Bharatiya Vidya Bhavan's

# SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)

Munshi Nagar, Andheri (W) Mumbai – 400058

**End Semester Examination**

**JUNE-2024**

10/6/24

**ELECTRICAL/MECHANICAL/CIVIL** **Duration: 03 Hours**

**Course Code: BS-FST201** **Maximum Points: 100**

**Course Name: ICDE** **Semester: II**

- **Attempt any five out of seven questions**
- **Use of scientific calculator is allowed**

Integral Calculus & Diff. Equation.

| QNO. | QUESTION | POINTS | CO | BL | Module No. |
|---|---|---|---|---|---|
| Q1 a) | Evaluate $\iiint \frac{1}{(1+x+y+z)^3}\, dx\, dy\, dz$ over the volume of the tetrahedron $x=0, y=0, z=0, x+y+z=1$ | 06 | 3 | 2 | 4 |
| Q1 b) | Solve $\frac{dy}{dx} + \left(\frac{4x}{x^2+1}\right) y = \frac{1}{1+x^2}$ | 06 | 1 | 3,5 | 1 |
| Q1 c) | Using Runge - Kutta method of fourth order, solve $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$ given $y(0) = 1$ at $x = 0.2, 0.4$ | 08 | 1 | 1 | 5 |
| Q2 a) | Prove that $\int_0^1 \sqrt{1-\sqrt{x}}\, dx \int_0^{1/2} \sqrt{2y-4y^2}\, dy = \frac{\pi}{30}$ | 06 | 2 | 2 | 5 |
| Q2 b) | Evaluate $\int_0^1 \int_0^{\sqrt{1-x^2}} \int_0^{\sqrt{1-x^2-y^2}} \frac{1}{\sqrt{1-x^2-y^2-z^2}}\, dx\, dy\, dz$ | 06 | 2 | 2 | 4 |
| Q2 c) | Solve $(3x+2)^2 \frac{d^2y}{dx^2} + 3(3x+2)\frac{dy}{dx} - 36y = 3x^2 + 4x + 1$ | 08 | 1 | 3 | 2 |
| Q3 a) | Solve $(D^2 + 2D + 1)\, y = x \cos x$ | 06 | 1 | 2 | 2 |
| Q3b | State and prove Duplication formula | 06 | 2 | 2 | 4 |

| | | | | | |
|---|---|---|---|---|---|
| Q3c) | Change the order of integration $\int_0^1 \left\{ \int_{\sqrt{2x-x^2}}^{1+\sqrt{1-x^2}} \phi(x,y)\,dy \right\} dx$ | 08 | 2 | 4,5 | 3 |
| Q4 a) | Solve: $(D^2+4)\,y = \sin x + e^x + x^2$ | 06 | 1 | 3 | 2 |
| Q4 b) | Find y(0.1), y(0.2) given $\frac{dy}{dx} = x^2y - 1$, $y(0) = 1$ Using Taylor's series method. | 06 | 2 | 2 | 1 |
| Q4 c) | Prove that : $\int_0^\infty xe^{-x^8}dx \cdot \int_0^\infty x^2 e^{-x^4}dx = \frac{\pi}{16\sqrt{2}}$ | 08 | 3 | 3 | 1 |
| Q5 a) | Find the area of the cardiod $r = a(1-\cos\theta)$ | 06 | 3 | 2 | 5 |
| Q5 b) | Solve $\frac{dz}{dx} + \frac{z}{x}\log z = \frac{z}{x^2}(\log z)^2$ | 06 | 2 | 2 | 1 |
| Q5c) | Solve: $(D^2-1)y = x\sin x + (1+x^2)e^x$ | 08 | 2 | 3 | 2 |
| Q6 a) | Solve $\frac{di}{dt} + \frac{Ri}{L} = \frac{E}{L}$ in which the circuit has initial current $i_0$. at time t = 0 and emf $E = E_0 e^{-kt}$ | 06 | 1 | 4 | 2 |
| Q6 b) | Find the mass of lamina bounded by the curves $y^2 = ax$ and $x^2 = ay$ if the density of the lamina at any point varies as the square of its distance from the origin. | 06 | 3 | 3 | 5 |
| Q6c) | Change to polar and evaluate $\int_0^1 \int_x^{\sqrt{2-x^2}} \frac{x}{\sqrt{x^2+y^2}}\,dx\,dy$ | 08 | 2 | 3 | 3 |
| Q7 a) | Change the order of integration and evaluate $\int_0^2 \left\{ \int_{\sqrt{2y}}^{2} \frac{x^2}{\sqrt{x^4-4y^2}}dx \right\} dy$ | 06 | 2 | 3 | 3 |
| Q7b | Find the length of the loop of the curve $9y^2 = (x+7)(x+4)^2$ | 06 | 3 | 2 | 5 |
| Q7 c) | Solve $\frac{d^3y}{dx^3} - 4\frac{dy}{dx} = 2\cosh^2 2x$. | 08 | 1 | 3,5 | 2 |

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**Sardar Patel College of Engineering**
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**End Semester Exam**
**JUNE 2024**

12/6/24

Max. Marks: 100 Duration: 3 Hours
Class: F.Y. B.Tech (CME) **Semester: II** Program: B.Tech CME
**Course Code :** AE BT 201

Comm. Skills

NOTE:

