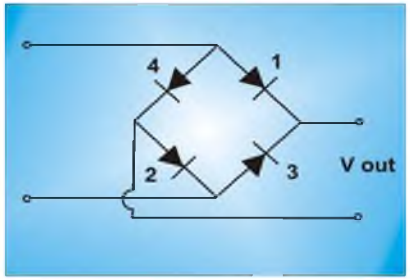
| GUÍA DE ESTUDIO- 1ER MAQUINISTA | | | | | | |
|---|---|---|---|---|---|---|
| **Q. Number** | **Question** | **IMAGEN** | **A** | **B** | **C** | **D** |
| | | **MAINTAIN ELECTRICAL & ELECTRONIC EQUIPMENT** | | | | |
| **1** | What is the purpose of a thermistor or an RTD which is embedded in an alternator winding? | | To equalize the three phase voltages. | To detect an overload condition on the windings. | To monitor internal temperature. | To monitor insulation resistance. |
| **2** | What is the advantage of a delta-star wound transformer? | | Can transform higher loads. | Allows cycle changing. | Allows an earthed secondary winding. | Allows an earthed primary winding. |
| **3** | How is a zener diode different from an ordinary rectifier diode? | | The zener diode has a much higher forward voltage drop. | The zener diode can carry greater forward currents than a rectifier diode. | The zener diode can operate at higher temperatures than a rectifier diode. | The zener diode usually operates with a reverse voltage. |
| **4** | If an electrical solenoid fails to activate when the coil is energised, this could be due to... | | low spring pressure. | low voltage to the coil. | the residual magnetism of the contact faces. | dirty contact faces. |
| **5** | The minimum acceptable resistance between the stator winding and earth of a large 3-phase induction motor would be... | | 1,000 Ohms | 100,000 Ohms | 1,000,000 Ohms | 100,000,000 Ohms |
| **6** | When troubleshooting electronic equipment, the FIRST step to be taken before testing the circuit voltage is to... | | set the meter to the lowest range. | check the voltage supply from the power source. | remove the suspected component. | check the current flow through the circuit. |
| **7** | What does the abbreviation "DPDT" stand for on an electrical circuit diagram? | | Double-pole double-throw. | Duplex-pole double-terminal. | Direct-power differential-transformer. | Double-pole duplex-terminal. |
| **8** | What factor or factors determines whether a transformer is a step-up or step-down type? | | Voltage across the primary. | Current in the secondary. | Turns ratio. | All of these factors. |
| **9** | This diagram is a schematic drawing for a full-wave bridge rectifier circuit. Which one of the diodes is drawn incorrectly in reverse position? |  | Diode 1. | Diode 2. | Diode 3. | Diode 4. |
| **10** | A Wheatstone Bridge is used to measure an unknown resistance in relation to what? | | A voltage drop. | A current imbalance. | The current in the circuit. | A known resistance. |

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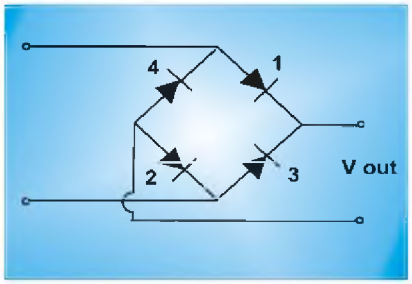
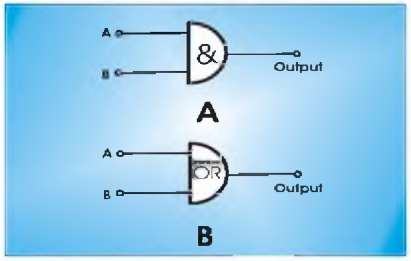
| **11** | Why is the "peak inverse voltage" rating of a P-N junction diode an important value? | | It is directly related to the maximum current the diode is designed to carry. | It determines the maximum ambient temperature in which the diode may be operated. | It determines the maximum inverse ripple voltage which the diode will provide. | It determines the maximum voltage value which the diode is guaranteed to block. |
| **12** | What is the result if one of the two rectifier diodes, shown here, becomes open circuited? |  | The output will become an AC voltage. | The transformer secondary will overheat. | The peak output voltage will be half the normal value. | The circuit will operate as a half-wave rectifier. |
| **13** | How will the terminal voltage of a lead-acid cell in good condition change between no-load and light-load conditions? | | It should fall 15-25 percent. | It should rise 10-25 percent. | It should fall initially then stabilise at about 10% lower. | It should remain about constant. |
| **14** | Given A=0 and B=0 for the 2-input digital logic gate shown. What happens to the output if both inputs are negated (changed to the opposite value)? |  | The output goes from 0 to 1. | The output goes from 1 to 0. | The output remains the same. | The output retains a value of 0. |
| **15** | One type of phase sequence indicator which may be provided in a vessel's shore power junction box is basically a... | | miniature three-phase induction motor. | miniature three-phase reverse voltage relay. | miniature three-phase rectifier circuit. | miniature single-phase sequence-lagged induction motor. |

