CENTURION UNIVERSITY ENTRANCE EXAMINATION

CUEE - 2015

Centurion University

QUESTION BOOKLET FOR LATERAL ENTRY

INSTRUCTIONS

Roll Number | | | | | | | | | |

Please read the following instructions carefully:

1 Mention carefully your Roll Number, Question Booklet number in the OMR Answer Sheet and sign at the appropriate place. Write your Roll Number on the question booklet.

2. Strictly follow the instructions given by the Centre Supervisor/ Room Invigilator and those given on the Question Booklet.

3. Please mark the answer ONLY with a Black/Blue Ball Point Pen on the OMR Answer Sheet.

4. Candidates are not allowed to carry any papers, notes, books, log table, calculators or calculating devices, scanning devices, communication devices like cellular phone/pager/ducopen, etc. to the examination hall. Any candidate found using, or in possession of such unauthorized material, indulging in copying or impersonation, adopting unfair means is liable to be summarily disqualified and may be subjected to penal action.

5. After finishing the examination, hand over the complete question booklet and OMR Answer Sheet to the Room Invigilator. DO NOT carry the question booklet or any part there of outside the examination room. Doing so, is a punishable offence.

6. The test is of objective type. This Question Booklet contains three parts, with a total of 180 questions and the total time alloted is 3.00 hours.

   Section-I:-Basic Electrical Engineering

   Section-II:-Mathematics

   Section-III:-Mechanics

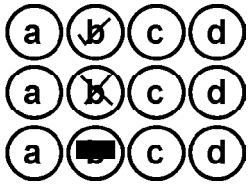
7. Each objective type question is followed by four responses. Your task is to choose the correct/best response and mark your response by darkening the relevant CIRCLE with Black/Blue Ball Point Pen on the OMR Answer Sheet and do not on the Question Booklet.

8. All questions are COMPULSORY. There will be "No NEGATIVE MARKING".

9. Completely darken the CIRCLE so that the number inside the CIRCLE is not visible. Darken ONLY ONE CIRCLE for each answer as shown in the example below. The CORRECT and the WRONG method of darkening the CIRCLE on the OMR sheet is given below.

CORRECT Method

WRONG Method



10. DO NOT make any stray marks anywhere on the OMR answer sheet. DO NOT fold or wrinkle the OMR answer sheet. Rough work MUST NOT be done on the answer sheet. Use your test booklet for this purpose.

11. In case you notice any questions missing in the question booklet, kindly bring it to the attention of the Invigilator.

Space for rough work

SECTION - I : BASIC ELECTICAL ENGINEERING

1. The capacity of battery is expressed in:
   a) Amperes b) Ampere-hours
   c) Watts d) Watt-hour

2. When two cells are connected in parallel, it should be ensured that they have
   a) Identical internal resistance
   b) Equal emfs
   c) Same make
   d) Same ampere-hour capacity

3. Cells are connected in series in order to increase the
   a) Current capacity b) Life of the cells
   c) Voltage ratings d) Terminal voltage

4. Moving Iron instruments can be used on:
   a) ac and dc both b) ac only
   c) dc only d) none of the above

5. Most commonly used watt meter is:
   a) Induction type b) electrostatic type
   c) dynamometer type d) moving iron type

6. The deflection torque can be produced by:
   a) Gravity control b) spring control
   c) air friction d) magnetically

7. The size of the earth or ground wire is based on the:
   a) maximum fault current carrying through the ground wire
   b) rated current carrying capacity of the service line
   c) depends on the soil resistance
   d) both (a) and (c)

8. The power factor of ac circuit lies between
   a) 0 and 1 b) -1 and 1
   c) 0 and -1 d) None of the above

9. The power factor of an ac circuit is equal to:
   a) Cosine of the phase angle
   b) Sine of the phase angle
   c) Tangent of the phase angle
   d) Cotangent of the phase angle

10. The rating of given on the name plate of a transformer indicates the:
    a) True power which it can supply
    b) Apparent power which it can supply
    c) Apparent power which it draws from the supply mains
    d) True power which it draws from the supply mains

11. Kirchhoff's laws are applicable to circuits with:
    a) Distributed parameters b) Lumped parameters
    c) Passive elements d) Non-linear resistances

