REGISTERED ELECTRICAL ENGINEERS Preboard Examination
Monday, March 4, 2019

2:00 PM - 6:00 PM

ENGINEERING SCIENCES AND ALLIED SUBJECTS

INSTRUCTION: Select the correct answer for each of the following questions. Mark **only one answer** for each item by shading the box corresponding to the letter of your choice on the answer sheet provided. **STRICTLY NO ERASURES ALLOWED.**

1-25 → Sept 2018

MULTIPLE CHOICE:

1. A bank charges 6% simple interest on a P 25,000 loan. How much will be repaid if the loan is paid back in one lump sum after five years? 25000 (1 + 0.06 (5))
   A. P 30,875 B. P 32,750 C. P 32,500 D. P 31,250

2. What is the present worth of two P 100 payments at the end of the third and fourth years if the annual interest rate is 8%?
   A. P 120 B. P 153 C. P 122 D. P 160

3. Which of the following corresponds to the meaning of annuity?
   A. A lump sum at the end of the year.
   B. An annual repayment of the loan.
   C. A series of uniform amounts over a period of time.
   D. The future worth of a present amount.

*4. The passing general weighted average rating for the licensure examination for Registered Electrical Engineers must be 70% with NO GRADE below ____ in any subjects in Mathematics, ESAS, and Electrical Engineering as required under Section 19(b) of RA 7920.
   A. 55% B. 65% C. 60% D. 50%

*5. Find the amount of P30,000 at 6 percent simple interest after 5 years. 30000 (1 + 0.06 (5))
   A. P39,000 B. P40,000 C. P41,000 D. P42,000

6. RA 9136 is _____.
   A. Electric Power Installation Reform Act
   B. Energy Power Isolation Reform Act
   C. Electric Power Industry Reform Act
   D. Energy Power Institution Reliability Act

7. Recognizable as suitable for the specific purpose, function, use, environment application, where described in a particular Code requirement.
   A. listed B. labeled C. approved D. identified

8. If 1/3 hp pump runs for 20 minutes, what is the energy used? 1/3 (746) (20×60)
   A. 0.06 erg B. 0.25 kW C. 0.30 MJ D. 0.11 kW-h

*9. Commercially used pressure measuring device today is
   A. Bourdon tube gauge B. Manometer C. Kelvin gauge D. Barometer

10. What does FTTH mean?
    A. Flexible to the House B. Flexible to the Home C. Fiber to the Home D. Fiber to the House

11. An 8 ft long pendulum subtends an angle of 340. What is the height difference from its stationary position? cos 34° = 8 − h / 8
    A. 1.37 B. 1.73 34° C. 1.26 D. 1.62

12. Which of the following expressions is incorrect?
    A. the future worth of a present amount, $(F/P, i, n) = \frac{1}{(P/F, i, n)}$.
    B. the future worth of an annuity, $(F/A, i, n) = \frac{1}{(A/F, i, n)}$.
    C. (A/F, i, n) x (P/A, i, n) = (P/F, i, n)
    D. (A/F, i, n) – i = (A/P, i, n)

$\eta_{max} = \left[1 - \frac{T_L}{T_H}\right] \times 100\%$ $\left[1 - \frac{800}{1000}\right]$

13. A Carnot engine operates between 800 deg R and 1000 deg R. What is the thermal efficiency?
    A. 20% B. 30% C. 40% D. 50%

14. Which permits American engineers to practice their profession in the Philippines? Art IV, Sec 38 of RA 7920
    A. Foreign Reciprocity
    B. Certificate of Specialty
    C. Professional license
    D. Certificate of Registration

15. What is the octal equivalent of the hexadecimal number EE?
    A. 356 B. 365 C. 653 D. 635

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16. The disconnecting means for motor circuits shall have an ampere rating of at least 115% of the full-load current rating of the motor.
A. manufacturing rule B. construction rule C. wiring design rule D. installation rule