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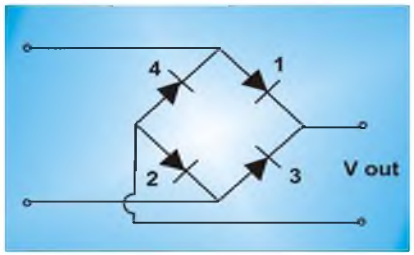
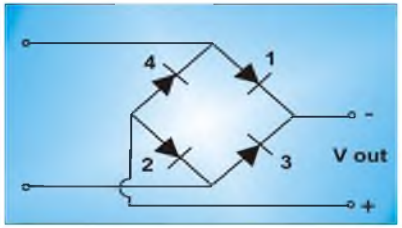
| **16** | What is a likely result if one of the two rectifier diodes, shown here, becomes short circuited? |  | The second rectifier diode will fail due to over-current. | The output will be a full-wave rectified AC voltage. | The circuit will operate as a half-wave rectifier. | The peak output voltage will be half the normal value. |
| **17** | What is wrong with the schematic of the three-phase rectifier circuit shown? |  | Output polarity is incorrect. | Diodes 1 and 2 are reversed. | Diodes 3 and 4 are reversed. | Diodes 5 and 6 are reversed. |
| **18** | When testing the stator windings of an AC electric motor to earth, a low resistance reading on an individual winding indicates... | | poor insulation on the coil. | an open circuit coil. | good continuity of the coil. | accumulation of dirt on the coil insulation. |
| **19** | What are some of the primary factors in determining the size and type of electrical power cable used for an installation? | | Capacitance to ground, series inductance, and resistance. | Surge impedance, ambient temperature, and insulation colour. | Amperage capacity, ambient temperature, and voltage drop. | Amperage capacity, withstand capacity, and breakdown voltage. |
| **20** | Before using a multi meter to measure an unknown resistance you should... | | short the test leads and calibrate the meter. | adjust the meter's pointer to mid-scale. | change the meter's batteries. | centre the meter's pointer at infinity. |
| **21** | What is the basic moving-coil instrument designed to measure? | | AC current. | AC voltage. | DC current. | DC voltage. |
| **22** | Which of the following is used to increase or decrease DC voltage? | | Simple wound transformer. | Rectifier. | Rotary convertor. | Transducer. |
| **23** | If an AC alternator is supplying power at an unacceptably low power factor, what protection device would operate? | | The low voltage trip. | The reverse power trip. | The overspeed trip. | The overcurrent trip. |

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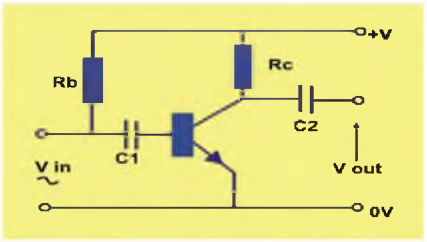
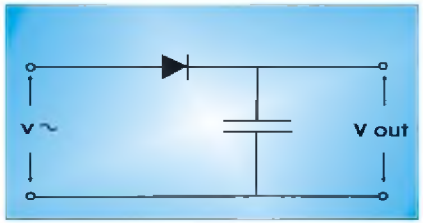
| **24** | The circuit shown here is an example of a... |  | Common-emitter AC amplifier. | Common-base DC amplifier. | Simple astable multivibrator. | RC load oscillator. |
| **25** | The main purpose of the capacitor shown in the half-wave rectifier circuit shown here is to... |  | limit output current to a safe value. | limit output voltage to a safe value. | limit voltage fluctuations from the output terminals. | limit current fluctuations from the output terminals. |
| **26** | What is the purpose of a two-winding iron-core transformer? | | To raise or lower DC voltages. | To raise or lower AC voltages. | To change AC voltage to DC voltage. | To raise, lower, or isolate AC voltages. |
| **27** | A 440 V AC shipboard system power cable carries a rating of 0.6kV/1.0kV. What does this dual voltage rating mean? | | Maximum voltage to ground is 600 V and the maximum voltage between conductors is 1000 V. | Maximum voltage with no current is 1000 V and the maximum voltage at full current is 600 V. | Maximum voltage at 0 deg C is 1000 V and the maximum voltage at 45 deg C is 600 V. | Maximum voltage at 50 Hz is 1000 V and the maximum voltage at 60 Hz is 600 V. |
| **28** | The operation of an electric motor under continuous small overload conditions would usually result in... | | the fuse blowing. | the breaker tripping. | the thermal overload protection tripping the motor. | damage to the insulation of the motor windings. |
| **29** | When connecting to shore power, what would be the most reasonable value to set on the vessel's "shore power" circuit breaker? | | The maximum setting allowed for the circuit breaker's frame size. | A setting equal to 100% of the rating of the shore supply fuses. | A setting equal to about 110% of the rating of the shore supply fuses. | A setting equal to about 90% of the rating of the shore supply fuses. |
| **30** | An earth fault occurring outside the machinery spaces, on the secondary voltage supply... | | cannot be detected by the engine room earth detection system. | is not important and will not affect other electrical equipment. | will be indicated at the branch circuit breaker panel. | will be indicated by the appropriate earth detecting lamps on the main switchboard. |

