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312302 - Basic Electrical & Electronics Engg
(BEE-Sem II)
As per MSBTE's K Scheme
CO / CM / IF / AI / AN / CW / DS

Unit IV	Special purpose diodes and their applications	Marks - 12
S. N.	**MSBTE Board Asked Questions**	**Marks**
1.	Why is there a sudden increase in current in Zener diode? a) Due to the rupture of ionic bonds b) Due to rupture of covalent bonds c) Due to viscosity d) Due to potential difference Answer: b. Due to rupture of covalent bonds Explanation: The sudden increase in current in a Zener diode is due to the rupture of the many covalent bonds present. Therefore, the Zener diode should be connected in reverse bias.	1M
2.	What is the semiconductor diode used as? a) Oscillator b) Amplifier c) Rectifier d) Modulator Answer: c. Rectifier Explanation: Semiconductor diode can be used as a rectifier. The function of a rectifier is that it converts an alternating current into direct current by allowing the current to pass	1M

	through in one direction.	
3.	What is rectification? a) Process of conversion of ac into dc b) Process of conversion of low ac into high ac c) Process of conversion of dc into ac d) Process of conversion of low dc into high dc Answer: a. Process of conversion of ac into dc Explanation: Rectification is the process of conversion of alternating current into direct current. The conversion first powers to alternating current then use a transformer to change the voltage, and finally rectifies power back to direct current.	1M
4.	What is a Zener diode used as? a) Oscillator b) Regulator c) Rectifier d) Filter Answer: b. Regulator Explanation: Zener diode can be used as a voltage regulator. They can also be used as shunt regulators to regulate the voltage across small circuits. Zener diodes are always operated in a reverse-biased condition.	1M
5.	Forward biasing of p-n junction offers infinite resistance. a) True b) False Answer: b. False Explanation: No, this is a false statement. Forward biasing of p-n junction offers low resistance. In the case of an ideal p-n junction, the resistance offered is zero. So, forward biasing does not offer any resistance.	1M

6.	When a junction diode is reverse biased, what causes current across the junction? a) Diffusion of charges b) Nature of material c) Drift of charges d) Both drift and diffusion of charges Answer: c. Drift of charges Explanation: The reverse current is mainly due to the drift of charges. It is due to the carriers like holes and free electrons passing through a square centimeter area that is perpendicular to the direction of flow.	1M
7.	What can a p-n junction diode be used as? a) Condenser b) Regulator c) Amplifier d) Rectifier Answer: d. Rectifier Explanation: A junction diode can be used as a rectifier. The rectifier converts alternating current into direct current. During the positive half cycle, the diode is forward biased and allows electric current through it.	1M
8.	In a PN junction with no external voltage, the electric field between acceptor and donor ion is called a a) Peak b) Barrier c) Threshold d) Path Answer: (b) Barrier Explanation:In p-n junction with no external voltage, the electric field between the acceptor and the donor ions is	1M

	called a barrier.	
9.	In a PN junction the potential barrier is due to the charges on either side of the junction, these charges are a) Majority carriers b) Minority carriers c) Both (a) and (b) d) Fixed donor and accepter ions Answer: (d) Fixed donor and accepter ions Explanation:The potential barrier created throughout the P-N junction is due to the diffusion of electrons and holes, and this potential barrier normally does not allow charging flow through the junction.	1M
10.	The capacitance of a reverse-biased PN junction a) Increases as reverse bias is increased b) Decreases as reverse bias is increased c) Increases as reverse bias is decreased d) Is significantly low Answer: (c) Increases as reverse bias is decreased Explanation: When reverse bias decreases, the depletion region width "d" decreases. As "d" increases, the capacitance increases.	1M
11.	For a PN junction diode, the current in reverse bias maybe a) Few milliamperes b) Between 0.2 A and 15 A c) Few amperes d) Few micro or nano amperes Answer: (d) Few micro or nano amperes	1M

	Explanation:n a reverse-biased diode, the current is very low, typically in the nanoampere (nA) to picoampere (pA) range. This is because the reverse bias causes the depletion region to widen, making it difficult for current to flow across the diode. The diode acts as an insulator in the reverse bias condition.	
12.	**When PN junction is in forward bias, by increasing the battery voltage** **a) Circuit resistance increases** **b) Current through P_N junction increases** **c) Current through P_N junction decreases** **d) None of the above** **Answer: (b) Current through P_N junction increases** **Explanation:When the voltage increases up to around measurable current starts to flow through the diode in the forward direction. As the voltage moves a little above , the current through the diode rises rapidly.**	**1M**
13.	**When a PN junction is reverse biased** **a) Holes and electrons tend to concentrate towards the junction** **b) The barrier tends to break down** **c) Holes and electrons tend to move away from the junction** **d) None of these** **Answer: (c) Holes and electrons tend to move away from the junction** **Explanation: Reverse bias applied to a p-n junction diode raises the potential barrier because p-type material connected to the negative terminal and pulls the holes away from the junction. Similarly, n-type material connected to the positive terminal and pulls the electrons**	**1M**

