MOCK BOARD IN GENERAL ENGINEERING AND APPLIED SCIENCE (B)

May 21, 2009

1) It is a beam whereby one end is fixed and the other end is free.
   a) propped beam
   b) simple beam
   c) cantilever beam
   d) fixed and beam
2) A body fired from the ground at an inclination of 30° with the horizontal, attained a maximum height of 500m. The body stayed in air for how many seconds?
   a) 20.2 secs
   b) 30.5 secs
   c) 15.4 secs
   d) 25.4 secs
3) A 50 mm. diameter solid circular shaft was stressed by 40 MPa when transmitting power at 1200 rpm. If G = 100GPa, what horsepower is transmitted?
   a) 156.5 h.p.
   b) 165.36 h.p.
   c) 136.55 h.p.
   d) 155.6 h.p.
4) An object was dropped from a height of 50 m. At the same instant, another object was fired vertically from the ground at an initial velocity of 20 m/s. when will the two object be at same level?
   a) 4.5 secs.
   b) 5.5 secs.
   c) 2.5 secs.
   d) 3.5 secs.
5) For plant expansion, a communication company wishes to accumulate P50 M by investing equal amount each semi-annual for 50 years. If money is worth 20% nominal, how much must be invested semi-annually?
   a) P 3, 205, 616.80
   b) P 2, 750, 605.80
   c) P 3, 416, 205.90
   d) P 2, 509, 815.80
6) An annuity whereby payment is postponed for a certain period of time is known as.
   a) annuity due
   b) Deferred Annuity
   c) Ordinary annuity
   d) Perpetuity
7) It is a single force that has the same effect as a system of forces.
   a) moment
   b) equilibrium
   c) force couple
   d) resultant
8) If P 200, 000 must be available in 10 years by depositing equal amount monthly for 6 years, what must each monthly deposit be to attain this goal if nominal interest is 18%.
   a) P 625.40
   b) P 910.60
   c) P 764.17
   d) P 815.50
9) A bond whereby the security behind it are the equipments of the issuing corporation.
   a) debenture bond
   b) mortgage bond
   c) collateral bond
   d) lien bond
10) It is the stress development when a force is directed away from a resisting area.
    a) tensile stress
    b) axial stress
    c) compressive stress
    d) shearing stress
11) A stone will be dropped from a bridge where a small boat is approaching. The bridge is 15 m high and the boat has a constant velocity of 10 kph. How far from the bridge must the stone be dropped to insure hitting the boat?
    a) 7.85 m
    b) 6.15 m
    c) 4.86 m

d) 8.07 m

12) The actual interest earned by a given principal is known as
    a) nominal interest
    b) effective interest
    c) compounded interest
    d) simple interest
13) An object is fired vertically and reached a maximum height of 100 m. How long was it in air?
    a) 9.03 secs.
    b) 4.51 secs.
    c) 10.5 secs.
    d) 5.4 secs.
14) What is the equivalent in terms of interest compounded daily is 16% compounded quarterly?
    a) 17.2 %
    b) 14.5 %
    c) 16.2 %
    d) 15.7 %
15) A simple beam, 8 m long is loaded with a concentrated load of 20 kN applied at center and a uniform load of 10 kN/m occupying the whole span. The maximum moment is:
    a) 300 kN-m
    b) 120 kN-m
    c) 160kN-m
    d) 320 kN-m
16) a 500 g bullet was fired into a 10 kg block suspended at the end of a one meter string. The bullet is embedded at the center of percussion of the block. If the string subtended 60° with the vertical caused by the impact, find the velocity of the bullet?
    a) 211.94 m/s
    b) 107.92 m/s
    c) 201.72 m/s
    d) 217.9 m/s
17) Find the force required to turn a 500 N wheel whose radius is 25 cm over a block with height equal to 10 cm.
    a) 1000 N
    b) 500 N
    c) 667 N
    d) 333 N
18) A smooth floating pulley supports a load of 100 N. It is suspended at the middle of a 20m long string. Find the tension on the string.
    a) 75.74 N
    b) 57.74 N
    c) 57.47 N
    d) 75.47 N
19) Find the tension at the ends of a cable supporting a uniformly distributed load of 10kN per meter of horizontal projection.
    a) 65.1 kN
    b) 41.67 kN
    c) 50.5 kN
    d) None of these
20) The elevator in an office building, starting from rest at the first floor, is accelerated 0.75 m/sec/sec for 5 secs. It continues at constant velocity for 12 secs more and is then stopped in 3 secs with constant deceleration. If the floors are 3.75 m apart, at what floor did the elevator stop?
    a) 16 th floor
    b) 17 th floor
    c) 18 th floor
    d) 19 th floor
21) A stone dropped in still air from the deck of a high bridge. The sound of the splash reaches the deck 3 secs later. If sound travels 342 m/sec in still air, how high is the deck above water?
    a) 40.67 ft
    b) 12 m
    c) 12.5 m
    d) 35 ft
22) At what rpm is a Ferris Wheel turning when the rider feels weightlessness or zero gravity every time the rider is at the topmost part of the wheel 9 m in radius?
    a) 11.25 rpm
    b) 9.97 rpm
    c) 9.4 rpm
    d) None of these
23) A 40 gm rifle bullet is fired with a speed of 300 m/s into a ballistic pendulum of mass 5 kg suspended from a cord 1 m long. What is the