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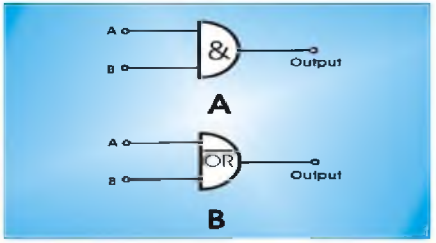
| **31** | If the governor of the diesel engine driving an alternator malfunctions, which safety device will trip the main breaker? | | The overload trip. | The reverse current trip. | The under voltage trip. | The high/low frequency trip. |
| **32** | What does the "Interrupt Capacity" rating (measured in amps) for a fuse or circuit breaker indicate? | | The maximum current the fuse or breaker can safely interrupt during a short circuit without rupturing or blowing apart. | The average current the fuse can handle without causing an arc which would ignite a flammable mixture. | The maximum current which the circuit breaker or fuse can withstand and continue to operate. | The maximum current the fuse or circuit breaker can block in the open condition. |
| **33** | Given A=0 and B=1 for the 2-input digital logic gate shown. What happens to the output if both inputs are negated (changed to the opposite value)? |  | The output goes from 0 to 1. | The output goes from 1 to 0. | The output remains the same. | The output retains a value of 0. |
| **34** | The purpose of a heatsink when it is used in conjunction with a diode is to... | | stabilise the diode output. | prevent excessive heat loss from the diode. | prevent excessive heat from entering the diode. | prevent the diode from overheating. |
| **35** | If a small cargo vessel is not equipped with an emergency generator it is an acceptable situation only... | | if one of the generators can be started by independent batteries. | if it is possible to start one of the generators by hand. | when all of the main generators are started by independent batteries. | if the main propulsion and steering can be maintained from the emergency battery supply. |
| **36** | What happens when resistance is added in series with the field coil of a DC shunt-wound motor? | | Motor speed increases. | Motor speed decreases. | Field current increases. | Armature current decreases. |
| **37** | If you suspected that the preferential trips were not operating correctly, how would you test them? | | By loading up the alternator. | By raising the alternator frequency. | By raising the alternator voltage. | By lowering the alternator voltage. |
| **38** | Why is PVC (polyvinylchloride) electrical insulation not used for marine applications? | | PVC tends to crack at the lower temperatures which may be encountered during the normal trade of a vessel. | PVC melts at 150 deg C, and emits toxic fumes when burned. | PVC distorts under mechanical pressure and will lose it's water-tightness in a pressure-type cable gland | All of the other answers are reasons for not using PVC insulation in marine applications. |

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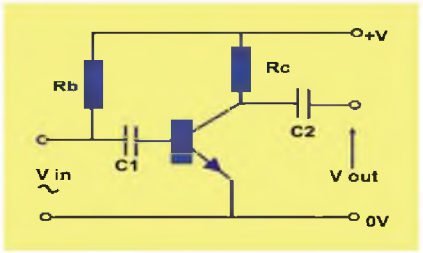
| **39** | When testing the stator windings of an AC electric motor with a megger, a low resistance reading on an individual winding indicates... | | an open circuit coil. | poor insulation on the coil. | good continuity of the coil. | accumulation of dirt on the coil insulation. |
| **40** | Which statement is true about the AC linear amplifier stage shown? |  | The value of Rc must be much higher than the value of Rb for linear operation. | Vin must be greater than the +V supply voltage for proper linear operation. | The output voltage amplification depends only on the ratio of the value of C2 to C1. | C1 and C2 prevent DC currents from entering or leaving the amplifier stage. |

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| ANSWERS | |
| 1 | C |
| 2 | C |
| 3 | D |
| 4 | B |
| 5 | C |
| 6 | B |
| 7 | A |
| 8 | C |
| 9 | D |
| 10 | D |
| 11 | D |
| 12 | D |
| 13 | D |
| 14 | B |
| 15 | A |
| 16 | A |
| 17 | A |
| 18 | A |
| 19 | C |
| 20 | A |

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| ANSWERS | |
| 21 | C |
| 22 | C |
| 23 | D |
| 24 | A |
| 25 | C |
| 26 | D |
| 27 | A |
| 28 | C |
| 29 | D |
| 30 | D |
| 31 | D |
| 32 | A |
| 33 | C |
| 34 | D |
| 35 | B |
| 36 | A |
| 37 | A |
| 38 | D |
| 39 | C |
| 40 | D |