14.	**A PN junction** **a) Has low resistance in forward as well as reverse directions** **b) Has high resistance in forward as well as reverse directions** **c) Conducts in the forward direction only** **d) Conducts in the reverse direction only** **Answer: (c) Conducts in the forward direction only** **Explanation:Diode is a combination of p-type and n-type semiconductors. This combination creates a potential barrier at the junction. Therefore, the external power source must overcome the potential barrier to conduct. In the forward bias, the diode conducts and in the reverse bias, it will not conduct.**	**1M**
15.	**A PN junction is said to be forward-biased when** **a) The positive terminal of the battery is connected to P-side and the negative side to the N-side** **b) Junction is earthed** **c) N-side is connected directly to the p-side** **d) The positive terminal of the battery is connected to N-side and the negative side to the P-side.** **Answer: (a) The positive terminal of the battery is connected to P-side and the negative side to the N-side** **Explanation:In forward biasing, the p-type is connected with the positive terminal and the n-type is connected with negative terminal of the battery.**	**1M**
16.	**PN Junction is also called _____.** **a) diode** **b) transistor** **c) triode**	**1M**

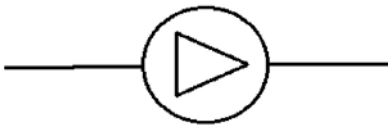
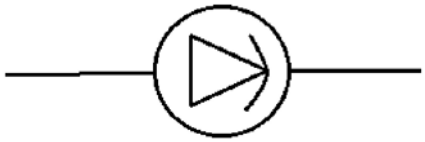
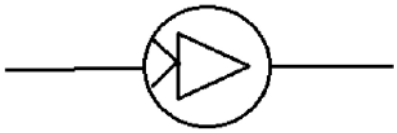
	d) inductor Answer: a) Diode Explanation:Pn junctions are called diodes because they allow the flow of current in one direction and not in another, and also because they are two terminals or distinct electrodes, which are anode and cathode.	
17.	The P-type region of diode is called _____. a) cathode b) anode c) grid d) both a & b Answer: b) anode Explanation:The anode is a positive terminal in a forward-biased p-n junction diode (that p-type is linked to the positive terminal and n-type is connected to the negative). On this type of junction, the cathode terminal is negative. The anode is a positively charged electrode or wire that charges the p-n junction with holes.	1M
18.	The N-type of region of PN Junction diode is called Cathode. True / False Answer: True Explanation:We call the lead affixed to the N-type semiconductor the cathode. Therefore, the cathode is the negative side of a diode.	1M
19.	When a diode is_____bias then it shows the conventional direction of current. a) forward b) reverse	1M

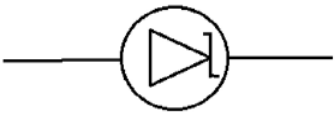
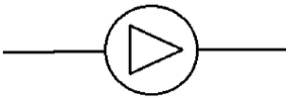
	Answer:a) forward **Explanation:The Conventional flow of current is from P side to N side. As in a forward bias p-n junction the electrons move from n side to p side, hence causing the conventional current flow from P to N. *Conventional current flow is always opposite to the direction of electrons flow.**	
20.	**How can we identify the positive and negative leads of a diode?** **a) colour coding** **b) colour band** **c) both a & b** **d) none is correct** **Answer: c) both a & b** **Explanation:We can identify the positive and negative leads of a diode by using colour coding colour band**	**1M**
21.	**PN Junction diode is a _____ device.** **a) one way** **b) two way** **c) double way** **d) b & c are correct** **Answer: a) one way** **Explanation:A diode is often referred to as a one-way valve because it allows current to flow in only one direction. When a diode is forward-biased, it conducts current, but when it is reverse-biased, it effectively blocks the flow of current.**	**1M**