12. An ideal voltage source should have:
    a) Zero source resistance
    b) Infinite source resistance
    c) Terminal voltage is proportional to current
    d) Open-circuit voltage nearly equal to voltage of the load current

13. Which of the following is the best electrical conductor
    a) Copper b) Aluminium
    c) Silver d) Cadmium Copper

14. If the back emf in a dc motor varnishes suddenly, then the motor:
    a) Run at very high speeds b) Start hunting
    c) Burn d) Come to stall

15. When a dc machine is connected to the dc supply main it will produce:
    a) EMF in opposition to the applied voltage
    b) EMF in phase with the applied voltage
    c) EMF decreases with time
    d) None of the above

16. In steam power plant which of the following component needs more maintenance:
    a) Condenser b) Boiler
    c) Turbine d) Coal carrying system

17. A shell type transformer is commonly used as it has:
    a) Two magnetic paths
    b) Reduced magnetic flux leakage
    c) Reduced copper loss
    d) Both (a) and (b)

18. Transformer core is made of:
    a) Silicon sheet steel
    b) Chromel steel
    c) Low carbon steel
    d) High content silicon steel

19. The horse power obtained from the motor shaft is called:
    (a) HP (b) BHP
    (c) Useful torque (d) None of the above

20. As per Faraday's laws of electromagnetic induction, an emf is induced in a conductor whenever it
    (a) lies perpendicular to the magnetic flux
    (b) lies in a magnetic field
    (c) cuts magnetic flux
    (d) Moves parallel to the direction of the magnetic field.

21. The peak factor is ratio of
(a) Average value of rms value
(b) Rms value to average value
(c) Peak value to average value
(d) Peak value to RMS value

22. Two waves of the same frequency have opposite phase when the phase angle between them is _____degrees.
(a) 360 (b) 180 (c) 90 (d) 0

23. Which of the following plant is expected to have the longest expected life?
(A) Hydroelectric (b) steam
(c) Diesel (d) All have equal life.

24. A 100 MW thermal power-plant will consume nearly how many tonnes of coal in one hour ?
(a) 50 tonnes (b) 150 tonnes
(c) 1500 tonnes (d) 15,000 tonnes

25. The starting capacitor of a single phase motor is
(a) Electrolytic capacitor (b) Ceramic capacitor
(c) Paper capacitor (d) none of the above.

26. A certain series circuit consists of a 1/8 W resistor, a 1/4 W resistor, and a 1/2 W resistor. The total resistance is 1200Ω. If each resistor is operating in the circuit at its maximum power dissipation, total current flow is
(a) 27mA (b) 2,7mA (c) 19mA (d) 190ma

27. When the induction motor is stand still the slip will be:
(a) zero (b) one (c) infinity (d) 0.5

28. The terminal voltage of the dc shunt generator on loading:
(a) Increases slightly
(b) Decreases sharply
(c) Decreases slightly
(d) Increases sharply

29. The Transformer core laminations are insulated from each other by:
(a) Paper
(b) Thin varnish coating
(c) Mica strip
(d) All the above can be used for insulation

30. The energy meter used for measuring energy of a dc circuit is:
(a) ampere hour meter
(b) induction type
(c) electrostatic type
(d) dynamometer type

31. What will be the resistance if 10 resistors of 10 ohm each is connected in series
(a) 100 ohms (b) 10 ohms (c) 0.1 ohm (d) 1 ohm

32. In a two watt meter method the reading of W1 = 3 kW and W2 = 2 kW. But W2 reading was taken after reversing the current soil of the wattmeter. The net power in the circuit is _____
(a) 2kW (b) 1kW (c) 3kW (d) none of these

33. The pressure coil of an energy meter is
(a) purely resistive (b) purely inductive
(c) highly resistive (d) highly inductive

34. The flux involved in the emf equation of a transformer has
(a) Rms value (b) maximum value
(c) Average value (d) total value

35. The speed of dc shunt motor can be increased above its normal speed by:
(a) Increasing the field current
(b) Decreasing the field current
(c) Decreasing the terminal voltage
(d) Increasing the armature resistance

36. Capacitive reactance increases with decrease in
(a) Capacitance
(b) Frequency
(c) Voltage
(d) Both a & b

37. The law that the induced emf and current always oppose the cause producing them is due to
(a) Faraday (b) Lenz
(c) Newton (d) coulomb

