with the fool that he turned him out of the country. The fool returned, however, and the king ordered him to be put to death. Saying privately that he would only repay fright with fright, he directed the executioner not to use the axe but to let fall a single drop of water on the fool's neck. The fool was led to the gallows. The executioner dropped a drop of water on the fool's neck, and amidst shouts and laughter, the fool was asked to rise and thank the king for kindness. But the fool never moved: he was dead- killed by his master's joke.

1. How could the sick be cured?
2. Who alone could afford to play tricks on the king and why?
3. What did the fool do in the boat?
4. Why did the king turn the fool out of his country?
5. What cured the sick king?
6. Did the king really want the fool to die?

(b) **Correct following sentences**

1. I have seen him yesterday.

2. The French food is delicious

3. He is sleeping for 2 hours

4. Write the full abbreviation forms to the following

i) NATO ii) VAT

12. (a) Write an essay in your own words on "How you spent the Summer Vacation"

(b) **Correct following sentences**

1. I went to the India in 1985

2. My house is built in 2019.

3. I will ask to my mother tonight.

4. Write the full abbreviation form to the following

i) RBI ii) USP

R-20 **Code : 20SH1103**

B.TECH. DEGREE EXAMINATION, APRIL 2022

I B.Tech. I Semester

ENGINEERING CHEMISTRY

(Common to CE & ME)

Time : 3Hrs Max. Marks : 60

*Answer **SIX** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks

* * *

SECTION - I

1. (a) Discuss briefly about the various boiler troubles and their treatment methods.
   (b) Describe the desalination of brackish water by Reverse osmosis method.
2. (a) Describe the ion-exchange process for softening of water. What are its advantages and limitations?
   (b) What is meant by carbonate and non-carbonate hardness of water? Explain with examples.

SECTION – II

3. (a) Discuss the titration curves obtained in conductometric titrations of strong acid *vs* strong base.
   (b) What are the reference electrodes? Describe the construction of calomel electrode.
4. (a) Describe the construction and working of Zn-air battery with relevant reactions occurring during discharge.
   (b) Describe the construction of lead-acid battery with reactions occurring during discharge.

SECTION – III

5. (a) Explain how corrosion can be controlled by proper designing.
   (b) Write a short note on Role of sacrificial anode in corrosion control.
6. (a) Discuss the role of nature of oxide formed in dry corrosion. State and explain Pilling-Bed worth rule.
   (b) What are metallic coatings? Explain electroplating as an anticorrosive device.

SECTION – IV

7. (a) Distinguish between addition and condensation polymerization.
   (b) Write a short note on co-polymerization with suitable examples.
8. (a) What is Bakelite? Explain its preparation, properties and uses.
   (b) Describe the preparation, properties and uses (a) Thiokol (b) Urea-formaldehyde.

SECTION – V

9. (a) Define calorific value of a fuel. Describe the method of determination of calorific value of solid fuel by bomb calorimeter.

   (b) Discuss the ultimate analysis of coal with its significance.

10. (a) Define Octane and Cetane number. What is the significance of octane and Cetane number and for which these are used? How these can be improved?

    (b) What is crude oil? Write a short note on refining of crude petroleum.

SECTION – VI

11. (a) Give the classification of refractories with examples.

    (b) Write a short notes (a) Thermal Spalling (b) Dimensional stability (c) Porosity.

12. (a) Write a short notes (a) cloud and pour point (b) fire point and flash point.

    (b) Explain the setting and hardening of a Portland cement.

R-20 **Code: 20SH1104**

B.TECH. DEGREE EXAMINATION, APRIL 2022

I B.Tech. I Semester

APPLIED CHEMISTRY

(Electronics & Communication Engineering)

Time: 3Hrs Max. Marks: 60

*Answer **SIX** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks

* * *

SECTION - I

1. (a) Give Schrodinger equation, Explain significance of Ψ and Ψ^2.
   (b) What are the postulates of molecular orbital theory?

2. (a) Describe energy level diagrams of CO and calculate bond order.
   (b) Illustrate π-molecular orbitals of butadiene.

SECTION – II

3. (a) Explain oxidation state and coordination number of coordination compounds.
   (b) Draw d-orbital splitting in tetrahedral geometry.

4. (a) Differentiate Semi and superconductors.
   (b) Compare carbon nanotubes and Graphene nanoparticles.

SECTION – III

5. (a) Explain electrochemical cell; how electrode potential will calculate.
   (b) What is primary battery; explain Zinc air battery.