vertical height through which the pendulum rises?
a) 29.88 cm
b) 28.89 cm
c) 28.45 cm
d) 29.42 cm

24) Find the ordinary simple interest on P1000 for 8 months and 20 days at an interest rate of 10%.
a) P72.22
b) P70.22
c) P75.00
d) P71.05

25) If I = 12% compounded quarterly, find the equivalent effective interest rate.
a) 3% per quarter compounded quarterly
b) 3% per month compounded quarterly
c) 3% per quarter compounded semi-annually
d) 3% semi-annually compounded quarterly

26) A loan may be paid by 10 equal end of year payments of P1000 each. If interest rate is 10% effective, what 5 equal end of year payments will equitably repay the said loan if the first payment falls at the end of the 3^{rd} year?
a) P1961.31
b) P1962.31
c) P1963.31
d) P1960.31

27) What is the accumulated amount after 3 years of P 6500 invested at the rate of 12% per year compounded semi-annually?
a) P 9220.37
b) P 9332.37
c) P 9753.37
d) P 9243.37

28) P 1 000 becomes P 1500 in three years. Find the simple interest rate.
a) 16.67%
b) 15.67%
c) 17.67%
d) 18.67%

29) At 10% interest rate, how much should you invest today to be able to withdraw P10 000 at the end of 10 years?
a) P 4 855.43
b) P 5 855.43
c) P 3 855.43
d) P6 855.43

30) At an interest rate of 10% compounded annually, how much will a deposit of P 1500 be in 15 years?
a) P 6, 100.00
b) P 6, 234.09
c) P 6, 265.87
d) P 6, 437.90

31) Find the least number of years required to double a certain amount of money at 5% per annum compound interest to the nearest year.
a) 14 years
b) 12 years
c) 18 years
d) 20 years

32) Two lead balls whose masses are 5 kg and 0.5 kg are placed with their center 50 cm apart. With what force do they attract each other?
a) 6.67×10^{-10} N
b) 6.67×10^{-11} N
c) 6.67×10^{-8} N
d) 6.67×10^{-9} N

33) What is the force in Newtons, required to move a car with 1000 kg. Mass with an acceleration of 12.0 meters/sec?
a) 12 000 N
b) 30 000 N
c) 8 000 N
d) 6 000 N

34) A government regulation in telecommunication which provide policy to improve the provision of local exchange carrier service.
a) E.O. 109
b) Act 3846
c) E.O. 59
d) E.O.546

35) Radio communication operation service between mobile and land stations or between mobile stations.
a) Land mobile satellite service

b) Maritime mobile service
c) Mobile service
d) Land mobile

36) A radio communications service use in radio regulation between specified fixed points provided primarily for the safety of air navigation and for the regular efficient and economical air transport.
a) Space Operation Service
b) Space Service
c) Aeronautical Mobile Service
d) Aeronautical Fixed Service

37) Any governmental office responsible in discharging the obligations undertaken in the convention of the ITU and the regulation.
a) Administration
b) The union
c) Country
d) Telecommunications office

38) The two methods of analog companding that approximate a logarithmic function are;
a) A-Law & B-Law
b) B-Law & μ-Law
c) A-Law & μ-law
d) Vocoding & Trellis Coding

39) DOTC Mem. Cir. No. ____, is for Domestic Satellite Communications Policy.
a) 90-252
b) 91-260
c) 92-269
d) 93-273

40) For the purpose of frequency allocation, into how many regions is the world divided?
a) one
b) two
c) three
d) four

41) What is required when installing a base radio station prior to issuance of license?
a) permit to operated
b) license
c) construction permit
d) permit to purchase

