**University of Mumbai**

Program: \_First Year (All Branches) Engineering - SEM-I

Curriculum Scheme: Rev 2019

BEE

**Question Bank**

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| 1. | The average and effective values of for a sinusoidal AC waveform are: |
| Option A: | Vavg=0.637 Vm, V=0.5 Vm |
| Option B: | Vavg=0.5 Vm, V=0.5 Vm |
| Option C: | Vavg=0.11 Vm, V=0.707 Vm |
| Option D: | Vavg=0.637 Vm, V=0.707 Vm |
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| 2. | VAB = ? |
| Option A: | 6V |
| Option B: | 10V |
| Option C: | 16V |
| Option D: | 4V |
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| 3. | An AC voltage is given by the equation v = 325 sin 314t. The RMS and Average value of the voltage are\_\_\_\_\_\_\_\_\_\_\_\_\_ respectively. |
| Option A: | 229.80 V and 207.02 V |
| Option B: | 206.90 V and 229.80 V |

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| Option C: | 206.90 V and 206.90 V |
| Option D: | 229.80 V and 229.80 V |
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| 4. | If one of the wattmeters shows zero reading (in a two-wattmeter method measurement of three phase power), cosφ of the circuit is \_\_\_\_\_\_\_\_ |
| Option A: | 1 |
| Option B: | 0 |
| Option C: | 0.5 |
| Option D: | 0.25 |
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| 5. | A R-L-C series circuit has a resonant frequency ‘f’. If all the component values are doubled, the new resonant frequency is |
| Option A: | 2f |
| Option B: | 4f |
| Option C: | f/2 |
| Option D: | f/4 |
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| 6. | In dc circuit,resistor values in delta network that is \_\_\_\_\_\_\_\_\_equivalent to a star Y containing three 120 Ohm resistors is |
| Option A: | 360 Ohms each |
| Option B: | 240 Ohms each |
| Option C: | 180 Ohms each |
| Option D: | 120 Ohms each |
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| 7. | The current in 100Ω is \_\_\_\_\_\_\_\_ A. |
| Option A: | 0.52 |
| Option B: | 0.17 |
| Option C: | 0.69 |
| Option D: | 0.35 |
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| 8. | When a three-phase supply is given to the \_\_\_\_\_\_\_\_\_ winding, a rotating magnetic field of \_\_\_\_\_\_\_\_\_\_ magnitude is produced. |
| Option A: | Stator, constant |
| Option B: | Rotor, variable |
| Option C: | Stator, variable |
| Option D: | Rotor, constant |
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| 9. | When three equal phase impedances are connected in delta in a three-phase electrical system, the equivalent star impedance is \_\_\_\_\_\_\_\_ of the delta impedance. |
| Option A: | Half |
| Option B: | One-third |
| Option C: | Equal |
| Option D: | One-fourth |
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| 10. | An ideal voltage source should have \_\_\_\_\_\_\_\_\_ |
| Option A: | zero internal resistance |
| Option B: | infinite source resistance |
| Option C: | large value of emf |
| Option D: | low value of emf |
| 11. | If the equation of an alternating voltage is v=623.5 sin323t then \_\_\_\_\_\_\_\_\_\_ is the rms voltage and \_\_\_\_\_\_\_\_ is the average voltage. |
| Option A: | 623.5V,441V |
| Option B: | 441V,397V |
| Option C: | 397V, 623.5V |
| Option D: | 623.5V,397V |
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| 12. | Current delivered by 40V is \_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Option A: | 6A |
| Option B: | 5A |
| Option C: | 10A |
| Option D: | 4A |
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| 13. | \_\_\_\_\_\_\_\_\_ type of alternating power is always positive whereas \_\_\_\_\_\_\_\_\_ power can be positive or negative depending on the nature of the load. |
| Option A: | Apparent, active |
| Option B: | Active, reactive |
| Option C: | Active, passive |
| Option D: | Reactive, apparent |
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| 14. | If one wattmeter of two wattmeter method for three phase power measurement is equal and opposite to the other wattmeter reading then the power factor of the circuit is \_\_\_\_\_\_\_\_. |
| Option A: | 1 |
| Option B: | 0 |
| Option C: | 0.5 |
| Option D: | 0.25 |
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| 15. | \_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_ are not parts of three phase as well as single phase induction motor. |
| Option A: | Brushes, rotor |
| Option B: | Commutator, stator |
| Option C: | Brushes, commutator |
| Option D: | Commutator, rotor |
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| 16. | \_\_\_\_\_\_\_\_\_\_\_ type of winding does not have neutral connection whereas \_\_\_\_\_\_\_\_\_\_\_ type of winding may or may not have neutral connection, |
| Option A: | Star, Delta |
| Option B: | Parallel, Star |