6. (a) Differentiate Specific, equivalent & molar conductance.
   (b) Explain PH metry and its applications.

SECTION – IV

7. (a) Discuss mechanism of wet corrosion.
   (b) Pilling Bedworth ratios and its uses.

8. (a) What is the preventive measures of corrosion?
   (b) Compare electroplating and electroless plating.

SECTION – V

9. (a) What is co- polymerization; explain with suitable example.
   (b) How average molecular weight of polymer can measure.

10. (a) Differentiate PVC and Nylon.
    (b) Demonstrate Preparation, properties and applications Bakelite.

SECTION – VI

11. (a) Define fuel; Classify them.

    (b) Explain determination of calorific value by boy's gas calorimeter.

12. (a) Illustrate Flue gas analysis by Orsat's apparatus.

    (b) Compare knocking and anti-knock agents.

R-20

Code : 20SH1102

B.TECH. DEGREE EXAMINATION, APRIL 2022

I B.Tech. I Semester

APPLIED PHYSICS

(Common to EEE, CSE, IT & AI&DS)

Time : 3Hrs

Max. Marks : 60

*Answer **SIX** Questions, Choosing **ONE** Question from each section*

All Questions carry equal marks

* * *

SECTION - I

1. (a) With necessary theory, explain the interference of light by wave front splitting.

   (b) Describe the Fraunhofer diffraction due to double slit.

2. (a) Explain the characteristics of laser light.

   (b) Describe the construction and working of He-Ne laser.

SECTION – II

3. (a) Describe the crystal systems along with its lattice parameters.

   (b) Explain the crystal structure determination by powder method.

4. (a) Write about properties and applications of ultrasonic waves.

   (b) Describe the production of ultrasonic waves by Piezoelectric Method.

SECTION – III

5. (a) State and explain Heisenberg's uncertainty principle along with is applications.

   (b) Describe the behaviour of a particle in a one-dimensional infinite potential well in terms of its eigen values.

6. (a) Explain Fermi-Dirac distribution function and discuss its temperature dependence.

   (b) Explain the classification of solids into conductors, semiconductors and insulators based on energy bad structure.

SECTION – IV

7. (a) With the help of band diagrams explain different extrinsic semiconductors and identify the variation of Fermi level with temperature.

   (b) Describe Hall Effect in a semiconductor along with its applications.

8. (a) Explain the formation of P-N junction and sketch its I-V characteristics.

   (b) Explain the construction, working principle and advantages of photo detectors.

SECTION – V

9. (a) Derive the expression for internal field in a polarised dielectric materials.

   (b) Explain the ferroelectricity along with its applications.

10. (a) Describe the origin of magnetic moments in an atom.

    (b) Explain hysteresis of ferromagnetic material.

SECTION – VI

11. (a) Describe Type I and type II superconductors.

    (b) Summarize BCS theory of superconductivity.

12. (a) Explain the physical, mechanical and magnetic properties of nanomaterials.

    (b) Describe the synthesis of nanomaterials by chemical vapour deposition method.

R-20 **Code: 20SH1105**

B.TECH. DEGREE EXAMINATION, APRIL 2022

I B.Tech. I Semester

ENGINEERING MATHEMATICS - I

(Common to All Branches)

Time: 3Hrs Max. Marks: 60

*Answer **SIX** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks

* * *

SECTION - I

1. (a) Solve the differential equation $e^y dx + (xe^y + 2y)dy = 0$.

   (b) Solve $(x^2y^2 + xy + 1)y\,dx + (x^2y^2 - xy + 1)x\,dy = 0$

2. (a) Solve $(5x^4 + 3x^2y^2 - 2xy^3)dx + (2yx^3 - 3x^2y^2 - 5y^4)dy = 0$

   (b) A pan filled with hot food cools from 94 °C to 86 °C in 2 minutes when the room temperature is at 20 °C. How long will it take to cool from 71 °C to 69 °C?

SECTION – II

3. (a) Solve $(D^3 + 1)y = Sin(2x + 1)$

   (b) Solve $(D^3 + 2D^2 - D - 2)y = 1 - 4x^3$

4. (a) Solve $(D^2 + 4D + 20)y = 23sint - 15cost$

   (b) Solve $(D^2 + 3D + 2)y = xe^x sin\,x$

SECTION – III

5. (a) Find $L\{ e^{2t} (3\,Sinh2t - 5\,Cosh3t)\}$

   (b) Find $L\left\{\frac{2\sin t \sinh t}{t}\right\}$

6. (a) Evaluate $\int_0^\infty t^3 e^{-t} \sin t\,dt$

   (b) Find $L\left\{\frac{1-\cos t}{t^2}\right\}$

SECTION – IV

7. (a) Find $L^{-1}\left\{\frac{4}{(s^2+16)^2}\right\}$ by using Convolution theorem.

