

國立中山大學 107 學年度碩士暨碩士專班招生考試試題

科目名稱：電路學【電機系碩士班丁組】

題號：431006

※本科目依簡章規定「可以」使用計算機（廠牌、功能不拘）（單選題共 20 題） 共 3 頁第 1 頁
每題正確答案得 5 分，錯誤答案倒扣 1 分，未作答者，不給分亦不扣分

1. A Lithium Ion battery module is rated at 12V/6Ah. A module is discharged by 0.5C constant current for 0.5 hour. Determine the power supplied by the battery module.
(A) 144W
(B) 72W
(C) 36W
(D) 18W
2. A capacitor 0.1F is charged from 50V to 100V by a constant current 1A. Determine the energy is stored in the capacitor during this process.
(A) 500J
(B) 375J
(C) 250J
(D) 125J
3. Current flowing in a resistor 10k Ω is equal to 2mA. Determine power consumption of the resistor.
(A) 40kW
(B) 40W
(C) 40mW
(D) 40 μ W
4. A voltage source 10 V is applied to a series RLC circuit with parameters L=4H, C=0.25F, R=10 Ω . Determine power consumption.
(A) 200W
(B) 100W
(C) 50W
(D) 0W
5. Determine reactance of a capacitor C=20nF at 100kHz.
(A) 0.002 Ω
(B) 0.0125 Ω
(C) 500 Ω
(D) 80 Ω
6. Determine time constant of a series RC first-order circuit with parameters C=0.25F and R=40 Ω .
(A) 10s
(B) 0.1s
(C) 10rad
(D) 0.1rad
7. Current 10cos(377t) A flows into a series RL circuit with parameters L=1mH and R=10 Ω . Determine average power of the RL circuit.
(A) 1000W
(B) 500W
(C) 250W
(D) 0W

背面有題

試題隨卷繳回

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8. A 10Ω resistive load is applied by $100\cos(377t)$ V. Choose a false statement.
- (A) instantaneous power is equal to average power
 - (B) average power is equal to apparent power
 - (C) power factor is equal to 1
 - (D) reactive power is equal to 0
9. For an AC circuit, choose a false statement.
- (A) inductive current lags inductive voltage
 - (B) capacitive current leads capacitive voltage
 - (C) average power of an inductor is zero
 - (D) instantaneous power of an inductor is zero
10. Determine the power factor of a load with impedance $10+j10\Omega$.
- (A) 0.707 leading
 - (B) 0.707 lagging
 - (C) 0.866 leading
 - (D) 0.866 lagging
11. A delta-connected resistive load 100Ω per phase is connected to a balanced three-phase three-wire 200V circuit. Choose a false statement.
- (A) power factor is 1
 - (B) reactive power is 0
 - (C) average power is 1200W
 - (D) line current is 2A
12. A Y-connected resistive load 40Ω per phase is connected to a balanced three-phase four-wire voltage source. Phase voltage is 100V. A neutral line with resistance 10Ω is connected between source and load. Determine current in the neutral line.
- (A) 10A
 - (B) 2A
 - (C) 2.5A
 - (D) 0A
13. For an ideal transformer, voltage at the primary side and the secondary side are 500V and 100V, respectively. Secondary side is connected to a 100Ω resistor. Choose a false statement.
- (A) output power is 100W
 - (B) input power is 100W
 - (C) output current is 1A
 - (D) input current is 1A
14. For a two-winding coupling device in an AC circuit, choose a false statement.
- (A) coupling coefficient is less than 1
 - (B) mutual inductance is between -1 and 1
 - (C) induced voltage is determined by Faraday's law
 - (D) direction of induced voltage is determined by Lenz's law

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15. Determine RMS value of a half-wave rectified sine wave with amplitude 100V.
- (A) 141.4V
 - (B) 100V
 - (C) 70.7V
 - (D) 50V
16. An ideal buck converter is operated in CCM mode. Input voltage is 20V, output voltage is 10V and load resistance is 2Ω . Determine the average value of switch current.
- (A) 2.5 A
 - (B) 5 A
 - (C) 10 A
 - (D) 20 A
17. An ideal boost converter is operated in CCM mode. Input voltage is 10V and output voltage is 50V and load resistance is 10Ω . Determine the average value of diode current.
- (A) 5A
 - (B) 4A
 - (C) 2A
 - (D) 1A
18. Determine the speed of rotation of a synchronous generator with parameters 480V/60Hz/six poles/delta-connection.
- (A) 3600rpm
 - (B) 1800rpm
 - (C) 1200rpm
 - (D) 900rpm
19. A four-pole, 60Hz induction motor supplies 15kW to a load at a speed of 1710 rpm. Determine rotor frequency at this condition.
- (A) 3Hz
 - (B) 6Hz
 - (C) 63Hz
 - (D) 57Hz
20. Consider load flow in an inductive feeder. Choose a true statement.
- (A) real power flow is primarily determined by voltage difference between two buses
 - (B) reactive power flow is primarily determined by angle difference between two buses
 - (C) injection of reactive power increases voltage
 - (D) consumption of real power increases voltage