42) What authorization from NTC is needed for the operation of a portable transceiver?
a) permit to purchase
b) permit to possess
c) construction permit
d) radio station license

43) A ship station is classified as
a) land station
b) maritime mobile station
c) coastal station
d) radio navigational station

44) How long must a logbook containing distress entries be retained?
a) 2 years
b) 3 years
c) 5 years
d) preserved until cleared by NTC to be disregard

45) Who is authorized to make corrections n the logbook?
a) radio operator who made the entry
b) radio operator supervisor
c) an ECE
d) the lawyer of the company

46) Department Order No. 88 is basically base from
a) RA 5734 and RA 3396
b) RA 3396 and RA 7306
c) RA 7306 and RA 3846
d) RA 3846 and RA 5734

47) The chairman and two members of the board of ECE shall be
a) appointed by the president of the Philippines
b) appointed by the vice president of the Philippines
c) be elected among the appointees
d) be elected from the officers of IECEP

48) Who will administer the provisions of RA 5734?
a) PRC commissioner
b) ECE board
c) IECEP
d) President of the Philippines

49) What is the maximum diameter of the official dry seal of an ECE?
a) 1 inch

b) 1 and ½ inches
c) 1 and ¾ inches
d) 1 and 7/8 inches

50) How many electrons are orbiting around the nucleus in the atom of our official dry seal?
a) 2
b) 4
c) 6
d) 8

51) What is the data rate of the ISDN Basic access B channel?
a) 192 kbps
b) 32 kbps
c) 64 kbps
d) 144 kbps

52) The product of mass and its' velocity
a. momentum
b. impulse
c. power
d. energy

53) The scattering of reflected rays of light.
a. reflection
b. diffusion
c. refraction
d. diffraction

54) The ability of solid matter to combine with similar atoms.
a. ductility
b. malleability
c. diffusion
d. cohesion

55) Force that keeps a body moving in a circular path.
a. centrifugal
b. inertia
c. centripetal
d. kinetic energy

56) Conversion of a single force into 2 or more components
a. resultant
b. resolution
c. component
d. restitution

57) Forces that intersect a body in a single point.
a. co-planar
b. co-linear
c. concurrent
d. center of gravity

58) When a center of gravity is in the lowest possible position.
a. neutral equilibrium
b. stable equilibrium
c. constant equilibrium
d. center equilibrium

59) A small amount of forces exerted by a liquid and elastic film on top.
a. miniscusity
b. vixcosity
c. surface tension
d. capillarity

60) A study of light thru a geometric medium
a. optics
b. photometry
c. spectrum analysis
d. optoelectronics

61) The first law of motion
a. force equals mass x acceleration
b. energy is neither created not destroyed
c. force in = force out
d. inertia

62) The ability of a body to give or take work.
a. enthalpy
b. entropy
c. energy
d. power

63) Force multiplied by time it is applied.
a. momentum
b. stress
c. energy
d. impulse

64) The force that represents the equivalent effect of a system of forces system.
a. equilibrium
b. resultant
c. moment
d. couple

65) Fluid friction is also called
a. Viscosity
b. minicusity
c. surface tension
d. laminar flow

66) Is the quantity of heat required to evaporate 1 lb saturated liquid
a. latent heat
b. heat of fusion

c. specific heat
d. calorie

67) It is the amount of transferred heat required to change the temperature of one unit weight of a substance one-degree unit of temperature.
a. latent heat
b. heat of fusion
c. specific heat
d. calorie

68) One over one hundred eighty the quantity of heat required to raise the temperature of 1 lb pure water from 32^0F to 212^0F under standard atmospheric pressure.
a. calorie
b. BTU
c. Latent heat
d. Absolute temperature

69) The quantity of heat required raising the temperature of 1 gram of water from 14.5^0C to 15.5^0C.
a. Calorie
b. BTU
c. Absolute temp.
d. Latent heat

70) How much heat is required to change 100 lbs of ice of 10^0F to steam at 212^0F.
a. 150,000 BTU
b. 140, 325 BTU
c. 130, 500 BTU
d. 15, 000 BTU

71) The science of energy transformation.
a. Physics
b. Chemistry
c. Thermodynamics
d. Kinetic energy

72) The energy added to the reacting mixtures.
a. Endothermic
b. exothermic
c. isotopes
d. joules

73) The energy withdrawn from the reacting mixture.
a. endothermic
b. exothermic
c. isothermic
d. thermal energy