- **Question 1 is compulsory.**
- **Out of remaining 6 questions attempt any 04**
- **Total questions to be attempted is 5 including question 1.**
- **Please write subsections of questions in a sequence**

| Sr.No. | Questions | Points | CO | BL |
|---|---|---|---|---|
| Q.1. A | "The single most important characteristics of the human race is the ability to communicate". Explain the process and elements of communication process in detail. Draw a neat diagram of the communication process. | 10 | 02 | 01 |
| Q.1.B. | Write Short Notes on any (TWO)<br>a. Eye training and Mind Training to effective reading<br>b. Proxemics and haptics as means of non-verbal communication.<br>c. Discuss the important characteristics of conversation.<br>d. Advantages of Oral Communication | 10<br>05<br>Each. | 02 | 02 |
| | | | | |
| Q.2. A. | Does our culture influence our interpretation of the behaviour of those from other cultures? Explain the cultural barriers to communication in relation to values, time, space, paralanguage, colour, space distance. | 12 | 03 | 03 |
| Q.2. B. | Discuss the main classification of Non-Verbal Communication with diagram. Describe the importance of non-verbal communication in daily life with examples. | 08 | 02 | 01 |
| | | | | |
| Q.3. A. | A passage for summarization and comprehension:<br><br>In the ever-evolving landscape of engineering, the effective utilization of the latest technology is not merely advantageous but imperative for staying ahead of the curve. From artificial intelligence to quantum computing, engineers are constantly challenged to adapt to and harness the power of emerging technologies to solve complex problems and drive innovation.<br><br>One such groundbreaking technology is quantum computing, which has the potential to revolutionize the field of computational engineering. Unlike classical computers that rely on binary bits, | 20 | 01 | 03 |

which can represent either a 0 or a 1, quantum computers utilize quantum bits or qubits, which can exist in multiple states simultaneously. This quantum parallelism enables quantum computers to perform calculations at exponentially faster speeds, unlocking new possibilities for modeling complex systems and optimizing engineering processes.

Moreover, the integration of artificial intelligence (AI) and machine learning algorithms has ushered in a new era of autonomous engineering. Engineers can leverage AI to analyze vast datasets, identify patterns, and make data-driven decisions with unparalleled accuracy and efficiency. Whether it's optimizing energy consumption in smart buildings or fine-tuning production processes in manufacturing plants, AI-powered systems are redefining the boundaries of what's possible in engineering.

Furthermore, the Internet of Things (IoT) has emerged as a game-changer in engineering, enabling the seamless integration of physical devices and digital systems. Through IoT sensors and connectivity, engineers can remotely monitor and control equipment in real-time, predict maintenance needs, and optimize performance for maximum efficiency and reliability. This interconnectedness not only enhances productivity but also enhances safety and sustainability across various engineering domains.

Comprehension Questions:

1. What is quantum computing, and how does it differ from classical computing? 02

2. How can artificial intelligence benefit engineers in decision-making processes? 02

3. What role does the Internet of Things (IoT) play in engineering? 01

4. How does quantum parallelism enable faster computations in quantum computing? 01

5. What are some examples of how engineers can utilize AI in various industries? 02

6. Choose the synonym for "imperative": a) optional b) crucial c) insignificant d) minor 01

7. Select the antonym of "efficiency": a) productivity b) effectiveness c) inefficiency d) capability 01

| | | | | |
|---|---|---|---|---|
| | 8. In the phrase "quantum parallelism enables quantum computers to perform calculations," what part of speech is "parallelism"? a) noun b) verb c) adjective d) adverb 01<br><br>9. Write a summary in 120 words for the above passage. 05 | | | |
| Q. 3.B. | One word substitutes:<br>1. An annual calendar that contains important dates and time.<br>2. A structure on which abstractly defined structure is based.<br>3. Copying someone else's work and trying to submit as your own.<br>4. Exact use of words that were being used originally. | 04 | 01 | 01 |
| | | | | |
| Q.4. A. | 'Listening is hearing with thoughtful attention'. Explain in detail the importance of listening and the different types of listening. What strategies help improve listening? | 12 | 04 | 05 |
| Q.4. B. | Case Study:<br>*There are times when teachers are too busy to listen to their students' difficulties. Students find them preparing the next day's lecture, correcting scripts, doing administrative jobs, or discussing college problems with other teachers.*<br>*Geeta, an Engineering student finds herself approaching her Head of Department, who seldom encourages students to discuss their personal problems or any course related questions or concerns. The teacher brushes her off by pointer her mistakes, shouting at her publicly and saying she is too busy to deal with her problems.*<br>***Geeta:*** *Madam?*<br>***Ms. Sanika:*** *Yes?*<br>***Geeta:*** *Can I talk to you for a minute? I need your help.*<br>***Ms. Sanika:*** *Not Now Geeta, I am making papers and I have lot of papers to correct. I am also busy with other department related work.*<br>***Geeta:*** *Madam then can I see you after my class, Please?*<br>***Ms. Sanika:*** *No Not today. I have to attend the faculty meeting and also have to prepare for tomorrow's lectures. Why don't you approach Rita Madam?*<br>***Geeta:*** *Madam, I had actually first gone to Rita Madam. She also told me she is not free. She too was busy with some administrative wark.*<br>***Ms. Sanika:*** *Yes, Geeta, we all are very busy till the end of this month. And yes, attend lectures regularly so that you do not have ta come with problems to us.* | 08<br>02 each question. | 04 | 05 |