22.	The barrier potential of germanium is .3v. True / False Answer: True Explanation:Germanium (Ge) has a potential barrier of 0.3 eV	1M
23.	The barrier potential of silicon is _____. a) .3v b) .7v c) .5v d) .4v Answer: b) 0.7 v Explanation:Silicon (Si) has a potential barrier of 0.7 eV	1M
24.	The reverse saturation (Is) or maximum (Io) current during reverse bias of a PN junction diode depends on _____. a) temperature b) doping level c) physical size of junction d) all are correct Answer: d)all are correct Explanation:The reverse saturation (Is) or maximum (Io) current during reverse bias of a PN junction diode depends on temperature, doping level, physical size of junction	1M
25.	How to protect a diode from increasing voltages of breakdown level? a) Filter capacitor b) Limiting resistor	1M

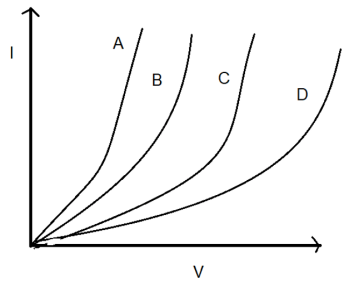
	c) Zener diode d) None is correct Answer: b) Limiting resistor Explanation: There is a series resistor connected to the circuit in order to limit the current into the diode. It is connected to the positive terminal of the d.c. It works in such a way the reverse-biased can also work in breakdown conditions.	
26.	Zener diodes are also known as a) Voltage regulators b) Forward bias diode c) Breakdown diode d) None of the mentioned Answer: c) Breakdown diode Explanation: Zener diodes are used as voltage regulators but they aren't called voltage regulators. They are called breakdown diodes since they operate in breakdown region.	1M
27.	Which of the following is true about the resistance of a Zener diode? a) It has an incremental resistance b) It has dynamic resistance c) The value of the resistance is the inverse of the slope of the i-v characteristics of the Zener diode d) All of the mentioned Answer: d) All of the mentioned Explanation: All of the statements are true for the resistance of the zener diode.	1M

28.	**Zener diode is designed to specifically work in which region without getting damaged?** **a) Active region** **b) Breakdown region** **c) Forward bias** **d) Reverse bias** **Answer: b) Breakdown region** **Explanation: The Zener diode is a specifically designed diode to operate in the breakdown region without getting damaged. Because of this characteristic, it can be used as a constant-voltage device.**	**1M**
29.	**What is the level of doping in Zener Diode?** **a) Lightly Doped** **b) Heavily Doped** **c) Moderately Doped** **d) No doping** **Answer: b) Heavily Doped** **Explanation: A Zener diode is heavily doped so that the breakdown voltage occurs at a lower voltage. If it were lightly/moderately doped, it would breakdown at a comparatively high voltage and, thus, would not be able to serve its purpose.**	**1M**
30.	**When the reverse voltage across the Zener diode is increased _____** **a) The value of saturation current increases** **b) No effect** **c) The value of cut-off potential increases** **d) The value of cut-off potential decreases**	**1M**

	Answer: c) The value of cut-off potential increases **Explanation: As the frequency of the incident radiation increases, the kinetic energies of the emitted electron are higher and therefore require more repulsive force to be applied to stop them.** **The value of saturation current increases, as the intensity of the incident radiation, increases.** **The value of cut-off potential decreases, as the frequency decreases.**	
31.	**Zener Diode is mostly used as _____** **a) Half-wave rectifier** **b) Full-wave rectifier** **c) Voltage Regulator** **d) LED** **Answer: c) Voltage Regulator** **Explanation: The Zener diode, once in the breakdown region, keeps the voltage in the circuit to which it is connected as constant. Thus it is widely used as a voltage regulator.**	**1M**
32.	**Which of the following is the correct symbol for the zener diode?** **a)**  **b)**  **c)** 	**1M**

	d)  **Answer: d**  **Explanation: The following figure is the correct symbol for the Zener diode.** **The following figure is the symbol of a normal p-n junction diode.** 	
33.	**In normal junctions, the breakdown is same as Zener breakdown.** **a) True** **b) False** **Answer: b) False** **Explanation: In normal p-n unction diodes, the breakdown takes place by avalanche breakdown which is different than the Zener breakdown. Zener diode is specifically made to operate in that region.**	**1M**
34.	**The depletion region of the Zener diode is _____** **a) Thick** **b) Normal** **c) Very Thin** **d) Very thick**	**1M**