74) _____ is the theory used to determine the energy, distribution in space, and other properties of particles such as electrons when in different environments.
a) Quantum Mechanics
b) Quantum Physics
c) Astrionics
d) Cryogenics

75) Jennifer Bulak. while playing "jackstone", accidentally drops the rubber ball from a window about 63 centimeters high. Each time the ball hits the flat ground, it rebounds to two thirds (2/3) of the previous height from which it fell. The total distance traveled by the ball before coming to rest is ____ centimeters.
a) 315
b) 513
c) 135
d) 153

76) A pound of force is equivalent to _____ Newtons.
a) 2.25
b) 4.45
c) 3.45
d) 5.44

77) A 40 gram body starting from rest falls through a vertical distance of 25 centimeters to the ground. The velocity of the body just before it hits the ground is ____ meters per second.
a) 2.21
b) 3.21
c) 1.22
d) 1.32

78) In nuclear physics, a / an _____ is a particle of antimatter corresponding to a given particle in every respect except that charge and certain other discrete properties change sign.
a) Antiparticle
b) Hadron
c) Lepton
d) Muon

79) ____ is a particle that exhibits a strong nuclear force.
a) Lepton

b) Muon
c) Hadron
d) Pion

80) The apparent radius of an atom, typically calculated from the dimensions of the unit cell, using close-packed directions (depends upon coordination number).
a) Coordination radius
b) Dimension radius
c) Atomic Radius
d) Directional radius

81) ___ is the value of the equipment with use over a period of time, it could mean the difference in value between a new asset and the used asset currently in service.
a) Loss
b) Depreciation
c) Gain
d) Sunk Cost

82) Don Fausto wants to make 14% nominal interest compounded semi-annually on - a bond investment. How much should he be willing to pay now for 12%, P 10,000 bond that will mature in ten (10) years and pays interest semi-annually?
a) P 8,940.50
b) p 2,584.19
c) P 3,118.05
d) P 9,480.50

83) An act providing for the regulation of public and radio communications in the Philippines.
a) RA 3396
b) RA 5734
c) RA 7306
d) RA 3846

84) The rules and regulations requiring the services of a duly registered Electronics and Communications Engineer.
a) DO 88
b) RA 5734
c) DO 227
d) RA 3846

85) To pass the ECE licensure examination, a candidate must obtain an average of ___ percent, with no rating below ___ percent in any subject.
a) 70 / 50
b) 75 / 50
c) 70 / 60
d) 75 / 60

86) The characteristic of an element being able to exist in more than one crystal structure, crystal structure, depending on temperature and pressure.
a) Allotropy
b) Isotropy
c) Mallotropy
d) Anisotropy

87) Structures showing a packing fraction of 0.74 (FCC and HCP).
a) Face-centered cubic
b) Close-packed structure
c) Packing fraction
d) Packing structure

88) An interstitial position that has a coordination number of eight.
a) Interstitial site
b) Cubic site
c) Web site
d) Tetrahedral site

89) Two jeepneys start at the same point but are going in different directions. If jeepney A runs at the rate of 60 km/hr and jeepney B at 50 km/hr and both start at the same time, when will the two jeepneys be 550 km apart?
a) In 5hrs
b) In 4.7 hrs
c) In 5.5 hrs
d) None of these

90) Car A runs 30 km/hr less than Car B. Car A covers 250 km in the same time car B travels 400 km. Find the rate of each.
a. 80 kms/hr and 50 kms/hr
b. 50 kms/hr and 80 kms/hr
c. 48 kms/hr and 72 kms/hr
d. 72 kms/hr and 48 kms/hr

91) A government regulation in telecommunication which provide policy to improve the provision of local exchange carrier service.
a) Act. 3846

b) E.O. 59
c) E.O. 109
d) E.O. 546

92) A radio communication service use in radio regulation between specified fixed points provided primarily for the safety of air navigation and for the regular, efficient and economical air transport.
a) Aeronautical Mobile Service
b) Space Service
c) Space Operation Service
d) Aeronautical Fixed Service

93) The constructive interference, or reinforcement, of a beam of x-rays or electrons interacting with a material.
a) Reflection
b) Refraction
c) Diffraction*
d) Knife edge

94) Refers to the inculcation, assimilation and acquisition of knowledge, skills, proficiency, and ethical and moral values, after the initial registration of a professional, that raises and enhances the professional's technical skills and professional competence.
a) CPE
b) MS degree
c) Technical training
d) Advancement training