| | | | | |
|---|---|---|---|---|
| | Questions:<br>A. Discuss the barrier to Listening as shown by response of the teacher to Geeta. (02)<br>B. What, according to you, is the real reason for the teacher's inability to listen to Geeta? Are they really too busy to listen to students' problems? (02)<br>C. 'I am too busy'. What does this statement show about the nature of the responses of some teachers? (02)<br>D. What tips will you give to teachers to improve listening? (02) | | | |
| | | | | |
| Q.5. A. | Discuss the formal and informal channels of communication. What gives rise to informal channels of communication in an organization? How can the management prevent it from spreading? | **10** | **04** | **01** |
| Q.5. B. | Answer the following questions :<br>a. Explain the Advantages and Limitations of Horizontal means of communication. (05)<br><br>b. Choose only **one correct and appropriate answer** from choices given: (05)<br><br>**1. In organizations, the flow of communication sometimes slows down because there are too many:**<br>i. Managers<br>ii. Channels<br>iii. Hierarchical levels<br>iv. Departments.<br>**2. To create a cooperative, understanding, and pleasant work environment in an organization, decision making should be:**<br>i. Transparent<br>ii. Strong<br>iii. Flexible<br>iv. Quick<br>**3. A limitation of informal communication is that it is:**<br>i. inadequate<br>ii. personal<br>iii. unwarranted<br>iv. false<br>**4. Formal channels of communication promotes:**<br>i. Quick transmission of information<br>ii. Unofficial information<br>iii. Hierarchical authority<br>iv. Communication through prescribed routes.<br>**5. Horizontal means of communication:**<br>i. Helps in spreading rumors'<br>ii. Creates misunderstanding amongst peers<br>iii. Helps in thrashing out problems through mutual cooperation. | **10 marks 05 each** | **05** | **04** |

| | | | | |
|---|---|---|---|---|
| Q.6.A. | Write a mail to Head of department ( First year Engineering program) seeking permission to conduct a one- week short- term training program on soft skills and Interpersonal skills during summer vacation . Invent necessary details with schedule and details of speakers. | 10 | 03 | 06 |
| Q.6. B. | What do you understand by netiquette? Write in detail the rules to be followed for etiquette while using the internet and rules to be followed while writing emails. | 10 | 05 | 06 |
| | | | | |
| Q.7. A. | Explain **(Any Two)** of the following principles of business correspondence with examples. :<br>1. You-Attitude<br>2. Emphasize the positive<br>3. Avoiding verbosity in a business letter. | 10 | 05 | 02 |
| Q.7. B. | A reply letter to an erring customer: Read the letter and Rewrite the letter according to the principles of effective correspondence. Apply all the principles of effective business writing.<br>Write the letter using all 8 basic parts of a letter in correct format.<br><br>*Dear Sir;*<br><br>*Your letter of 23rd, with a cheque for Rs. 25,000 an account, is to hand.*<br><br>*We note what you say regarding the difficulty you experienced in collecting your outstanding accounts, but we are compelled to remark that we do not think that you are treating us with consideration we have a right to expect.*<br><br>*It is true that small remittances have been forworded from time to time, but the debit balance against you has been steadily increasing during the past twelve months until it now stands at the considerable total of Rs. 85,000.*<br><br>*Having regard to the many years during which you have been a customer of this house and the generally satisfactory character of your account, we are reluctant to resort to harsh measures.*<br><br>*We must however, insist that the existing balance be cleared by regular installments of say Rs. 10,000 per month, and the first installment should reach us by the 7 July. Meanwhile, you shall to pay cash for all further gods; we are allowing you an extra 3 percent discount in lieu of credit.*<br><br>*We shall be glad to hear from you about this favor that is being offered to you, as otherwise we shall have no alternative but to close your account and place the matter in your honds.*<br><br>*Sincerely,* | 10 | 05 | 06 |
| | | | | |

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End Semester Examination Sem II 2023-2024

June 2024

14/6/24

Total Marks: **100** Duration: **3 Hrs**

CLASS/SEM : **F.Y.B.Tech Electrical Sem.-II** COURSE NAME : **ENGINEERING PHYSICS**

COURSE CODE: **BSBTE202** DATE: **14/06/2024**

- **Answer any FIVE questions out of SEVEN.**
- **Diagrams have to be drawn wherever necessary. Assume suitable data (if necessary) and state your assumptions clearly.**
- **Figures to the right indicate Mark, Module no, Course Outcome and Bloom's Taxonomy level respectively.**
- **Marks will be given on the basis of what will be written in the paper irrespective of your intentions!**

Good luck!

| | | Mark | MN | CO | BL |
|---|---|---|---|---|---|
| Q1. | **(20 mark)** | | | | |
| a. | Find the wave vector and hence the momentum of the particles which come out as an output in a He-Ne laser. | **5** | 1,5 | 1 | 3,5 |
| b. | Prove that the divergence of curl of the following function is ZERO! $\overrightarrow{v_a} = x^2\hat{x} + 3xz^2\hat{y} - 2xz\hat{z}$ (please read $\hat{x}, \hat{y} and \hat{z}$ as unit vectors along the direction of X,Y and Z axes. | **5** | 3 | 3 | 3 |
| c. | A silicon optical fibre with a core diameter large enough has a core refractive index of 1.50 and a cladding refractive index 1.47. Determine(i) the critical angle at the core cladding interface, and the numerical aperture for the fibre. | **5** | 5 | 5 | 3 |
| d. | Velocity of ultrasonic waves in mild steel is $5.9 \times 10^3$ m/s. The velocity of ultrasonic waves in brass calibrated for mild steel measured by an ultrasonic gauge meter is $4.8 \times 10^3$ m/s. If the thickness of brass plate measured by gauge meter is 12.8cm, calculate its real thickness. | **5** | 4 | 4 | 3,5 |
| Q2. | **(20 mark)** | | | | |
| a. | Arrive at Schrodinger's time independent equation from its time dependent form. | **8** | 2 | 2 | 2 |
| b. | A He-Ne laser has an output power of 2.5mW. How many photons are emitted each milli second by this laser when operating? | **6** | 5 | 5 | 3,5 |
| c. | Derive integral and differential forms of Gauss' law. | **6** | 3 | 3 | 3 |
| Q3. | **(20 mark)** | | | | |