	Answer: c) Very Thin **Explanation: Zener diode is fabricated by heavily doping both p- and n-sides of the junction, which results in an extremely thin depletion region.**	
35.	**A light emitting diode is _____** **a) Heavily doped** **b) Lightly doped** **c) Intrinsic semiconductor** **d) Zener diode** **Answer: a) Heavily doped** **Explanation: A light emitting diode, LED, is heavily doped. It works under forward biased conditions. When the electrons recombine with holes, the energy released in the form of photons causes the production of light.**	**1M**
36.	**Which of the following materials can be used to produce infrared LED?** **a) Si** **b) GaAs** **c) CdS** **d) PbS** **Answer: b) GaAs** **Explanation: GaAs has an energy band gap of 1.4 eV. It can be used to produce infrared LED. Various other combinations can be used to produce LED of different colors.**	**1M**
37.	**The reverse breakdown voltage of LED is very low.** **a) True** **b) False** **Answer: a) True** **Explanation: The reverse breakdown voltages of LEDs are very low, typically around 5 V. So, if access voltage is**	**1M**

	provided, they will get fused.	
38.	**What should be the band gap of the semiconductors to be used as LED?** **a) 0.5 eV** **b) 1 eV** **c) 1.5 eV** **d) 1.8 eV** **Answer: d) 1.8 eV** **Explanation: Semiconductors with band gap close to 1.8 eV are ideal materials for LED. They are made with semiconductors like GaAs, GaAsP etc.**	**1M**
39.	**What should be the biasing of the LED?** **a) Forward bias** **b) Reverse bias** **c) Forward bias than Reverse bias** **d) No biasing required** **Answer: a) Forward bias** **Explanation: The LED works when the p-n junction is forward biased i.e., the p- side is connected to the positive terminal and n-side to the negative terminal.**	**1M**
40.	**Which of the following would have highest wavelength?**  	**1M**

	a) A **b) B** **c) C** **d) D** **Answer: a) A** **Explanation: In the I-V characteristic of an LED, as the frequency increases, the voltage required to achieve the same current increases. Hence A would have the highest wavelength.**	
41.	**Increase in the forward current always increases the intensity of an LED.** **a) True** **b) False** **Answer: b) False** **Explanation: As the forward current is increased for an LED, the intensity of the light increases up to a certain maximum value. After that, the intensity starts decreasing.**	**1M**
42.	**Which process of the Electron-hole pair is responsible for emitting of light?** **a) Generation** **b) Movement** **c) Recombination** **d) Diffusion** **Answer: c) Recombination** **Explanation: When the recombination of electrons with holes takes place, the energy is released in the form of photon. This photon is responsible for the emission of light.**	**1M**

43.	Which of the following is not a characteristic of LED? a) Fast action b) High Warm-up time c) Low operational voltage d) Long life Answer: b) High Warm-up time Explanation: The warm-up time required should be lower so that the lighting action can take place faster. This is one of the advantages LED have over incandescent lamps.	1M
44.	LEDs work on the principle of _____. a) Electromagnetic induction b) Conduction c) Electroluminescence d) Induction Answer: c) Electroluminescence Explanation: Electroluminescence is an electrical and optical phenomenon where material emits light when electricity flows through it.	1M
45.	State true or false: High warm-up time is needed for LEDs. a) TRUE b) FALSE Answer: b) FALSE Explanation: little or no warm-up time is needed for light emitting diodes.	1M
46.	Aluminium alloys are used to obtain _____ light.	1M

	a) Red b) Orange c) Yellow d) All of the above Answer: d) All of the above Explanation: Aluminium alloys are used to obtain yellow, orange, and red colour lights.	
47.	Why is there a sudden increase in current in Zener diode a) Due to the rupture of ionic bonds b) Due to rupture of covalent bonds c) Due to viscosity d) Due to potential difference Answer: b) Due to rupture of covalent bonds Explanation: The sudden increase in current in a Zener diode is due to the rupture of the many covalent bonds present. Therefore, the Zener diode should be connected in reverse bias.	1M
48.	In a pure semiconductor crystal, if current flows due to breakage of crystal bonds, then what is the semiconductor is called? a) Acceptor b) Donor c) Intrinsic semiconductor d) Extrinsic semiconductor Answer: c) Intrinsic semiconductor Explanation: Pure semiconductors are called intrinsic semiconductors. The number of electrons in the conduction band will be equal to the number of holes in the valence band. Intrinsic semiconductors are also called undoped and	1M