   (b) Find $L^{-1}\left\{\frac{s}{s^4+2s^2+1}\right\}$

8. (a) Find $L^{-1}\left\{\frac{2s+1}{(s+2)^2(s-1)^2}\right\}$

   (b) Solve $y''(t) + y(t) = \text{Cos } 2t$ with $y(0) = 1, y'(0) = 1$

SECTION – V

9. (a) Determine the rank of a matrix $\begin{bmatrix} 1 & 1 & -3 & 2 \\ 2 & -1 & 2 & -3 \\ 3 & -2 & 1 & -4 \\ -4 & 1 & -3 & 1 \end{bmatrix}$ by reducing it to echelon form

   (b) Show that the equations $4x - y + 6z = 16$, $x - 4y - 3z = -16$, $2x + 7y + 12z = 48$, $5x - 5y + 3z = 0$ are consistent and solve them.

10. (a) If λ is an eigen value of a nonsingular matrix A ,then prove that $\frac{|A|}{\lambda}$ is the eigen value of adjA.

    (b) Find Eigen values and the corresponding Eigen vectors of the matrix $\begin{bmatrix} 5 & -2 & 0 \\ -2 & 6 & 2 \\ 0 & 2 & 7 \end{bmatrix}$

SECTION – VI

11. (a) Find the Taylor's series expansion of $f(x) = \sin x$, about $x = \pi/2$

    (b) Write the Maclaurin series expansion of the following functions of $\cos^2 x$

12. (a) Find the maximum and minimum values of $f(x, y) = x^3 + 3xy^2 - 15x^2 - 15y^2 + 72x$.

    (b) Find the maximum and minimum values of $f(x, y, z) = y^2 - 10z$,subject to the constraint $x^2+y^2+z^2=36$ by Lagrangian method of multipliers.

R-20 **Code: 20EE1101**

B.TECH. DEGREE EXAMINATION, APRIL 2022

I B.Tech. I Semester

BASIC ELECTRICAL SCIENCES

(Electrical & Electronics Engineering)

Time : 3Hrs Max. Marks : 60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks

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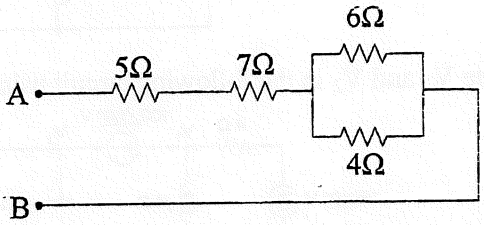
SECTION - I

1. (a) Give the volt-ampere relations of R, L, and C parameters.

   (b) What is the equivalent resistance between the terminals, AB in the following circuit?



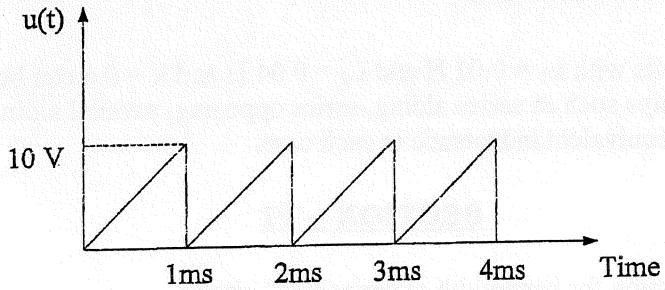
2. (a) Give the difference between dependent and independent sources.

   (b) Explain the delta-to-star transformation for a resistive network.

SECTION – II

3. (a) Define Average value, RMS value, Form factor & Peak factor.

   (b) Determine form factor for the given saw tooth wave form?



4. (a) Explain the terms: Reactance, Impedance, Susceptance and Admittance.

   (b) Convert (i) 5+j6 into polar form (ii) 27 ∟160° into rectangular form.