38. Form factor for a sine wave is
(a)1.414 (b) 0.707 (c) 1.11 (d) 0.637

39. A heater is rated as 230V, 10kW, A.C. The value 230V refers to
(a) Average voltage (b) r.m.s voltage
(c) peak voltage (d) none

40. The curve representing Ohms law is a:
(a) Sine function (b) Linear
(c) Parabola (d) Hyperbola

41. The power dissipated by a resistor of 10 ohm when a current of 2A passes through it is:
(a) 0.4W (b) 20W (c) 40W (d) 200W

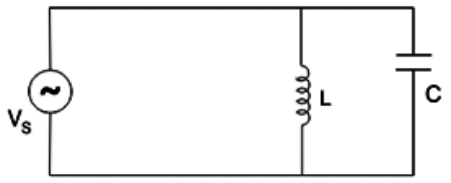
42. Voltage equation of a dc motor is
(a) V = Eb + IaRa (b) Eb = V + IaRa
(c) V = Eb/IaRa (d) V = Eb + Ia2Ra

43. In a DC series motor increasing the load current will
(a) Decrease the speed (b) Increase the speed
(c) Better commutation (d) Increase the back emf

44. A DC series motor is best for driving
(a) Lathes (b) Cranes and hoists
(c) Shears and punches (d) Machine tools

45. The number of millivolts in 0.06 kilovolts is
(a) 60000mV (b) 6000 mV
(c) 600 V (d) 600000 mV

46. In a pure parallel LC circuit under resonance condition, current drawn from main supply is



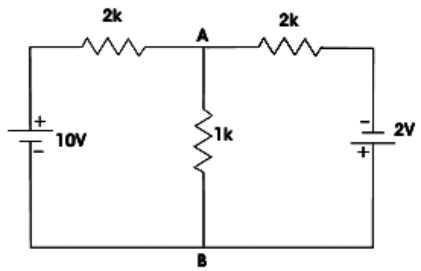
(a) Very Large (b) zero
(c) V/LC (d) insufficient data

47. The main purpose of choke is
(a) to block low frequencies
(b) to pass high frequencies
(c) to pass low frequencies
(d) none of above

48. Which of following is the unit of inductance?
(a) Ampere turns (b) Ohm
(c) Weber/m (d) Milli-henry

49. The primary and secondary windings of a transformer are
(a) conductively linked (b) inductively linked
(c) electrically linked (d) mechanically linked

50. The voltage across the 1 kΩ resistor between the nodes A and B of the network shown in the given figure is



(a) 1V (b) 2V (c) 3V (d) 4V

51. A hydroelectric power station is commonly found in
(a) grasslands (b) hilly areas
(c) desert areas (d) swamps

52. Nuclear power plant are used as
(a) peak load plants (b) base load plants
(c) intermediate load plants (d) none of above

53. What is the approximate efficiency of a normal thermal power station?
(a) 30 - 40 % (b) 45 - 55 %
(c) 20 - 25 % (d) 60 - 70 %

54. To neglect a voltage source, the terminals across the source are
(a) terminal voltage is equal to the source emf
(b) terminal voltage cannot exceed source emf
(c) terminal voltage is always lower than source emf
(d) terminal voltage is higher than the source emf

55. An ammeter is an electrical instrument used to measure
(a) Voltage (b) Current
(c) Resistance (d) Reluctance

56. Which of the following current is considered dangerous to the human body
(a) 1mA (b) 50mA (c) 0.5mA (d) 25mA

57. In the left hand rule, forefinger always represents
(a) Voltage (b) Current
(c) Magnetic field (d) Force

58. The function of brushes in a DC Generator is to
(a) Collect the current from the commutator and supply it to external circuit
(b) Prevent the sparking
(c) Helps to provide good commutation by offering smooth surface
(d) Provide continuity between adjacent commutator segments

59. The power drawn by the circuit whose input is 20KVA and p.f is 0.8 lagging
(a) 12 (b) 20 (c) 16 (d) 8

60. Which of the following is not correct?
(a) $P = \frac{V}{R^2}$ (b) P=VI
(c) $I = \sqrt{\frac{P}{R}}$ (d) $V = \sqrt{PR}$