	i-type semiconductors	
49.	In a p-type semiconductor, germanium is doped with which of the following? a) Gallium b) Copper c) Phosphorous d) Nitrogen Answer: a) Gallium Explanation: Substances such as gallium, boron, and aluminum are all trivalent atoms. These are called acceptor impurities and they produce p-type semiconductors. Therefore, germanium is doped with gallium in a p-type semiconductor	1M
50.	What are the majority charge carriers in P-type semiconductors? a) Electrons b) Holes c) Negative Ions d) Positive Ions Answer: b) Holes Explanation: Holes are the majority charge carriers in P-type semiconductors. These holes are actually electron vacancies that contain positive charge. The holes are responsible for the conduction in p-type semiconductors.	1M
5.1	Which of the following is operated in forward bias? a) LED b) Zener diode c) Photodiode	1M

	d) Solar cell Answer: a) LED Explanation: A light-emitting diode (LED) converts electric energy into light energy. A LED is a heavily doped p-n junction which under forward bias emits spontaneous radiation. The semiconductor used for the fabrication of visible LEDs must at least have a bandgap of 1.8 eV.	
52.	In a shunt capacitor filter, the mechanism that helps the removal of ripples is a) The current passing through the capacitor b) The property of capacitor to store electrical energy c) The voltage variations produced by shunting the capacitor d) Uniform charge flow through the rectifier Answer: b) The property of capacitor to store electrical energy Explanation: Filtering is frequently done by shunting the load with capacitor. It depends on the fact that a capacitor stores energy when conducting and delivers energy during non-conduction. Throughout this process, the ripples are eliminated.	1M
	The charge (q) lost by the capacitor during the discharge time for shunt capacitor filter. a) IDC*T b) IDC/T c) IDC*2T d) IDC/2T Answer: a) IDC*T Explanation: The „T" is the total non-conducting time of capacitor. The charge per unit time will give the current flow.	1M

53.	**Which of the following are true about capacitor filter?** **a) It is also called as capacitor output filter** **b) It is electrolytic** **c) It is connected in parallel to load** **d) It helps in storing the magnetic energy** **Answer: b) It is electrolytic** **Explanation: The rectifier may be full wave or half wave. The capacitors are usually electrolytic even though they are large in size**	**1M**
54.	**The rms ripple voltage (Vrms) of a shunt filter is** **a) IDC/2$\sqrt{3}$** **b) IDC2$\sqrt{3}$** **c) IDC/$\sqrt{3}$** **d) IDC$\sqrt{3}$** **Answer: a) IDC/2$\sqrt{3}$** **Explanation: The ripple waveform will be triangular in nature. The rms value of this wave is independent of slopes or lengths of straight lines. It depends only on the peak value.**	**1M**
55.	**What is the effect of an inductor filter on a multi frequency signal?** **a) Dampens the AC signal** **b) Dampens the DC signal** **c) To reduce ripples** **d) To change the current** **Answer: a) Dampens the AC signal** **Explanation: Presence of inductor usually dampens the AC signal. Due to self-induction induces opposing EMF or changes in the current.**	**1M**

56.	The inductor filter gives a smooth output because a) It offers infinite resistance to ac components b) It offers infinite resistance to dc components c) Pulsating dc signal is allowed d) The ac signal is amplified Answer: a) It offers infinite resistance to ac components Explanation: The inductor does not allow the ac components to pass through the filter. The main purpose of using an inductor filter is to avoid the ripples. By using this property, the inductor offers an infinite resistance to ac components and gives a smooth output	1M
57.	Which of the following can be a source of supply in dc power supplies? a) Battery b) Dry cell c) Full wave rectifier d) All of the mentioned Answer: d) All of the mentioned Explanation: Source of supply will be a battery, dry cell or full wave rectifier etc.	1M
58.	Which of the application's filters used for? a) Reducing ripples b) Increasing ripples c) Increasing phase change d) Increasing amplitude Answer: a) Reducing ripples Explanation: Ripples are ac components and filters are used	1M

	for eliminating ac components from a signal.	
59.	Which of the following represent a change of output voltage when load current is increased? a) Line regulation b) Load regulation c) Current regulation d) Voltage regulation Answer: b) Load regulation Explanation: Load regulation is the process of fractional change of output voltage when load current is increased from zero to maximum value.	1M
60.	Why zener diodes are provided in dc supply? a) For forward conduction b) For reverse conduction c) For reference voltage d) For increasing amplitude Answer: c) For reference voltage Explanation: Zener diodes in dc power supplies are used for providing a reference voltage used for comparison.	1M
61.	Stability of output voltage is entirely depended on _____ a) Stability of transformer b) Stability of zener diode c) Quality of wires d) Capacitor values	1M