SECTION – III

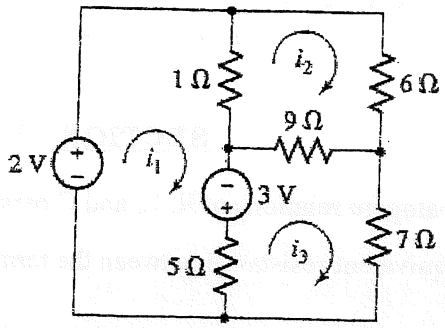
5. In a series RL circuit, R= 5 ohms and L= 0.06H and the voltage across Resistor is V_R=15 sin200t. Find the current and total voltage across the circuit.

6. (a) Define: (i) Graph (ii) Path (iii) Connected graph (iv) directed graph (v) Tree

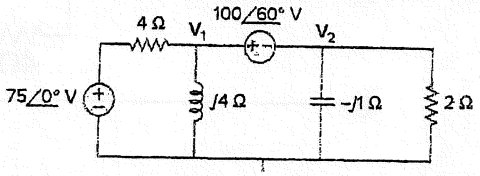
(b) Explain the procedure to form the tie-set matrix of the given network. Discuss the advantages of tie-set matrix.

SECTION – IV

7. Determine numerical values for each of the three mesh currents as labelled in the circuit diagram of figure below :



8 Calculate V_1 and V_2 in the following circuit using nodal analysis.



SECTION – V

9. (a) State and Explain Faraday's law of electromagnetic induction.

(b) Explain the dot convention for mutually coupled coils.

10. (a) Define self-inductance, mutual inductance and co-efficient of coupling and also derive the relation between them.

(b) Two coupled coils with $L_1 = 0.01$ H and $L_2 = 0.04$ H and $k = 0.6$ can be connected in four different ways such as series aiding, series opposing, parallel aiding and parallel opposing. Find equivalent inductance in each case.

SECTION – VI

11. (a) Derive the expression for bandwidth of series RLC circuit.

(b) A series RLC circuit has R=80 ohms, L=100 μH, C=0.3 μF. Find the resonant frequency and current at resonance if the supply voltage is 10 V.

12. (a) Draw the current locus diagrams of R-C series circuit with R variable as well as C variable.

(b) Define bandwidth and quality factor, and also write the relationship between them.

R-20 **Code : 20EE1102**

B.TECH. DEGREE EXAMINATION, APRIL 2022

I B.Tech. I Semester

BASIC ELECTRICAL ENGINEERING

(CSE, IT and AI & DS)

Time : 3Hrs Max. Marks : 60

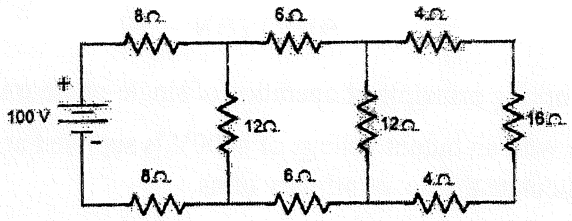
*Answer **SIX** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks

* * *

SECTION - I

1. (a) Classify network elements.

   (b) Calculate a) the equivalent resistances across the terminals of the supply b) Total current supplied by the source



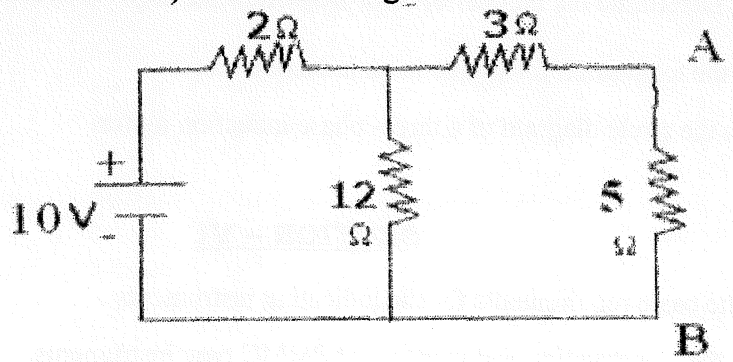
2. (a) Derive equivalent values of capacitance when 3 capacitances are connected in series and parallel.

   (b) Explain the star to delta transformation in a electrical circuit.

SECTION – II

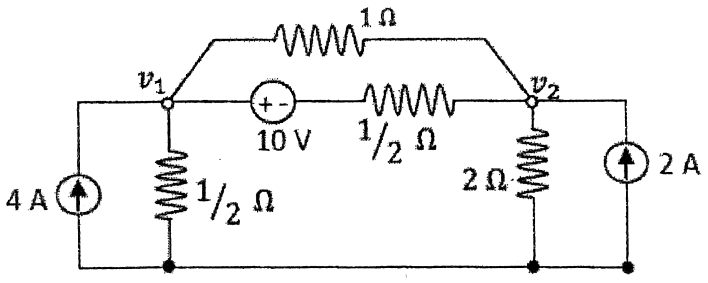
3. (a) State and explain Thevenin's theorem.