SECTION - II : MATHEMATICS

61. If α, β are the complex cube roots of unity, then $\alpha^2 + \beta^2 + \alpha^{-2}\beta^{-2}$ = _____
a) 0 b) 3 c) -3 d) None of these

62. The smallest positive integer n for which $(1+i)^{2n} = (1-i)^{2n}$ is
a) 1 b) 2 c) 4 d) 8

63. The complex number $\sin x + i\cos 2x$ and $\cos x - i\sin 2x$ are conjugate to each other, for
a) $x = n\pi$ b) x = 0
c) $x = \left(n + \frac{1}{2}\right)\pi$ d) None of these

64. $If \left(\frac{1+i}{1-i}\right)^3 - \left(\frac{1-i}{1+i}\right)^3 = x + iy, then$
a) x = 0, y = 2 b) x = 0, y = -2
c) x = 2, y = 0 d) x = 2, y = 2

65. The points 1 + i, 1 - i, -1 + i and -1 -i are
a) with a circle of radius 1
b) collinear
c) concyclic
d) four vertices of a regular polygon

66. The number of arrangements of letters of the word BANANA in which the two 'N' do not appear adjacently is
a) 40 b) 60 c) 80 d) 100

67. If $9_{P5} + 5 \times 9_{P4} = 10_{P4}$ then r =
a) 4 b) 5 c) 8 d) 10

68. The number of ways dividing equally a pack of 52 cards among 4 players is
a) $\frac{52!}{13!}$ b) $\frac{52!}{(13!)^2}$ c) $\frac{52!}{(13!)^3}$ d) $\frac{52!}{(13!)^4}$

69. If the rth term in the expansion of $\left(\frac{x}{3} - \frac{2}{x^2}\right)^{10}$ contains x^4, then r =
a) 2 b) 3 c) 4 d) 5

70. The coefficient of x^n in the expansion of $(1+x+x^2+x^3+...)^{-n}$
(a) 1 (b) $(-1)^n$ (c) n (d) n+1

71. $\begin{vmatrix} \frac{1}{a} & 1 & bc \\ \frac{1}{b} & 1 & ca \\ \frac{1}{c} & 1 & ab \end{vmatrix}$
(a) 1/abc (b) 0 (c) abc (d) None of these

72. Multiplication of the two matrices
$A = \begin{bmatrix} 1 \\ 2 \\ 4 \end{bmatrix}$ and B = [3 6 1] is
(a) $\begin{bmatrix} 10 \\ 20 \\ 40 \end{bmatrix}$ (b) $\begin{bmatrix} 3 & 12 & 4 \\ 6 & 2 & 24 \\ 1 & 6 & 12 \end{bmatrix}$
(c) [3 12 4] (d) $\begin{bmatrix} 3 & 6 & 1 \\ 6 & 12 & 2 \\ 12 & 24 & 4 \end{bmatrix}$

73. If a matrix A is symmetric as well as skew-symmetric, then
a) A is a diagonal matrix (b) A is a null matrix
c) A is a unit matrix (d) A is a triangular matrix

74. If A is an invertible matrix, then $\det(A^{-1})$ is equal to
a) 1 b) |A| c) 1/|A| d) none of these

75. If A is a square matrix, then $A - A^T$ is a
a) diagonal matrix b) symmetric matrix
c) skew-symmetric matrix d) none of these

76. The system of equations, 2x+3y=7, 14x+21y=49 has
a)Infinitely many solutions (b) A unique solution
c) No solution (d) Finitely many solution

77. If the system of equations x-ky-z=0, kx-y-z=0, x+y-z=0 has a non-zero solution, then the possible values of k are
a) -1,2 (b) 1,2 (c) 0,1 (d) -1,1

78. The value of $\cos 1^0 . \cos 2^0 . \cos 3^3 ..... \cos 359^0$ is
(a) -1 (b) 0 (c) $\frac{1}{3}$ (d) $\frac{1}{\sqrt{2}}$