| | | | | | |
|---|---|---|---|---|---|
| a. | Derive expressions for Numerical Aperture and Acceptance angle of Optical fibers. | **8** | **5** | 5 | 3 |
| b. | Evaluate the first three energy levels of an electron enclosed in a box of width 10A°. Compare it with those of a person of mass 80kg moving inside a potential well of width 1m. Comment on the results. | **6** | 1 | 1 | 3 |
| c. | 2 ships are separated by a particular distance. Ultrasonic signals of frequency 150 kHz are sent from one ship to another through air and through water. Find distance between the ships and time required for the signal to travel through water. Given: velocity of the signal in air is 348 m/s and velocity in water is 1520 m/s and that the difference in times sent through water and air is 2s. | **6** | 4 | 4 | 3 |
| Q4. | **(20 mark)** | | | | |
| a. | State Maxwell's equations in medium as well as vacuum. Also, derive electric wave equation in vacuum. | **8** | 3 | 3 | 1, 3 |
| b. | Evaluate the uncertainty in position of a particle if it has a wavelength corresponding to the wavelength output of a He-Ne Laser. Given: $\Delta\lambda$ is 0.69A°. | **6** | 1&5 | 1 & 5 | 2,5 |
| c. | An optical wire has light incident into the fiber from a liquid with an index of refraction of 1.33. If the index of refraction of the core is 1.58, what is the critical angle needed to achieve total internal reflection? Also calculate the Numerical aperture of the optical wire given that the fractional refractive index change is 0.05. | **6** | 5 | 5 | 3,5 |
| Q5. | **(20 mark)** | | | | |
| a. | Explain construction and working of an Nd:YAG laser in detail. | **8** | 5 | 5 | 1,2 |
| b. | Derive differential form of Ampere's law from its integral form. | **6** | 3 | 3 | 3 |
| c. | Imagine an electron inside an infinite potential well of width 10A° in an energy state corresponding to the wavelength output of an Nd:YAG laser. Calculate the order of the excited state corresponding to this energy. | **6** | 2&5 | 2 | 3,4 |
| Q6. | **(20 mark)** | | | | |
| a. | Explain the principle of working of a piezolectric oscillator in detail with a neat and labeled diagram. | **8** | 4 | 4 | 3 |
| b. | Explain the working of a four level pumping scheme. | **6** | 5 | 5 | 3 |
| c. | Explain (with both mathematical and Physical reasoning) Heisenberg's Uncertainty Principle using the concept of a wave group. | **6** | 1 | 1 | 3 |
| Q7. | **(20 mark)** | | | | |
| a. | Derive the Energy Eigen values and Eigen functions for a particle moving in an infinite height and of width L. Also sketch the probablities function for the states n=1 and 2. | **8** | 2 | 2 | 3 |
| b. | Draw a diagram which clearly mentions important axes of a quartz crystal. Also mention different cuts of the quartz crystal. | **6** | 4 | 4 | 3 |
| c. | Wavelengths can be determined with accuracies of one part in $10^8$. What is the uncertainty in the position of a 1.5A° X-ray photon when its wavelength is simultaneously measured? | 6 | 1 | 1 | 3,5 |

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F-Y. **End Sem June 2024** 19/6/24

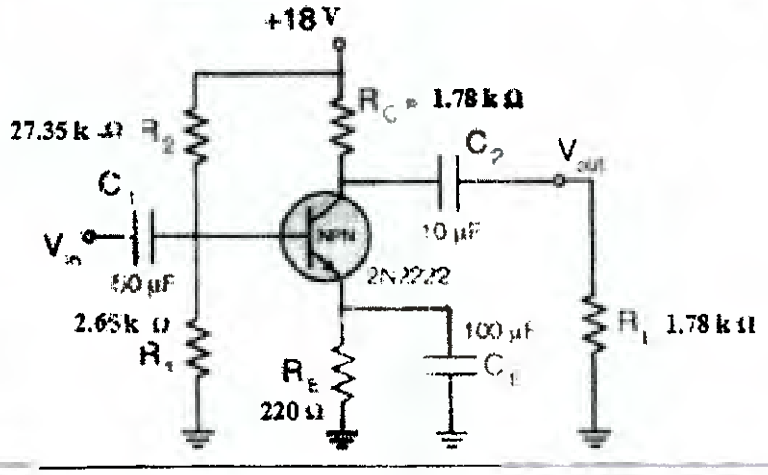
**Program:** Electrical Engineering **Duration: 3 Hour**