17. Which of the following metals has the highest specific heat capacity at 100 deg C?
A. aluminum B. silver C. copper D. iron

18. A force causing a rise in liquid in tubes of small diameter.
A. Cohesion B. Surface tension C. Capillarity D. Adhesion

19. Under very slow deformation and at high temperature, it is possible to have some plastic flow in a crystal at a shear stress lower than the critical shear stress. What is the phenomenon called?
A. slip B. twinning C. creep D. bending

20. The ability to convert assets to cash quickly is known as _____.
A. Solvency B. Liquidity C. Leverage D. Insolvency

21. Who is the current chairman of the Board of EE?
A. Jaime V. Mendoza B. Francis V. Mapile C. Fortunato C. Leynes D. Gregorio T. Cayetano

22. Which of the following does not threaten the operation of a computer
A. Trojan horse B. Worm C. Firewall D. Hacking

23. Which if the following is NOT an extensive property? INTENSIVE - size independent → temp, pressure, density
A. Kinetic Energy B. Momentum C. Mass D. Density

24. Which of the following is NOT an intensive property? EXTENSIVE - dependent the size → mass, volume, total
A. Kinetic Energy B. Momentum C. Mass D. All of these

25. A jeweler examines a diamond with a loupe (a simple magnifier) with a focal length of 8.0 cm. If the gem is positioned so that its image is at the normal near point, 25 cm. How far from the lens must the diamond be held? $\frac{1}{do} + \frac{1}{di} = 1/f$ $\frac{1}{do} + \frac{1}{-25} = 1/8$
A. 4.1 cm B. 11.8 cm C. 6.1 cm D. 9.8 cm

26. The executive officer of the Board of Electrical Engineering is _____.
A. PRC Commissioner C. Civil Service Commission
B. Chairman of the Board of EE D. IIEE President

27. What is a set of instructions that resides on a storage device, such as hard drive, and can be loaded into memory and executive called?
A. Stored program C. Operating program
B. Device program D. Memory-resident program

28. A Ferrari sports car can accelerate from rest to 96 km/h (about 60 mi/h) in 2.2 s. What is its average acceleration? $\frac{\Delta V}{\Delta t} = \frac{V_f - V_o}{t_f - t_o}$ $\frac{96\,km}{hr} \times \frac{1000m}{1km} \times \frac{1hr}{3600} \div 2.2$
A. 6.1 m/s^2 B. 12.1 m/s^2 C. 1.6 m/s^2 D. 11.2 m/s^2

29. Cavitation is the result of
A. static pressure in a fluid becoming less than fluid vapor pressure
B. exposure of concrete to salt water
C. heat treatment of a low carbon steel
D. improper welding technique

30. The term "bronze" is used to designate any alloy containing:
A. copper and zinc (Brass) B. copper and aluminum C. copper and nickel (Constantan) D. copper and tin

31. What acid is added to carbonated drinks to produce a tart test?
A. Citric acid B. Phosphoric acid C. Sulfuric acid D. Nitric acid

32. Isentropic compression of 1 ft^3 of air, $c_p/c_v = 1.40$, at 20 psia to a pressure of 100 psia gives a final volume of: Polytropic $P_1V_1^k = P_2V_2^k$ $20psi\,(1ft^3)^{1.4} = 100psi\,(V_2)^{1.4}$
A. 0.16 ft^3 B. 0.20 ft^3 C. 0.32 ft^3 D. 0.40 ft^3

33. What is the only gas in Group VIA in the periodic table?
A. Argon B. Krypton C. Oxygen D. Helium

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$I = P/V = \frac{70\,W}{12} = 5.8$

34. A 12-V car battery powers a 70-W headlamp. What current does the lamp draw?
A. 5.8 A B. 8.5 A C. 0.17 A D. 0.71 A

35. Sec. 34 of Art. IV: Sundry Provisions Relative to Practice of Electrical Engineering states that _____.
A. Personnel required
B. Preparation of plans, supervision of installation application of PEC code
C. Practice not allowed for firms and corporations
D. Prohibitions in the Practice of Electrical Engineering