79. The value of $\sin^6\theta + \sin^6\theta + 3\sin^2\theta\cos^2\theta$ is

(a) 0 (b) 1 (c) 2 (d) 3

80. The value of $\dfrac{\left(\cos 11^0 + \sin 11^0\right)}{\left(\cos 11^0 - \sin 11^0\right)}$ is

(a) $\tan 45^0$ (b) $\cot 11^0$ (c) $\tan 56^0$ (d) $\tan 60^0$

81. If $\sin\theta = \sin\alpha$, then the angles θ and α are related by

a) $\theta = n\pi \pm \alpha$ b) $\theta = 2n\pi + (-1)^n\alpha$

c) $\alpha = n\pi + (-1)^n\theta$ d) $\theta = (2n+1)\pi + \alpha$

82. $\tan^{-1}\frac{1}{2} + \tan^{-1}\frac{1}{3} =$

(a) $\frac{\pi}{4}$ (b) $\frac{\pi}{6}$ (c) $\frac{\pi}{2}$ (d) π

83. In a triangle ABC,

$(a-b)^2\cos^2\frac{c}{2} + (a+b)^2\sin^2\frac{c}{2}$ equals to

(a) a^2 (b) b^2 (c) c^2 (d) none of these

84. The value of $\sin 50^0 - \sin 70^0 + \sin 10^0$ is

(a) $\frac{1}{2}$ (b) $\frac{1}{\sqrt{2}}$ (c) 1 (d) 0

85. The value of $\sin\cot^{-1}x$ is

a) $\sqrt{1+x^2}$ (b) x (c) $\left(1+x^2\right)^{\frac{-3}{2}}$ (d) $\left(1+x^2\right)^{\frac{-1}{2}}$

86. If the lines 3x+4y=1, y=x+5 and 5y+bx=3 are congruent then the value of b is
(a) 6 (b) 3 (c) 1 (d) 0

87. Find the equation of the straight line which passes through (1, 2) and is perpendicular to the line x+y+4=0.
(a) x+y+1=0 (b) x-y+1=0
(c) x-y-1=0 (d) y-x+1=0

88. The line y-x+2=0 divides the join of points (3,-1) and (8, 9) in the ratio
(a) 1:2 (b) 3:2 (c) 1:3 (d) 2:3

89. The triangle joining the points A (2, 7), B (4,-1), C (-2, 6) is
(a) equilateral (b) right-angled
(c) isosceles (d) none of these

90. The length of the tangent from (5, 1) to the circle $x^2 + y^2 + 6x - 4y - 3 = 0$ is
(a) 81 (b) 29 (c) 21 (d) 7

91. The circle $x^2+y^2+4x-7y+12=0$ cuts an intercept on y-axis equal to
(a) 1 (b) 3 (c) 4 (d) 7

92. If the equation $ax^2+by^2+2hxy+2gx+2fy+c=0$ represents a circle then the condition will be
(a) a=b and c=0 (b) f=g and h=0
(c) a=b and h=0 (d) f=g and c=0

93. If $\vec{a}$ be a non-zero vector, then which of the following is correct
(a) $\vec{a}.\vec{a} = 0$ (b) $\vec{a}.\vec{a} > 0$
c) $\vec{a}.\vec{a} \geq 0$ (d) $\vec{a}.\vec{a} \leq 0$

94. $\vec{a}.\vec{b} = 0$ implies that
(a) $\vec{a} = 0$ (b) $\vec{b} = 0$ (c) $\theta = 90^0$
(d) either $\vec{a} = 0$ or $\vec{b} = 0$

95. $\left[\vec{a}\ \ \vec{b}\ \ \vec{c}\right]$ is the scalar triple product of three vectors $\vec{a},\vec{b}\Lambda\vec{c}$, then $\left[\vec{a}\ \ \vec{b}\ \ \vec{c}\right]$ =
(a) $\left[\vec{b}\ \ \vec{a}\ \ \vec{c}\right]$ (b) $\left[\vec{c}\ \ \vec{b}\ \ \vec{a}\right]$
(c) $\left[\vec{b}\ \ \vec{c}\ \ a\right]$ (d) $\left[\vec{a}\ \ \vec{c}\ \ b\right]$

96. If $\vec{a},\vec{b}\Lambda\vec{c}$ are any three coplanar unit vectors, then
(a) $\vec{a}.\left(\vec{b}x\vec{c}\right) = 1$
(b) $\vec{a}.\left(\vec{b}x\vec{c}\right) = 3$
(c) $\left(\vec{c}x\vec{a}\right).\vec{b} = 0$
(d) $\left(\vec{a}x\vec{b}\right).\vec{c} = 0$