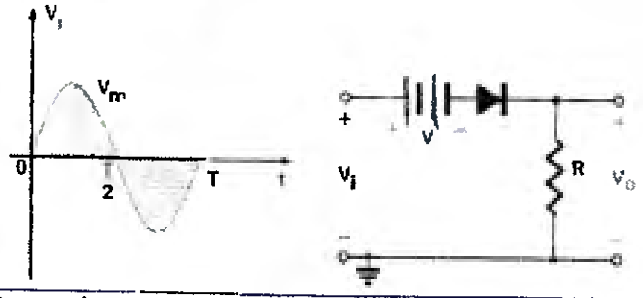
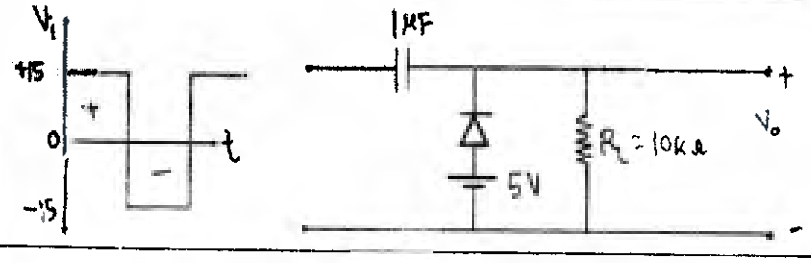
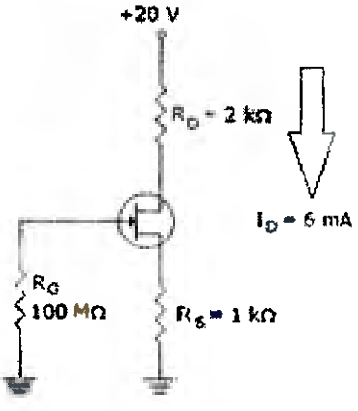
**Course code:** PC-BTE201 **Maximum Marks: 100**

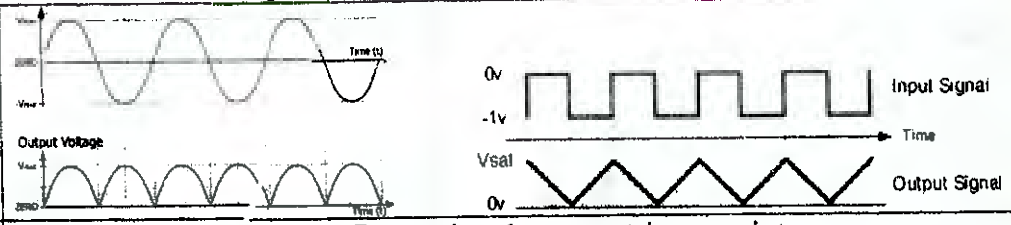
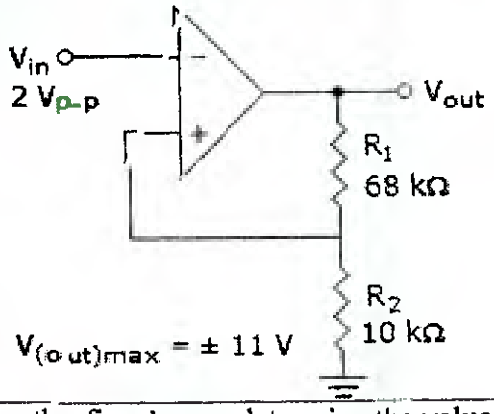
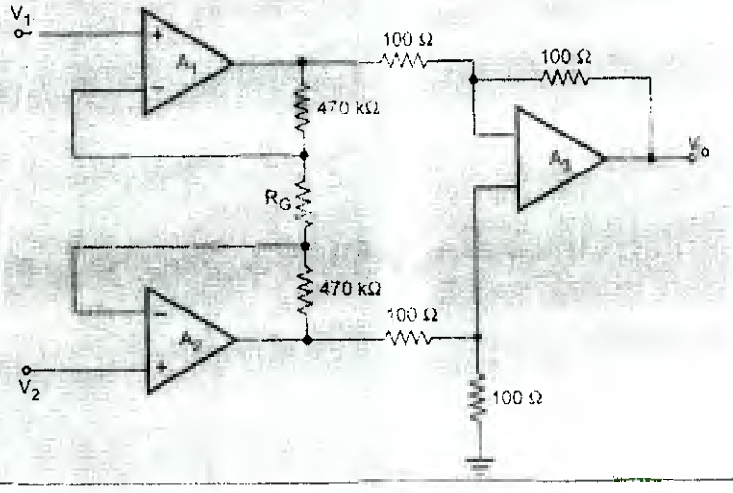
**Name of the Course: Electronic Circuits** **Semester: II**

- **Solve any five questions out of seven.**
- **Answers to all sub questions should be grouped together.**
- **Make suitable assumptions whenever necessary. State them clearly.**
- **Diagrams drawn to support your answer should be clearly visible.**

| Q. | | Pts | CO | BL | Module |
|---|---|---|---|---|---|
| 1 A | Draw the circuit diagram of a half wave rectifier. With respect to the input and output waveforms explain working of the circuit. A HWR using Si diode has a secondary emf of 14.14V rms. If the load resistance is 10 Ω, determine (i) DC load current (ii) DC load voltage (iii) PIV (iv) Dc power o/p for HWR (v) ripple factor | 10 | 1 | 3 | 1 |
| B (i) | Calculate the ripple factor of a π type (CLC filter) employing 10H choke and two equal capacitors of 16 micro farad each and fed from full wave rectifier and 50Hz mains. The load resistance is 4K ohm. | 3 | 1 | 3 | 1 |
| (ii) | A FWR delivers 50W to a load of 200Ω. If the ripple factor is 2%, calculate ac ripple voltage across the load. | 3 | 1 | 3 | 1 |
| (iii) | A power supply A delivers 10 V dc with a ripple of 0.5 V r.m.s. while the power supply B delivers 25 V dc with a ripple of 1 mV r.m.s. Which is better power supply? Why? | 4 | 1 | 3 | 1 |
| | | | | | |
| 2 A | Determine how $h_{fe}$ and $h_{ie}$ can be calculated from the characteristics of BJT. | 10 | 2 | 1 | 3 |
| B (i) | Determine $R_C$, $R_B$, $R_E$, $V_B$, $V_{CE}$ for the emitter bias circuit. Draw the circuit diagram. Given $V_C = 6$ V, $V_E = 2.4$ V, $\beta = 80$, $I_C = 2$mA, $V_{CC} = 12$ V, $V_{BE} = 0.6$ V. Determine stability factor. | 7 | 2 | 3 | 3 |
| (ii) | Draw ac equivalent circuit. Determine Zi, Zo. Given $h_{fe} = 100$, $h_{ie} = 2$ kΩ. | 3 | 2 | 3 | 3 |