	Answer: b) Stability of zener diode **Explanation: Stability of zener diodes used is an important factor in determining the stability of output voltage in dc power supply.**	
62.	**Which of the following are not the standard value of Zener diodes?** **a) 5.1 V** **b) 5.6 V** **c) 5.8V** **d) 6.2V** **Answer: c) 5.8V** **Explanation: Standard values of zener voltages are 5.1V, 5.6V, 6.2V and 9.1V etc.**	**1M**
63	**Which of the following can be used in series with a Zener diode so that combination has almost zero temperature coefficient?** **a) Diode** **b) Resistor** **c) Transistor** **d) MOSFET** **Answer: a) Diode** **Explanation: If a Zener diode of TC of about -2mV is connected with a forward diode (which has a TC of about +2mV) in series, the combination can be used to obtain a very low (close to zero) TC.**	**1M**

64	_____ is used for critical loads where temporary power failure can cause a great deal of inconvenience. a) SMPS b) UPS c) MPS d) RCCB Answer: b) UPS Explanation: Uninterruptible Power Supply is used where loads where temporary power failure can cause a great deal of inconvenience.	1M
65	_____ is used in the rotating type UPS system to supply the mains. a) DC motor b) Self excited DC generator c) Alternator d) Battery bank Answer: c) Alternator Explanation: When the supply is gone, the diesel engine is started, which runs the alternator and the alternator supplies power to the mains. Non-rotating type UPS are not used anymore.	1M
66	Static UPS requires _____ a) only rectifier b) only inverter c) both inverter and rectifier d) none of the mentioned Answer: c) both inverter and rectifier Explanation: Rectifier to converter the dc from the battery to	1M

	ac. Inverter to charge the battery from mains.	
67	**Usually _____ batteries are used in the UPS systems.** **a) NC** **b) Li-On** **c) Lead acid** **d) All of the mentioned** **Answer: c) Lead acid** **Explanation: Lead acid batteries are cheaper and have certain advantages over the other types. NC batteries would however be the best, but are three to four times more expensive than Lead Acid.**	**1M**
67	**What is the expansion ofUPS?** **a) Uninterrupted Power System** **b) Uninterrupted Power Supply** **c) Uninterrupted Power Solution** **d) Uninterrupted Power Section** **Answer: Uninterrupted Power Supply** **Explanation: The full form of UPS is Uninterrupted Power Supply**	**1M**
68	**Which electrical / electronic devicerequires ups?** **a) Air conditioner** **b) Micro wave oven** **c) Computer** **d) Television** **Answer: Computer**	**1M**

	Explanation: Computer is required UPS for back up.	
69	**What is the number of capacitors and inductors used in a CLC filter?** **a) 1, 2 respectively** **b) 2, 1 respectively** **c) 1, 1 respectively** **d) 2, 2 respectively** **Answer: b) 2, 1 respectively** **Explanation: A very smooth output can be obtained by a filter consisting of one inductor and two capacitors connected across each other. They are arranged in the form of letter 'pi'. So, these are also called as pi filters.**	**1M**
70	**Major part of the filtering is done by the first capacitor in a CLC filter because _____** **a) The capacitor offers a very low reactance to the ripple frequency** **b) The capacitor offers a very high reactance to the ripple frequency** **c) The inductor offers a very low reactance to the ripple frequency** **d) The inductor offers a very high reactance to the ripple frequency** **Answer: a) The capacitor offers a very low reactance to the ripple frequency** **Explanation: The CLC filters are used when high voltage and low ripple frequency is needed than L section filters. The capacitor in a CLC filter offers very low reactance to the ripple frequency. So, maximum of the filtering is done by the first capacitor across the L section part.**	**1M**

70	The inductor is placed in the L section filter because_____ a) It offers zero resistance to DC component b) It offers infinite resistance to DC component c) It bypasses the DC component d) It bypasses the AC component Answer: a) It offers zero resistance to DC component Explanation: The inductor offers high reactance to ac component and zero resistance to dc component. So, it blocks the ac component which cannot be bypassed by the capacitors.	1M
71	In practice the output from the diode rectifier has a) AC component only b) DC component only c) AC + DC component d) None of the mentioned Answer: c) AC + DC component Explanation: The output contents along with the DC components the AC harmonics which does no useful work & reduces the efficiency.	1M
78	Choose the correct statement a) The AC component in the output of rectifier does the useful work b) The AC component in the output of rectifier increases the efficiency of the system c) The AC component in the output of rectifier causes ohmic losses d) The AC component in the output of rectifier does not affect the operation Answer: c) The AC component in the output of rectifier	1M