| Option C: | Series, Delta |
| Option D: | Delta, Star |
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| 17. | The resistance RL for maximum power transfer is \_\_\_\_\_\_\_\_\_\_\_\_. |
| Option A: | 49 ꭥ |
| Option B: | 98 ꭥ |
| Option C: | 70 ꭥ |
| Option D: | 7 ꭥ |
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| 18. | An inductance of 1H is in series with a capacitance of 1µF\_\_\_\_\_\_\_\_ is the impedance of circuit if the frequency is 50Hz |
| Option A: | 2876Ω inductive |
| Option B: | 6121Ω inductive |
| Option C: | 2876Ω capacitive |
| Option D: | 6121Ω capacitive |
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| 19. | In dc circuit analysis, \_\_\_\_\_\_\_ method has less number of equations compared to \_\_\_\_\_\_\_\_\_\_\_ method due to the selection of reference voltage. |
| Option A: | Mesh, Nodal |
| Option B: | KVL,KCL |
| Option C: | Nodal, Mesh |
| Option D: | KCL, KVL |
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| 20. | An ideal and practical voltage sources have\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_ internal impedance respectively. |
| Option A: | Zero, low value |
| Option B: | Infinite , large value |
| Option C: | Large value, zero |
| Option D: | Low value ,infinite |
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| 21. | Three identical coils each of (4.2 +j5.6) ohms are connected in star across a 415V. The phase voltage is\_\_\_\_\_\_\_\_. |
| Option A: | 139.6V |
| Option B: | 439.6V |
| Option C: | 539.6V |
| Option D: | 239.6V |
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| 22 | In a series R-L-C circuit, R=2kΩ L=1H, C=1/400µF.The resonant frequency is \_\_. |
| Option A: | 2 x 104 Hz |
| Option B: | 0.318 x 104 Hz |
| Option C: | 104 Hz |
| Option D: | 6.248 x 104 Hz |
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| 23 | A series RLC circuit will have unity power factor if operated at a frequency of\_\_\_\_\_. |
| Option A: | 1/(LC) |
| Option B: | 1/w√LC |
| Option C: | 1/2w√LC |
| Option D: | 1/2∏√LC |
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| 24 | Two currents I1 = 10500A and I2 = 5-1000A flow in a single phase ac circuit. The resultant current is \_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Option A: | 626.200A |
| Option B: | 8.246.210A |
| Option C: | 9.272.210A |
| Option D: | 6.226.210A |
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| 25 | Basic elements that cannot be analyzed by ohms law |
| Option A: | Transistors |
| Option B: | Resistor |
| Option C: | Capacitor |
| Option D: | Inductor |
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| 26 | According to fundaments of electrical energy,which of the following is correct about alternating current |
| Option A: | Frequency is zero |
| Option B: | Magnitude changes with time |
| Option C: | Can be transported to larger distances with less loss in power |
| Option D: | Flows in both the directions |
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| 27 | Superposition theorem is not applicable to networks containing \_\_\_\_\_\_\_\_\_. |
| Option A: | Non-linear elements |
| Option B: | Dependent current sources |
| Option C: | Dependent voltage sources |
| Option D: | Transformers |
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| 28 | A network contains only an independent current source and resistors. If all the resistors are doubled, the values of node voltages will be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. |
| Option A: | Become half |
| Option B: | Becomes doubled |
| Option C: | Remain unchanged |
| Option D: | Become twice |
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| 29 | The power consumed by a purely capacitive circuit is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the \_\_\_\_\_\_ power is reactive power. |
| Option A: | 1 , circulating |
| Option B: | 0, non-circulating |
| Option C: | 0, circulating |
| Option D: | 1, non-circulating |
|  |  |
| 30 | Apparent power is \_\_\_\_\_\_\_\_\_\_\_\_ and is expressed in \_\_\_\_\_\_\_\_\_\_\_\_. |
| Option A: | Input, kW |
| Option B: | Output , kVA |
| Option C: | Input, kVA |
| Option D: | Output, kW |
|  |  |
| 31 | A series circuit consumes 2000W at 0.5leading power factor when connected to 230V.50Hz ac power supply. The reactive power is \_\_\_\_\_\_\_\_\_\_\_\_\_. |
| Option A: | 4.464kVAR |
| Option B: | 3.764kVAR |
| Option C: | 3.464kVAR |
| Option D: | 4.764kVAR |
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| 32 | The voltage and current in a circuit are given by V= 12 300V and I = 3 600A.The reactance and resistance is \_\_\_\_\_ and \_\_\_\_\_\_\_\_\_. |
| Option A: | 3.46 –j2 |
| Option B: | 2.46-j2 |
| Option C: | 3.46 +j2 |
| Option D: | 2.46 +j2 |