   (b) By using Thevenin's theorem, determine the current through 5 Ω resistor (All resistances are in Ω) as shown in figure.



4. (a) State super position theorem.

   (b) Find the power loss in the resistors of the network shown below using nodal analysis.



SECTION – III

5. (a) Define the following: i) RMS value, ii) Average value and iii) Form factor of an alternating quantity.

   (b) A 50Hz sinusoidal current has peak factor 1.4 and form factor 1.1. its average value is 20A. The instantaneous value of current is 15 A at t=0 sec. Write the equation of current and draw its wave form.

6. (a) Derive an expression for the current response in RLC series circuit with an sinusoidal source.

   (b) A series circuit consisting of a 20Ω resistor, a 100 μF capacitor and a 15 mH inductor is driven by a 50 Hz A.C voltage source of maximum value 100 volts. Calculate the equivalent Impedance, current in the circuit, the power factor and power dissipated in the circuit.

SECTION – IV

7. (a) Explain the working principle of operation of single-phase transformer.

   (b) A transformer with an output voltage of 4000V is supplied at 220V. If the secondary has 2000 turns, calculate the no. of primary turns.

8. (a) Derive the condition for maximum efficiency of a transformer.

   (b) A single phase 150 kVA transformer has efficiency of 96 % at full load, 0.8 pf and at half load with 0.8 pf lagging. Find maximum efficiency of transformer and Corresponding load.

SECTION – V

9. (a) Explain the Constructional details of squirrel cage and wound rotor machines.

   (b) A 6 pole slip ring induction motor runs at 290 rpm at full load, when connected to 50 Hz supply. Determine the number of rotor frequency and slip.

10. (a) Derive the expression for torque in an induction motor.

    (b) Explain the circle diagram of a three- phase induction motor.

SECTION – VI

11. (a) Write the basic requirements for the indicating instruments .

    (b) Explain the construction and working of PMMC type instruments.

12. (a) Define Absolute Instrument, Secondary Instrument .

    (b) Explain the construction and working of Repulsion type MI instruments with neat diagram.

R-20 **Code: 20CS1101**

B.TECH. DEGREE EXAMINATION, APRIL 2022

I B.Tech. I Semester

PROGRAMMING FOR PROBLEM SOLVING

(Common to All Branches)

Time: 3Hrs Max. Marks: 60

*Answer **SIX** Questions, Choosing **ONE** Question from each section*
All Questions carry equal marks

* * *

SECTION - I

1. (a) What is an algorithm? Write the various criteria used for judging an algorithm?

   (b) Write an algorithm to find the roots of quadratic equation for all the cases.

2. (a) Explain about identifiers and keywords in C.

   (b) What are the deferent data types available in C? Explain clearly about Basic Data types.

SECTION – II

3. (a) State the rules that applied while evaluating expressions in automatic type conversion.

   (b) Distinguish between getchar() and scanf() functions for reading strings.

4. Explain the following and illustrate it with an example each.
   A) Increment and Decrement Operator B) Conditional Operator
   C) Bit wise Operator D) Assignment Operator

SECTION – III

5. (a) Differentiate Entry control and exit control loops.

   (b) Write a C program to print the Pascal's triangle.

6. (a) What is the purpose of break statement?

   (b) Explain about Switch statement with an example program.

SECTION – IV

7. (a) What is an array? How to declare and initialize arrays? Explain.

   (b) Write a program to find the largest element in the array.

8. (a) Illustrate the usage of static variables using suitable program.

   (b) Distinguish between: A) Global and Local Variables B) Automatic and Static Variables

SECTION – V

9. (a) What is function? Give the structure of the functions and explain about arguments and their return values.

   (b) What are the Similarities between Variables and functions?

10 (a) Explain the effect of the following statements
   A) int a,*b=&a; B) int p,*p; C) char *s;

   (b) Explain the details about pass by value and pass by reference. Explain with a sample program.

SECTION – VI

11. (a) Define a file and elaborately discuss about reading, opening and closing a file.

    (b) Write a program to detect error while opening a file that does not exist.

12. (a) Distinguish between an array of structure and array within a structure. Give an example for each.

    (b) Write a program to illustrate the concept of structure with in structure.