36. What do you call the removal of zinc from brasses?
A. Dezincification B. Graphitization C. Stabilization D. Dealloying

37. A force of 120 N will stretch a spring 2 cm. If the spring were cut in half, what would then be the spring constant?
A. 6,000 N/m B. 3,000 N/m C. 12,000 N/m D. 4,000 N/m

38. The moment of inertia of any plane figure can be expressed in units of length to the
A. First power B. Second power C. Third power D. Fourth power

39. What law asserts that energy has quality as well as quantity?
Law of Conservation of Energy
A. First law of Thermodynamics C. Third law of Thermodynamics
B. Second law of Thermodynamics D. Zeroth law of Thermodynamics

40. Two hundred millilitres of oxygen gas (O_2) are collected over water at 23 deg C and a pressure of 1 atmosphere. What volume would the oxygen occupy dry at 273 K and 1 atmosphere?
A. 179.3 mL B. 184.4 mL C. 190.9 mL D. 194.5 mL

41. 1 bar is equivalent to how many pascals?
A. 10^3 B. 10^4 C. 10^5 D. 10^6

42. What law provides an absolute reference point for the determination of entropy?
A. Zeroth law of thermodynamics C. Second law of thermodynamics
B. First law of thermodynamics D. Third law of thermodynamics

43. On a level roadway, the coefficient of friction between the tires of a car and the asphalt is 0.80. What is the maximum speed at which a car can round a turn of radius 25 m if the car is not to slip?
A. 14 mph B. 31 mph C. 43 mph D. 18 mph

44. What height of mercury column is equivalent to a pressure of 100 psig? Density of mercury is 848 lb/ft^3.
A. 14 ft B. 17 ft C. 12 ft D. 11 ft

Metal Cover
45. MC cable insulation shall have a maximum operating temperature of not less than _____.
A. 75 deg C B. 80 deg C C. 90 deg C D. 60 deg C

46. Steels can be strengthened by all of the following practices, EXCEPT:
A. annealing → softening C. work hardening
B. quenching and tempering D. grain refinement

47. Which of the following metals has the highest melting point? RME
A. copper B. gold C. silver D. tungsten

48. The term "enthalpy" comes from the Greek "enthalpen" which means _____.
A. Warm B. Hot C. Heat D. Cold

49. What is the strong bond between hydrogen atoms known as?
Weakest - Van der Waa
A. the ionic bond C. ionic and metallic bonds
B. the metallic bond D. the covalent bond

50. The inner strand of ACSR is made of Aluminum Conductor Steel Reinforced
A. brass B. steel C. copper D. lead

51. What is the opposite of perfect competition?
A. Monopsony (one buyer) B. Oligopoly (more firms) C. Oligopsony D. Monopoly
- walang kakompetensya

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52. A windowpane is 1.2 m high and 0.6 m wide. The glass is 4 mm thick and has thermal conductivity k = 0.78 W/m-deg C. The temperature of the inner face of the glass is 12 deg C and that of the outer surface is −12 deg C. What is the rate of heat flow through the window?
A. 4.3 kW B. 3.4 kW C. 5.4 kW D. 4.5 kW

53. The ability to meet debts as they become due is known as _____.
a. Solvency B. Leverage C. Insolvency D. Liquidity

54. One banker's year is equivalent to _____ days.
A. 300 B. 360 C. 365 D. 366

55. Iron is said to be abundant in nature. About how many percent of the earth's crust is iron?
A. 10 percent B. 5 percent C. 20 percent D. 8 percent

56. What is the tensile load if a 1/2" × 4" x 12' steel rod experiences an 80 deg F temperature decrease from the no stress temperature?
A. 9,850 lb B. 15,600 lb C. 31,200 lb D. 62,400 lb