**DESCRIPTIVE QUESTIONS**

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|  | Show that the average power consumed by a pure capacitor is zero. |
|  | Two wattmeters connected to measure the input to a balanced three-phase circuit indicates 2000W and 500W, respectively. Find the total power supplied and the power factor of the circuit: (i) when both the readings are positive and (ii) when the latter reading is obtained after reversing the connections to the current coil. |
|  | Determine the current through 12ꭥ resistor using Source Transformation: |
|  |  |
|  | Explain the construction and working of variable reluctance stepper motor. |
|  | State and prove Maximum Power Transfer theorem. |
|  | Find the average value, rms value, form factor and peak factor for the given waveform: |
|  | A 30µF capacitor is connected across a 230V, 50Hz A.C. supply. Calculate:   1. Capacitive reactance 2. R.M.S. value of the current flowing through the capacitor 3. Power consumed by the capacitor 4. Power factor 5. Voltage and current time expressions |
|  | Explain the principle of operation of a three-phase induction motor. |
|  | A series RLC circuit has the following parameters: R = 10ꭥ, L = 0.012H, C = 100µF. Compute the resonant frequency, quality factor (Q), bandwidth, lower and upper cut-off frequencies. |
|  | How can you decide the nature of load from the two-wattmeter readings? |
|  | Find the current through 50ꭥ resistor using Mesh Analysis. |
|  | Determine the equivalent resistance between terminals X and Y for the network given below: |
|  | State Superposition Theorem and find the current ‘i’ as indicated in the circuit below: |
|  | An imperfect (not pure) capacitor has an impedance of 50ꭥ and p.f = 0.707 leading. It is connected in series with an external resistance of R = 40 ꭥ across an A.C supply of ‘V’ volts and then the current flowing is I = 3A. Determine the supply voltage and the overall phase angle. |
|  | A 415V, 50Hz, 3-phase voltage is applied to three star connected identical impedances each consisting of series combination of a resistance of 15ꭥ, inductance 0.1H and capacitance of 177µF.Find:   1. phase current 2. line current 3. p.f 4. active, reactive power 5. apparent power |
|  | Show that the average power consumed by a pure inductor is zero. |
|  | A balanced three phase load consists of three coils, each of resistance 4Ω and inductance 0.02H. Determine the total power when the coils are (i) star connected (ii)delta connected to a 400V, three phase,50Hz supply. |
|  | By source transformation find the current in 3 Ω resistor in the following circuit. |
|  | i)Explain the construction and working of variable reluctance stepper motor.  ii)Enlist four applications DC machines. |
|  | Find current I in the network using nodal analysis |
|  | Find RMS value and peak factor for the following waveform: |
|  | A coil of power factor 0.6 is in series with 100µF capacitor. When connected to a 50Hz supply, potential difference across coil is equal to potential difference across capacitor, Find resistance and inductance of the coil. |
|  | Describe the principle of operation of a single-phase induction motor. |
|  | Draw labelled phasor diagrams for three phase star and delta connected systems. |
|  | Explain with diagram construction and working of 3 phase induction motor**.** |
|  | Find current in 20 Ω resistor using mesh analysis. |
|  | A resistance and a capacitance connected in series across a 250V supply draws 5A at 50Hz. When frequency is increased to 60Hz ,it draws 5.8A. Find the values of R and C . Also find active power and power factor in both cases. |
|  | Explain with the neat phasor diagram how two wattmeters can be used to measure power in a 3-Փ system. |
|  | Each phase of a delta connected load consists of a 50mH inductor in series with a parallel combination of a 5Ω resistor and a 5µ capacitor. The load is connected to a three phase,550V, 50Hz A.C. supply |
|  | Compare core type and Shell type transformers. |
|  | Derive the E.M.F equation of a transformer. |
|  | State and prove maximum power transfer theorem. |
|  | Using source transformation convert the following circuit into a single voltage source in series with a resistor. |
|  | Using mesh analysis find the current through 5Ωresistor |
|  | Calculate RAB. |
|  | Calculate RXY for the circuit shown in figure below. |
|  | A total current of 10A flows through the parallel combination of three impedances (2-5j) Ω, (6+3j) and (3+4j) Ω. Calculate the current flowing through each branch. Find also the pf of the combination. |
|  | A series resonant circuit has an impedance of 500Ω at resonant frequency. The cut-off frequency observed are 10kHz and 100Hz Determine:   1. Resonant frequency 2. Value R, L and C 3. Q factor at resonance |
|  | A voltage of 150V, 50Hz is applied to a coil of negligible resistance and inductance 0.2H. Write the equation of voltage and current. |