

102 年度管理類、工程類、船員類從業人員甄試試題
管理類及工程類：「類別七：工程師/機電類(職務層次第 7 層)」

科目：專業英文

1. 作答前須檢查答案卡、入場通知書號碼、桌角號碼、應試類別是否相符，如有不同應立即請監試人員處理。繳卷時，請將「答案卡」及「試題卷」一併繳回。
2. 第 1 至 50 題為單一選擇題，每題都有(A)(B)(C)(D)四個答案，請選出一個正確選項，標示於答案卡。每題答對得 2 分，答錯不倒扣。

1. What is defined as the ratio of the mole fraction of water vapor in moist air to mole fraction of water vapor in saturated air at the same temperature and pressure?
 - (A) air-vapor ratio
 - (B) humidity ratio
 - (C) relative humidity
 - (D) sensible heat factor
2. Which refrigerant reacts with copper?
 - (A) Refrigerant 11
 - (B) Refrigerant 22
 - (C) Refrigerant 502
 - (D) Refrigerant 707
3. What is the definition of coefficient of performance for the refrigeration cycle?
 - (A) actual heat rejection/net work
 - (B) useful refrigeration/net work
 - (C) net work/actual heat rejection
 - (D) net work/useful refrigeration
4. What are the four components of a vapor-compression refrigerating system?
 - (A) compressor, condenser, expansion device, and evaporator
 - (B) compressor, combustor, turbine, and heat exchanger
 - (C) pump, boiler, turbine, and condenser
 - (D) pump, condenser, turbine, and economizer
5. Regarding the characteristics of refrigerants, which statement is true?
 - (A) high water solubility
 - (B) low freezing temperature
 - (C) relatively low critical temperature
 - (D) relatively high condensing temperature
6. What is the temperature below which the water vapor in a volume of humid air at a given constant barometric pressure will condense into liquid water at the same rate at which it evaporates?
 - (A) boiling point
 - (B) flash point
 - (C) dew point

- (D) pour point
7. Which device is a heat exchanger that usually rejects all the heat from the refrigeration system?
- (A) subcooler
 - (B) superheater
 - (C) condenser
 - (D) evaporator
8. What is the definition of heat exchanger effectiveness?
- (A) ideal heat transfer rate/minimum possible heat transfer rate
 - (B) ideal heat transfer rate/maximum possible heat transfer rate
 - (C) actual heat transfer rate/minimum possible heat transfer rate
 - (D) actual heat transfer rate/maximum possible heat transfer rate
9. Which chart can be used to find all of the various properties of air-water vapor mixture?
- (A) compressibility chart
 - (B) Gantt chart
 - (C) Moody chart
 - (D) psychrometric chart
10. Areas beneath reversible processes on the temperature-entropy diagram represent
- (A) transfer of heat
 - (B) amount of work
 - (C) thermal efficiency
 - (D) coefficient of performance
11. Which device is used to take heat at a low temperature from outside air and reject it to heat a building?
- (A) refrigerator
 - (B) heat pump
 - (C) reheater
 - (D) regenerator
12. Where will the frost usually form in a freezer?
- (A) compressor
 - (B) condenser
 - (C) expansion device
 - (D) evaporator
13. Number of electrons in uppermost orbit of an atom of a material is known as
- (A) diode
 - (B) transistor
 - (C) valence
 - (D) conductor
14. Which is the active electronic circuit component?
- (A) diode
 - (B) resistor

- (C) inductor
 - (D) capacitor
15. What is the unit of capacitance?
- (A) henry
 - (B) Farad
 - (C) ohm
 - (D) mho
16. Which is not an electronic component of optoelectronics?
- (A) quadrupler
 - (B) light-emitting diode
 - (C) photodiode
 - (D) optocoupler
17. What is a special diode optimized for operation in the breakdown region?
- (A) light-emitting diode
 - (B) photodiode
 - (C) Schottky diode
 - (D) zener diode
18. What is a measure of purity of the dc output of a rectifier?
- (A) power factor
 - (B) bias factor
 - (C) ripple factor
 - (D) gain factor
19. What is the ratio of change in drain current to the corresponding change in gate-source voltage at a constant drain-source voltage?
- (A) ac drain resistance
 - (B) dc drain resistance
 - (C) transconductance
 - (D) transresistance
20. What is the ratio of change in drain-source voltage to the change in gate-source voltage at a constant drain current?
- (A) safety factor
 - (B) contraction factor
 - (C) working factor
 - (D) amplification factor
21. Which semiconductor is not frequently used in the construction of electronic devices?
- (A) copper(Cu)
 - (B) silicon(Si)
 - (C) germanium(Ge)
 - (D) gallium arsenide(GaAs)
22. What is the electric charge of an electron?