| | | | | | |
|---|---|---|---|---|---|
| **3A** | State whether the following statements are true/false. Justify the same. | **10** | **1** | **5** | **1** |
| **(i)** | Rectifiers are clipper circuits. | | | | |
| **(ii)** | L filter is suitable for higher values of $R_L$ | | | | |
| **B (i)** | Draw the output voltage waveform for the circuit shown below with Vm = 10V, V = 4V, R = 1KΩ. Assume ideal diode.   | **5** | **1** | **3** | **2** |
| **(ii)** | Determine the output voltage $V_o$ if input voltage as shown below is applied. Assume ideal diode.   | **5** | **1** | **3** | **2** |
| **4A** | Explain the parameters $r_d$, $g_m$, $\mu$ with respect to JFET characteristics. | **12** | **2** | **1** | **4** |
| **B (i)** | With respect to neat construction diagram explain the statement 'MOSFET is also referred to as IGFET'. | **5** | **2** | **1** | **4** |
| **(ii)** | Refer to figure given below. Calculate the value of voltage across Rs and $V_{DS}$.   | **3** | **2** | **3** | **4** |
| **5A** | With the help of neat circuit diagrams explain the terms DIBO, DISO, SISO, and SIBO with respect to differential amplifier. | **10** | **3** | **1** | **5** |
| **B** | Define following terms with respect to differential amplifier (i) CMRR (ii) Differential gain (iii) Common mode gain | **6** | **3** | **1** | **5** |
| | The following specifications are given for the DIBO differential amplifier: $R_C$ = 3.3 kΩ, $R_S$ = 100Ω, $R_E$ = 8.2 KΩ, $+V_{CC}$ = 12V, $-V_{EE}$ = -12 V, | **4** | **3** | **3** | **5** |

| | | | | | |
|---|---|---|---|---|---|
| | $V_{BE}$ =0.7V, hie = 2 kΩ, $h_{fe}$ = 50. Draw the circuit diagram showing components values. Determine the operating points ($I_{CQ}$ and $V_{CEQ}$). | | | | |
| | | | | | |
| 6A (i) | Explain the statement with the help of proper circuit diagram and waveforms 'A zero-level detector is a comparator with a trip point referenced to zero' | 8 | 3 | 1 | 7 |
| (ii) | Fig. shows input output waveforms. Identify the application of opamp and draw the circuit diagram accordingly. | 4 | 3 | 2 | 7 |
| |  | | | | |
| B (i) | Refer to the given figure. Determine the upper trigger point.  | 3 | 3 | 3 | 7 |
| (ii) | For the fig. shown, determine the value of RG if the gain required is 1000.  | 5 | 3 | 3 | 7 |
| | | | | | |
| 7A | Explain the following terms w.r.t. opamp IC 741 | 10 | 3 | 1 | 6 |
| | (i) Slew rate (ii) UGB (iii) Input resistance (iv) output resistance (v) CMRR | | | | |
| B | Draw and explain block diagram of opamp. | 10 | 3 | 1 | 6 |

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# SARDAR PATEL COLLEGE OF ENGINEERING

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Munshi Nagar, Andheri (W) Mumbai – 400058

## END SEMESTER EXAMINATION JUNE 2024 21/6/24

**Program: FY B.TEC. (C/M/E)**

**Duration: 2 Hour**

**Course Code: MC-BTE02 01** **Maximum Points: 50**

**Course Name: Indian Traditional Knowledge.** **Semester: II**

**Note: Attempt Any Five Questions**

| Q.No. | Questions | Points | CO | BL | Module No. |
|---|---|---|---|---|---|
| 1 | **Complete the Statements by Selecting Proper Alternative.** | 10 | 2 | 2 | 3 |
| A. | Sankya philosophy is based on the analysis of the ____elements of existence.<br>a)20 b) 25 c) 15 d) 5 | | | | |
| B | _____ studies how speech sounds are produced by the human vocal apparatus.<br>a) Syntax b) Phonetics c) Semantics d) Pragmatics | | | | |
| C | Rigveda Consists of _____ mandalas which are organized by metre, deity and purpose.<br>a) 9 b) 15 c) 12 d) 10 | | | | |
| D | _____ Sahita Provided Comprehensive knowledge about anatomy, diseases and treatments.<br>a) Sushruta b) Bhaskara c) Nagaurjuna d) Yaska | | | | |
| E | _____ is a traditional practice in yoga consisting breath control.<br>a) Acupuncture b) chiropractic c) pranayama d) Niyama | | | | |
| F | Classical Tamil Literature includes the -------- Literature.<br>a) Sanskrut b) Pakrit c) Kharosthi d) Sangam | | | | |
| G | _____ deals with the Interpretation of Difficult words and Passages in the Vedas.<br>a) Kalpa b) Chandas c) Nirukta d) Shiksha | | | | |