	causes ohmic losses Explanation: A rectifier is used to convert AC to DC. Lower the AC (Non-DC) components in the output lower are the ohmic losses.	
79	An L filter is connected _____ a) in series b) in parallel c) in both series and parallel d) none of the mentioned Answer: a) in series Explanation: Inductor (L) has a very important property that the current through it cannot change rapidly. We can make use of this property by connecting it in series.	1M
80	In case of an L filter connected with a rectifier in series with the load, it offers _____ impedance to ac whereas _____ resistance to dc respectively. a) high, high b) high, low c) low, high d) low, low Answer: b)) high, low Explanation: It offers high impedance to AC such as the AC ripples do not pass through the load.	1M
81	In case of a C filter, the AC is not allowed to pass to the load by a) offering it high impedance b) offering it low impedance c) short circuiting the AC component d) open circuiting the AC component	1M

	Answer: c) short circuiting the AC component **Explanation: AC ripples are not allowed to pass, by S.C the AC ripples as the C is always connected in parallel with the load.**	
82	**A capacitor filter or C filter can be used in a rectifier by connecting it** **a) in parallel with the load** **b) in series with the load** **c) in parallel with the supply** **d) in series with the supply** **Answer: a) in parallel with the load** **Explanation: AC ripples are not allowed to pass, by S.C the AC ripples as the C is always connected in parallel with the load.**	**1M**
83	**In a shunt capacitor filter, the mechanism that helps the removal of ripples is_____** **a) The current passing through the capacitor** **b) The property of capacitor to store electrical energy** **c) The voltage variations produced by shunting the capacitor** **d) Uniform charge flow through the rectifier** **Answer: b) The property of capacitor to store electrical energy** **Explanation: Filtering is frequently done by shunting the load with capacitor. It depends on the fact that a capacitor stores energy when conducting and delivers energy during non-conduction. Throughout this process, the ripples are eliminated.**	**1M**

84	The cut-in point of a capacitor filter is_____ a) The instant at which the conduction starts b) The instant at which the conduction stops c) The time after which the output is not filtered d) The time during which the output is perfectly filtered Answer: a) The instant at which the conduction starts Explanation: The capacitor charges when the diode is in ON state and discharges during the OFF state of the diode. The instant at which the conduction starts is called cut-in point. The instant at which the conduction stops is called cut-out point.	1M
85	The rectifier current is a short duration pulses which cause the diode to act as a_____ a) Voltage regulator b) Mixer c) Switch d) Oscillator Answer: c) Switch Explanation: The diode permits charge to flow in capacitor when the transformer voltage exceeds the capacitor voltage. It disconnects the power source when the transformer voltage falls below that of a capacitor.	1M
86	The output waveform of CLC filter is superimposed by a waveform referred to as_____ a) Square wave b) Triangular wave c) Saw tooth wave d) Sine wave	1M

	Answer: c) Saw tooth wave **Explanation: Since the rectifier conducts current only in the forward direction, any energy discharged by the capacitor will flow into the load. This result in a DC voltage upon which is superimposed a waveform referred to as a saw tooth wave.**	
87	**A PN junction has a thickness of the order** **a. 1 cm** **b. 1 mm** **c. 10-6 m** **d. 10-12 cm** **Answer: (c) 10-6 m** **Explanation: When P- type semiconductor is mixed with N - type semiconductor, PN - junction is formed. There is very small region { which is in order of micro metre } . This region is known as depletion region. so, the thickness of junction { depletion region } is in order of 10 − 6 m**	**1M**
88	**In the depletion region of an unbiased PN junction diode there are** **a. Only electrons** **b. Only holes** **c. Both electrons and holes** **d. Only fixed ions** **Answer: (d) Only fixed ions** **Explanation:Depletion region or depletion layer is a region in a P-N junction diode where no mobile charge carriers are present. Depletion layer acts like a barrier that opposes the flow of electrons from n-side and holes from p-side.**	**1M**