- (A) -9.11×10^{-31} coulombs
(B) -1.637×10^{-27} coulombs
(C) -6.23×10^{-23} coulombs
(D) -1.602×10^{-19} coulombs
23. Which of the following is not the JFET connection?
(A) common gate
(B) common emitter
(C) common source
(D) common drain
24. Which semiconductor device is also known as Insulated Gate Field Effect Transistor?
(A) Field Effect Transistor(FET)
(B) Junction Field Effect Transistor(JFET)
(C) Bipolar Junction Transistor(BJT)
(D) Metal Oxide Semiconductor Field Effect Transistor(MOSFET)
25. If the mechanical rotation frequency of a motor equals the electrical frequency of the AC source, then this motor is
(A) a servomotor
(B) a synchronous motor
(C) an induction motor
(D) a universal motor
26. Which law states that voltage is directly proportional to current?
(A) Ohm's law
(B) Lenz's law
(C) Kirchhoff's law
(D) Ampere's law
27. What is the device composed of two metal plates separated by insulating material and used for the storage of electricity?
(A) resistor
(B) radiator
(C) capacitor
(D) regulator
28. What device consists of two coils of wire with magnetic coupling between them?
(A) a transformer
(B) an exciter
(C) a reactor
(D) a governor
29. If the load is inductive, then we say that it has a
(A) unity power factor
(B) lagging power factor
(C) leading power factor

- (D) zero power factor
30. What is defined as the ratio of actual power to apparent power?
- (A) gain
 - (B) damping ratio
 - (C) power factor
 - (D) power law
31. What is taken to be the product of the effective values of voltage and current?
- (A) apparent power
 - (B) real power
 - (C) impedance
 - (D) inductance
32. What is the ratio of the difference between the synchronous speed and the rotor speed to the synchronous speed?
- (A) lagging
 - (B) leading
 - (C) split
 - (D) slip
33. Which motor has a split-phase stator winding and a smooth cylindrical rotor of hard magnetic material?
- (A) servomotor
 - (B) hysteresis motor
 - (C) reluctance motor
 - (D) shunt motor
34. Which motor is an AC motor?
- (A) induction motor
 - (B) series motor
 - (C) shunt motor
 - (D) compound motor
35. What is the unit of magnetic flux density?
- (A) Weber
 - (B) Tesla
 - (C) Henry
 - (D) Farad
36. Which device is a piece of metal inserted in a circuit that is intended to melt and open the circuit before excessive currents have had time to damage the remainder of the circuit by overheating?
- (A) relay
 - (B) starter
 - (C) fuse
 - (D) breaker
37. What is the ideal cycle for spark-ignition reciprocating engines?

- (A) Brayton cycle
 - (B) Rankine cycle
 - (C) Diesel cycle
 - (D) Otto cycle
38. Which law of thermodynamics asserts that energy has quality as well as quantity, and actual processes occur in the direction of decreasing quality of energy?
- (A) The zeroth law of thermodynamics
 - (B) The first law of thermodynamics
 - (C) The second law of thermodynamics
 - (D) The third law of thermodynamics
39. Which principle states that for an inviscid flow, an increase in the speed of the fluid occurs simultaneously with a decrease in pressure or a decrease in the fluid's potential energy?
- (A) Bernoulli's principle
 - (B) superposition principle
 - (C) Aufbau principle
 - (D) Pauli exclusion principle
40. What is the ratio of the net work produced by the engine to the total heat input?
- (A) air-fuel ratio
 - (B) specific heat ratio
 - (C) thermal efficiency
 - (D) mechanical efficiency
41. Under what conditions, gases will follow the ideal –gas equation?
- (A) high pressures and high temperatures
 - (B) high pressures and low temperatures
 - (C) low pressures and high temperatures
 - (D) low pressures and low temperatures
42. Any equation that relates the pressure, temperature, and specific volume of a substance is called
- (A) an equation of state
 - (B) a Bernoulli's equation
 - (C) a characteristics equation
 - (D) a Maxwell equation
43. A system consists of a fixed amount of mass, and no mass can cross its boundary but energy can cross the boundary. This system is called
- (A) an open system
 - (B) a control volume
 - (C) an isolated system
 - (D) a closed system
44. The phenomenon of a substance passing from the solid phase directly into the vapor phase is called
- (A) boiling

- (B) sublimation
 - (C) condensation
 - (D) evaporation
45. A device that increases the velocity of a fluid at the expense of pressure is called
- (A) a nozzle
 - (B) a diffuser
 - (C) a turbine
 - (D) a compressor
46. Which material has the highest thermal conductivity?
- (A) copper
 - (B) silver
 - (C) aluminum
 - (D) iron
47. A process during which there is no heat transfer is called
- (A) an isobaric process
 - (B) an isometric process
 - (C) an adiabatic process
 - (D) an isothermal process
48. Which device is designed to be isenthalpic?
- (A) pump
 - (B) compressor
 - (C) turbine
 - (D) throttling valve
49. In gas-turbine power plants, the ratio of the compressor work to the turbine work is called
- (A) cut-off ratio
 - (B) pressure ratio
 - (C) utilization ratio
 - (D) back work ratio
50. Increasing the boiler pressure increases the thermal efficiency of the Rankine cycle, but it also increases the moisture content of the steam to unacceptable levels. This problem can be solved by using
- (A) a regenerative process
 - (B) an intercooling process
 - (C) a reheat process
 - (D) a refining process

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