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## END SEMESTER EXAMINATION JUNE 2024

| | | | | | |
|---|---|---|---|---|---|
| H | The____ outlook involves to adopt a rational and evidence-based approach.<br>a) Scientific b) Spiritual c) Metaphysical d) Theological | | | | |
| I | _____ Veda is the Vedic Science of Music, Dance and aesthetics.<br>a) Dhanur b) Sthapatya c) Gandharva d) Ayur | | | | |
| J | The Constitution--------- adopted in 1950 which enshrines the principles of democracy, secularism and Federalism.<br>A) France b) India c)USA d) England | | | | |
| 2 | Explain the Correlation Between the Scientific outlook and human values.<br>OR<br>Discuss the fundamental unity of India | 10 | 1 | 5 | 1 |
| 3 | Write about Yoga and Pranayama<br>OR<br>Explain the Relevance of Science and Spirituality | 10 | 3 | 2 | 2 |
| 4 | Narrate the Heroic Role of India in World Civilization.<br>OR<br>Describe ancient Indian engineering knowledge. | 10 | 2 | 4 | 4 |
| 5 | Explain main branches of Linguistics with Features<br>OR<br>Comment on Indian Linguistic tradition | 10 | 4 | 3 | 6 |
| 6 | Give an account of four Vedas<br>OR<br>Discuss the Six Vedangas. | 10 | 3 | 2 | 5 |
| 7 | Illustrate the Philosophy of the Following. ( Any Two)<br>a) Guru Nanak b) Kabir c) Kanad D) Tukaram | 10 | 2 | 5 | 7 |

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**End Semester – June 2024 Examination**

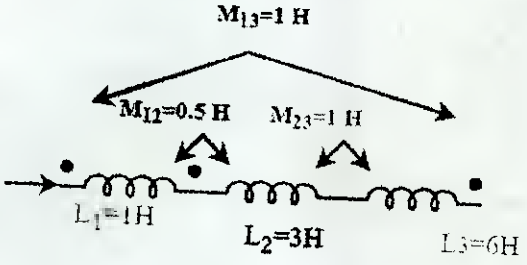
25/6/24

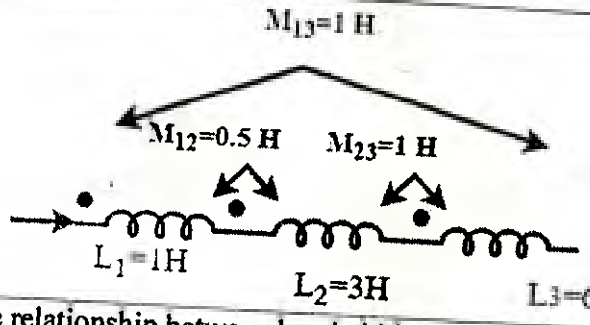
F.Y. B.Tech Sem II

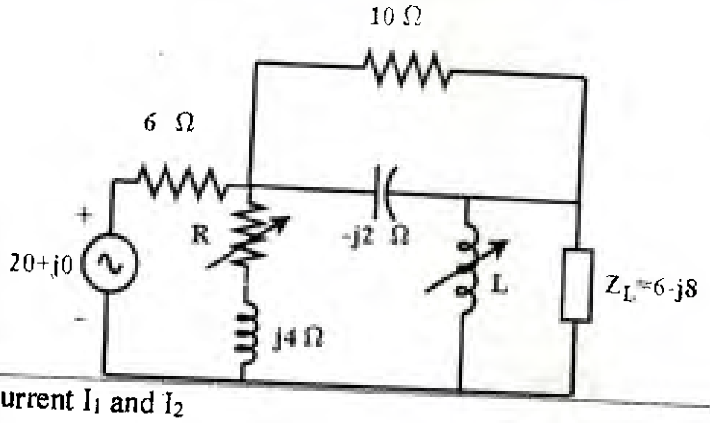
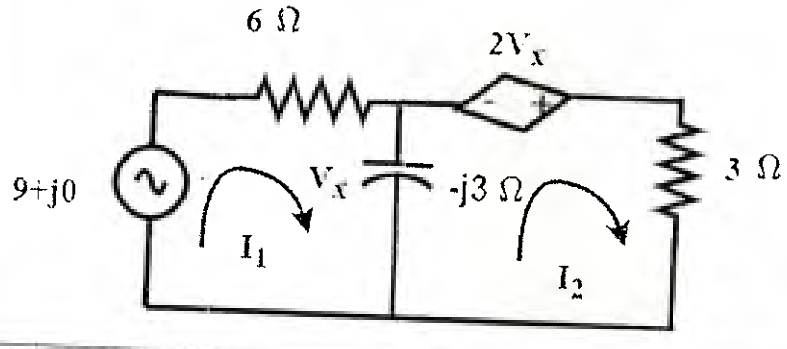
**Class:** FY Electrical
**Course Code:** ES-BTE201
**Course Name:** Basic Electrical Engineering II

**Duration:** 3h
**Semester:** II
**Maximum Points:** 100

- **Attempt any *Five*.**
- **Make suitable assumptions where ever necessary**
- **Club all sub questions together**
- **Do neat work**

| Q.NO | Questions | Points | Module | CO | BL |
|---|---|---|---|---|---|
| Q1.(a) | Two wattmeters are used to measure power in a 3Øbalanced load. Find the power factor if (i) two readings are equal and positive (ii) two readings are equal and opposite and (iii) one reading is zero. | 2+2+1 | 5 | 3 | 2 |
| (b) | What is the dot convention? How it is helpful in solving the couple circuits. | 5 | 4 | 2 | 2 |
| (c) | What are advantages of using three phase system over single phase system? | 5 | 5 | 3 | 2 |
| (d) | Find the total inductance of the following couple circuits:<br>(i)<br>  <br><br>(ii) | 2.5+2.5 | 4 | 2 | 3 |




| | | | | | |
|---|---|---|---|---|---|
| Q2(a) | Derive the relationship between bandwidth, resonant frequency and quality factor. Also explain how selectivity can be improved. | 8+2 | 3 | 1 | 3 |
| (b) | A series RLC circuit has R=10Ω, L=0.1 H and C=8μF. Determine;<br>(i) Resonant frequency<br>(ii) Q Factor<br>(iii) Half power frequencies<br>(iv) Bandwidth | 2+2+4+2 | 4 | 1 | 4 |
| Q3(a) | In a network R and L are adjusted so that the current through $Z_L$ is zero. Determine R and L.<br>  | 10 | 3 | 1 | 4 |
| (b) | Find Current $I_1$ and $I_2$<br>  | 10 | 1 | 1 | 4 |