89	In Zener diode, the Zener breakdown takes place a) Below 6 V b) At 6 V c) Above 6 V d) None of the above Answer: a) Below 6 V Explanation: Zener breakdown occurs where breakdown voltage is below 6 V and Avalanche breakdown occurs for other voltages.	1M
90	A Zener diode when biased correctly a) Never overheats b) Has a constant voltage across it c) Acts as a fixed resistance d) Has a constant current passing through it Answer: c) Has a constant voltage across it Explanation: When biased correctly, the Zener diode has a constant voltage across it.	1M
91	Depletion region behaves as a) Semiconductor b) Insulator c) Conductor d) High resistance Answer: b) Insulator Explanation: In the depletion region, an electric field exists that quickly sweeps out electron-hole pairs that may be thermally generated and reduces the equilibrium	1M

	concentration of the charge carriers to exceedingly low levels. Under these circumstances. This region, called the depletion layer, behaves as an insulator.	
92	The advantages of a pi-flter is_____ a) low output voltage b) low PIV c) low ripple factor d) high voltage regulation Answer: c) low ripple factor Explanation: Due to the involvement of 2 capacitors in addition with one inductor it provides improved filtering action. This leads to decrement in ripple factor. A low ripple factor means the ratio of current due to AC ripples and direct Current is low.	1M
93	The basic purpose of flter at the output of a rectifer is to a) minimize variations in ac input signal b) suppress harmonics in rectifed output c) remove ripples from the rectifed output d) stabilize dc output voltage Answer: c) remove ripples from the rectifed output Explanation: Rectifier is an electrical device that converts AC into DC by using one or more p-n junction diodes. But the output of rectifiers is pulsating (means contains both AC component and DC component). Hence, to remove all the AC components we use filters.	1M

94	What is correct about the ripple factor of LC flter? a) Increases with the load current b) increases with the load resistance c) remains constant with the load current d) has the lowest value Answer: c) remains constant with the load current Explanation: the ripple factor of LC flterremains constant with the load current	1M
95	Commercial power supplies have voltage regulation _____ A. of 10% B. of 15% C. of 25% D. within 1% answer: d) within 1% Explanation: Commercial power supplies have voltage regulation within 1%	1M
96	In an unregulated power supply, if load current increases, the output voltage _____ a) Remains the same b) Decreases c) Increases d) None of the above answer: b)Decreases Explanation: The DC voltage output is dependent on an internal voltage reduction transformer and should be matched as closely as possible to the current required by the load. Typically the output voltage will decrease as the current output to the load increases.	1M

97	Two similar 15 V Zeners are connected in series. What is the regulated output voltage? a) 15 V b) 5 V c) 30 V d) 45 V Answer: c) 30 V Explanation: As voltage and watt rating is more useful in real applications. Now if we connect two 15 volts of Zener diodes in series as above, then the total voltage will be 30 volts.	1M
98	The voltage regulator output impedance is _____ a) Very small b) Large c) Infinite d) None Answer: a) Very small Explanation:A low impedance allows the source to deliver current without significant voltage drop, ensuring the voltage remains stable even when connected to different loads. This is important for many electrical and electronic systems where a stable voltage is required for proper operation.	1M
99	A Zener diode utilises ……. characteristic for voltage regulation a) Forward b) Reverse c) Both forward and reverse	1M

	d) None of the above Answer : b) Reverse Explanation: A Zener diode utilises reverse characteristic for voltage regulation	
100	A Zener diode is used as a …… voltage regulating device a) Shunt b) Series c) Series-shunt d) None of the above Answer : a) Shunt Explanation: The Zener diode begins regulation operation only when the input voltage (V_{in}) is equal (or more than) Zener breakdown voltage (V_z). Otherwise, the diode remains "Off-state". Due to the parallel operation with load, Zener diodes are referred to as shunt voltage regulators.	1M
101	Which of the following is true about the temperature coefficient or TC of the Zener diode? a) For Zener voltage less than 5V, TC is negative b) For Zener voltage around 5V, TC can be made zero c) For higher values of Zener voltage, TC is positive d) All of the mentioned Answer: d) All of the mentioned Explanation: All of the mentioned are true for the TC of a zener diode.	1M

102	Zener diodes can be effectively used in voltage regulator. However, they are these days being replaced by more efficient a) Operational Amplifier b) MOSFET c) Integrated Circuits d) None of the mentioned Answer: c) Integrated Circuits Explanation: ICs have been widely adapted by the industries over conventional zener diodes as their better replacements for a voltage regulators.	1M
103	Which of the following is true about the resistance of a Zener diode? a) It has an incremental resistance b) It has dynamic resistance c) The value of the resistance is the inverse of the slope of the i-v characteristics of the Zener diode d) All of the mentioned Answer: d) All of the mentioned Explanation: All of the statements are true for the resistance of the zener diode.	1M

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