95) How many CPE units are needed for the renewal of PRC-ECE license?
a) 20 units
b) 40 units
c) 60 units
d) 80 units

96) An act to promote and govern the development of Philippine Telecommunications and the Delivery of Public Telecommunications services.
a) RA 3396
b) RA 7925
c) RA 7306
d) RA 3846

97) Known as the Public Telecommunications Policy Act of the Philippines.
a) RA 3396
b) RA 7925
c) RA 7306
d) RA 3846

98) Provides the policy to improve the provision of local exchange carrier service.
a) E.O. 109
b) E.O. 196
c) E.O. 205
d) E.O. 255

99) This kind of radio station does not need a franchise from Congress.
a) Public Paging System
b) Radio Training Station
c) Public Trunked Radio
d) Public Telegraph Operations

100) Is one of the requirements needed for the renewal of PRC license.
a) certificate of employment
b) certificate of professional practice
c) educational units
d) CPE units

ANSWERS TO GEAS MOCK BOARD (B)

1. C cantilever beam
2. A 20.2 secs
3. B 165.36 hp
4. C 2.5 secs
5. D P 2, 509, 815.80
6. B Deferred Annuity
7. D resultant
8. C P 764.17
9. D lien bond
10. A tensile stress
11. C 4.86 m
12. B effective interest
13. A 9.03 secs
14. D 15.7 %
15. C 160kN-m
16. A 211.94 m/s
17. C 667 N
18. B 57.74 N
19. A 65.1 kN
20. B 17 th floor
21. A 40.67 ft
22. B 9.97 rpm
23. B 28.89 cm
24. A P72.22
25. A 3% per quarter compounded quarterly
26. A P1961.31
27. A P 9220.37
28. A 16.67%
29. C P 3 855.43
30. C P 6, 265.87
31. A 14 years
32. A 6.67×10^{-10} N
33. A 12 000 N
34. A E.O. 109
35. C Mobile service
36. D Aeronautical Fixed Service
37. A Administrator
38. C A-Law & μ-law
39. D 93-273
40. C three
41. C construction permit
42. D radio station license
43. B maritime mobile station
44. D preserved until cleared by NTC to be disregard
45. A radio operator who made the entry
46. D RA 3846 and RA 5734
47. A appointed by the president of the Philippines
48. B ECE board
49. D 1 and 7/8 inches
50. A 2
51. C 64 kbps
52. A momentum
53. D diffraction
54. D cohesion
55. C centripetal
56. B resolution
57. C concurrent
58. B stable equilibrium
59. C surface tension
60. A optics
61. A force equals mass x acceleration
62. B entropy
63. D impulse
64. D couple
65. A Viscosity
66. A latent heat
67. C specific heat
68. B BTU
69. A Calorie
70. C 130, 500 BTU
71. C Thermodynamics
72. A Endothermic
73. B exothermic
74. A Quantum Mechanics
75. A 315
76. B 4.45
77. A 2.21
78. A Antiparticle
79. C Hadron
80. C Atomic Radius
81. B Depreciation
82. A P 8,940.50
83. D RA 3846
84. A DO 88
85. C 70 / 60
86. A Allotropy
87. B Close-packed structure
88. B Cubic site
89. A In 5hrs
90. B 50 kms/hr and 80 kms/hr
91. C E.O. 109
92. D Aeronautical Fixed Service
93. C Administration
94. A CPE
95. C 60 units

96. B RA 7925
97. B 7925
98. A E.O. 109
99. B Radio Training Station
100. D CPE units

75. Let D = Total distance traveled and a = 63; a_1 = (2/3) (63) = 42; a_2 = (2/3) (42) = 28, etc.
    * The succeeding distances traveled will be twice the value of a geometric progression with a common ratio of 2/3. * Therefore, the total distance traveled is D = 63 + 2 [(a_1) / (1 - r)] = 63 + 2{(42) / [1 - (2/3)]} = 63 + 252 = 315 centimeters.

77. As the body falls, its gravitational potential energy is converted to kinetic energy.
    PE = mgh;
    *PE = (0.040 kg)(9.8 m/sec^2)(0.25) = 0.098 Joule. Therefore, the Kinetic Energy just before the body hits the ground is 0.098. According to the Law of Conservation of Energy: PE = KE = 1/2 (m)$(v)^2$. Then, 0.098 Joule = 1/2 (0.04)$(v)^2$ From which, $(v)^2$ = 4.9; Extracting the square root; V = 2.21 meters per second.