57. A copper column of annular cross section has an outer diameter of 15 feet and is subjected to a force of 45 kips. The allowable compressive stress is 300 lbf/ft^2. What should be the wall thickness?
A. 3.52 ft B. 4.59 ft C. 5.03 ft D. 5.83 ft

58. The Implementing Rules and Regulations (IRR) of RA 7920 was approved under Board Resolution No. ____.
A. 16 B. 18 C. 22 D. 24

59. A mass of 5 slugs and one of 7 kg are combined. Express the total mass in slugs.
A. 4.58 B. 4.62 C. 5.48 D. 6.42

60. If Php 100,000 is invested at 12 percent interest, compounded monthly, the first year interest, is nearest to
A. Php 12,700 B. Php 12,850 C. Php 12,000 D. Php 12,350

61. When gases expand and mix with other gases to fill available space, it is called
A. vaporization B. evaporation C. solidification D. diffusion

62. In EPIRA, what does OARC stands for?
A. Open Access and Retail Competitors C. Open Access and Retailing Competitors
B. Open Access and Retail Competition D. Open Access and Retailing Competition

63. What is the atomic packing factor for a simple cubic crystal?
A. 0.48 B. 0.52 C. 1.00 D. 1.05

64. It is required to transmit 70 hp from a turbine by a solid circular shaft turning at 200 r/min. If the allowable shearing stress is 7000 lb/in^2, determine the required shaft diameter.
A. 3.13 in B. 2.52 in C. 1.12 in D. 2.12 in

65. Determine the moment of inertia of a circle of diameter 5 in about a diameter.
A. 30.7 in^4 B. 61.4 in^4 C. 15.35 in^4 D. 46.02 in^4

66. The temperature of an object is raised by 90 deg C. This is equivalent to an increase in its Fahrenheit scale of
A. 194 B. 130 C. 162 D. 50

67. Article IV, Rule ____. Requirements for examination as a REE.
A. 14 B. 15 C. 16 D. 17

68. Divide (15) base 16 by (011) base 2. Express the answer in base 10.
A. 9 B. 5 C. 7 D. 3

69. In refrigerator, the quantity 288,000 BTU/day is called,
A. Ton B. Vapor heat C. Throughput D. Freon number

70. Steam at 1000 lbf/ft^2 pressure and 300 deg R has a specific volume of 6.5 ft^3/lbm and a specific enthalpy of 9800 lbf-ft/lbm. Find the internal energy per pound mass of steam.
A. 2500 lbf-ft/lbm B. 3300 lbf-ft/lbm C. 5400 lbf-ft/lbm D. 6900 lbf-ft/lbm

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71. Which of the following is not a basic component of motion of a fluid element?
A. translation B. rotation C. angular distortion D. twist

72. An iron block weighs 5 newtons and has a volume of 200 cubic centimeters. What is the density of the block?
A. 800 kg/m^3 B. 988 kg/m^3 C. 1255 kg/m^3 D. 2550 kg/m^3

73. A body weighs 200 N in air and 125 N when submerged in water. Its specific weight is nearest
A. 2.31 B. 2.49 C. 2.54 D. 2.67

74. Which of the following is not a control volume?
A. insulated tank B. car radiator C. compressor D. turbine

75. Liquid water flows in the pipe at 12 m/s. The pipe's diameter is reduced by a factor of 2. What is the velocity in the reduced section?
A. 36 m/s B. 48 m/s C. 24 m/s D. 3 m/s

76. Heat can be transferred by conduction through:
A. solids only B. liquids only C. gases only D. all of these

77. A thin mild steel wire is loaded by adding loads in equal increments till it breaks. The extensions noted with increasing loads will behave as under
A. uniform throughout
B. increase uniformly
C. first increase and then decrease
D. increase uniformly first and then increase rapidly

78. An object is launched at 45 degrees to the horizontal on level ground. What is the range of the projectile if its initial velocity is 180 ft/sec? Neglect air resistance.
A. 719 ft B. 1000 ft C. 1440 ft D. 2050 ft