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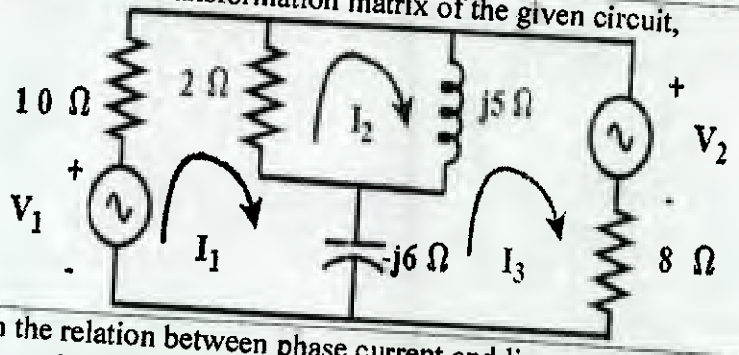
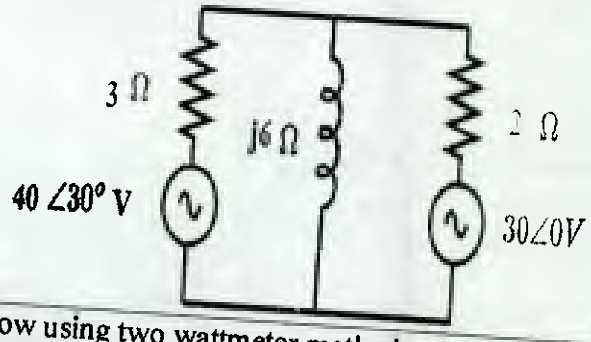
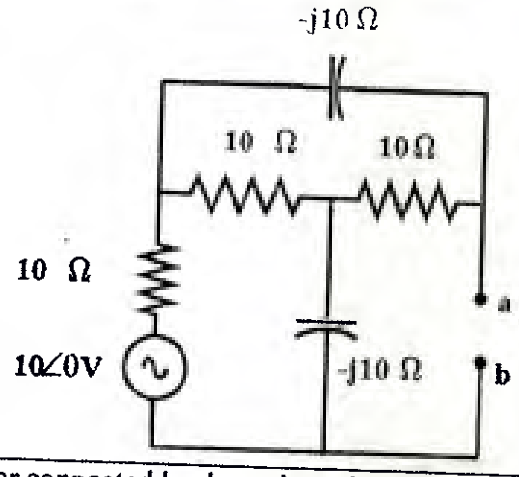
**End Semester – June 2024 Examination**

| | | | | | |
|---|---|---|---|---|---|
| Q4(a) | A balanced 3Øload connected to 400V, 50 Hz, A.C. supply draw a phase current of 50A at 0.6 power factor lagging. Find real power, reactive power and apparent power if load is :<br>(i) Star connected<br>(ii) Delta connected | 6+6 | 5 | 3 | 4 |
| (b) | Obtain the mesh transformation matrix of the given circuit,<br>  | 8 | 1 | 1 | 4 |
| Q5(a) | Obtain the relation between phase current and line current; and phase voltage and line voltage of a delta connected balanced load. Also draw a neat and labeled phasor diagram for the same. | 10 | 5 | 3 | 2 |
| (b) | Determine the current through 6Ω using superposition Theorem. Verify your result by using Nodal Analysis.<br>  | 6+4 | 1 | 1 | 4 |
| Q6 | Explain how using two wattmeter method you can obtain active power and reactive power consumed by 3Ø load with leading power factor. Also obtain expression of power factor for the same. | 12 | 5 | 3 | 4 |
| (b) | Determine maximum power transferred to pure resistive load across a-b. | 8 | 1 | 1 | 4 |

PTO

| | | | | | |
|---|---|---|---|---|---|
| |  | | | | |
| Q7 (a) | Each of the star connected load consists of a non-reactive resistance of 1000 Ω in parallel with a capacitance of 31.8μF connected to a 416 V, 3Ø, 50 Hz supply. Calculate;<br>(i) line current<br>(ii) Active power absorbed<br>(iii) Reactive power<br>(iv) Total KVA<br>(v) Power factor | 1+1+1+ 1+1 | 5 | 3 | 3 |
| (b) | Three coils each with a re4sistance of 10Ω and reactance of 10Ω are connected in star across a 3Ø, 50 Hz, 400 V supply. Calculate<br>(i) line current<br>(ii) reading of two wattmeters<br>(iii) if load is delta connected find line current and two wattmeter reading | 1+4+5 | 5 | 3 | 3 |
| (c) | Two coupled coils have self-inductances $L_1$=10mH, $L_2$=20mH. The coefficient of coupling K being 0.75 in the air, find voltage in the second coil and flux in the first coil provided the second coil has 500 turns and the circuit current is given by $i_1$=2sin314t. | 5 | 4 | 2 | 3 |