79. If the radius of wire stretched by a load is doubled, then its Young's modulus will be
A. doubled B. halved C. become four times D. remain unaffected

80. In a steady, ideal flow of an incompressible fluid, total energy at any point of the fluid is always constant. This theorem is known as
A. Euler's theorem
B. Navier-stockes theorem
C. Reynold's theorem
D. Bernoulli's theorem

81. When heat is transferred by molecular collision, it is referred to heat transfer by
A. conduction
B. convection
C. radiation
D. conduction and convection

82. A sealed tank containing seawater to a height of 12 m contains air above the water at gage pressure of 5 atm. Water flows out from the bottom through a small hole. Calculate the efflux speed of the water. Note: ρ_{sw} = 1.03 kg/m^3.
A. 34.92 m/s B. 45.24 m/s C. 20.45 m/s D. 35.45 m/s

83. What volume will 1.27 moles of helium has occupy at STP?
A. 30.53 L B. 28.45 L C. 29.49 L D. 31.57 L

84. Accounting book in which are recorded the credits and debits of commercial transactions.
A. balance B. journal C. ledger D. clerk's book

85. Rotameter is device used to measure
A. Absolute pressure B. Velocity of fluid C. Flow D. Rotation

86. An annuity where the payments are made at the beginning of each period.
A. ordinary annuity B. deferred annuity C. annuity due D. perpetuity

87. The first period contains how many elements?
A. 2 B. 4 C. 6 D. 8

88. A device used to measure atmospheric pressure is called
A. manometer B. barometer C. pycnometer D. hydrometer

89. Which of the following is not acceptable as an integer variable name?
A. IRISH B. KOST C. JAPAN D. INSERTS

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90. A 600 N object is to be given an acceleration of 0.70 m/s^2. How large an unbalanced force must act upon it?
A. 39 N B. 93 N C. 43 N D. 34 N

91. Concurrent forces are those forces whose line of action
A. meet at one point
B. lie on the same line
C. meet on the same plane
D. none of these

92. Momentum is closely related to
A. impulse B. kinetic energy C. power D. potential energy

93. What is the frequency of oscillation of a body if its mass m, is 0.015 kg and k is 0.5 N/m?
A. 0.51 Hz B. 0.66 Hz C. 0.78 Hz D. 0.92 Hz

94. Ideal fluid has:
A. no surface tension
B. no surface tension, no viscosity
C. no surface tension, no viscosity and no compressibility
D. surface tension, viscosity and compressibility

95. A turbine started from rest to 180 rpm in 6 min at a constant acceleration. Find the number of revolutions that it makes within the elapse time.
A. 550 B. 540 C. 630 D. 500

96. A hydroturbine operates on a stream in which 100 kg/s of water flows. Estimate the maximum power output if the turbine is in a dam with a distance of 40 m from the surface of the reservoir to the surface of the backwater.
A. 34.24 kW B. 46.89 kW C. 26.18 kW D. 96.36 kW

97. A location not normally subject to dampness or wetness.
A. Wet location B. Dry location C. Damp location D. Moist location

98. A power utility company desires to use the hot groundwater from a hot spring to power a heat engine. If the groundwater is at 95 deg C, estimate the maximum power output if a mass flux of 0.2 kg/s is possible. The atmosphere is at 20 deg C.
A. 10.2 kW B. 12.8 kW C. 9.6 kW D. 16.4 kW

99. A notice issued by the System Operator when the Contingency Reserve is less than the capacity of the largest Synchronized Generating Unit or power import from a single interconnection whichever is higher.
A. Blue Alert B. Yellow Alert C. Red Alert D. Green Alert

100. Which one of the following process is also called Hyperbolic Process?
A. Adiabatic B. Reversible C. Isothermal D. Isentropic

*** E N D ***

WARNING: **Failure to submit your Test Questions (Complete) set will cause the cancellation of your Test-Results for the subject.**