97. The vectors 2i + j - k is perpendicular to i - 4j + α k, if α =
(a) 0 (b) -1 (c) -2 (d) -3

98. If $\vec{a}$ and $\vec{b}$ are two vectors such that $\vec{a} \cdot \vec{b} = 0$ and $\vec{a} \times \vec{b} = 0$, then

a) $\vec{a}$ is parallel to $\vec{b}$

b) $\vec{a}$ is perpendicular to $\vec{b}$

c) either $\vec{a} \vee \vec{b}$ is a null vector

d) none of these

99. Evaluate $\lim_{x \to 1} \frac{x^3 + x^2 - 2}{\sin(x-1)}$

(a) $9/2$ (b) $2/9$ (c) 5 (d) 7

100. The value of $\lim_{x \to 0} \frac{e^x - (1+x)}{x^2}$ is _____.

(a) $\frac{1}{2}$ (b) 1 (c) 0 (d) $\frac{1}{4}$

101. For $x \in R$, $\lim_{x \to \infty} \left(\frac{x-3}{x+2} \right)^x$ = _____

(a) e (b) e^{-1} (c) e^{-5} (d) e^5

102. If sin y = x sin (a+y) then $\frac{dy}{dx}$ is

(a) $\frac{\sin \alpha}{\sin \alpha \sin^2(a+y)}$ (b) $\frac{\sin^2(a+y)}{\sin \alpha}$

(c) $\sin \alpha \sin^2(a+y)$ (d) $\frac{\sin^2(a-y)}{\sin \alpha}$

103. The differential co-efficient of *f(sin x)* with respect to 'x' where *f(x) = log x* is

(a) tan x (b) cot x (c) *f(cos x)* (d) $\frac{1}{x}$

104. If $\text{sgn.}(x) = \begin{cases} \frac{|x|}{x}, & x \neq 0 \\ 0, & x = 0 \end{cases}$

then the function *f(x) = sgn [sgn(x)]* is _____.

a) continuous as well as differentiable at x = 0.

b) continuous but not differentiable at x = 0.

c) differentiable but not continuous at x = 0.

d) neither differentiable nor continuous at x = 0.

105. If the line *ax + by + c = 0* is a normal to the curve *xy = 1,* then

(a) a> 0, b > 0 (b) a> 0, b < 0 or a< 0, b > 0

(c) a = 0, b = 0 (d) a< 0, b < 0

106. Let $f(x) = 1 + 3x^2 + 3^2x^4 + ... + 3^{30}x^{60}$, then *f(x)* has

a) at least one maximum

b) exactly one maximum

c) at least one minimum

d) exactly one minimum

107. $\int \frac{\cot x}{\log(\sin x)} dx$ is equal to:

(a) *log(log cot x) + C* (b) *log(sin x) + C*

(c) *log(log tan x) + C* (d) *log(log sin x) + C*

108. $\int_0^1 \frac{dx}{e^x + e^{-x}} =$

(a) $\tan^{-1}(1\text{-}e/1+e)$ (b) $\tan^{-1}[(e-1)/(e+1)]$

(c) $\frac{\pi}{4}$ (d) none

109. $\int_{-1}^{1} \log\left(\frac{2-x}{2+x}\right) dx =$

(a) -1 (b) 0 (c) 2 (d) 1

110. $\int_1^2 \frac{1}{x^2 - 9} dx =$

(a) -1/6 log 5/2 (b) 1/6 log 5/2

(c) 6 log 52 (d) -6 log 5/2

111. $\int_{-\alpha}^{\alpha} \cos x f\left(x^2\right) dx$ equals to

(a) 0 (b) $\int_0^{\alpha} \cos x f\left(x^2\right) dx$

(c) $2\int_0^{\alpha} \cos x f\left(x^2\right) dx$ (d) none

112. The condition that the line *lx + my = 1* may be normal to the curve $y^2 = 4ax$ is

(a) $al^3 - 2alm^2 = m^2$ (b) $al^2 + 2alm^3 = m^2$

(c) $al^3 + 2alm^2 = m^3$ (d) $al^3 + 2alm^2 = m^2$

113. For the parabola $y^2 = 4ax$, the ratio of the sub-tangent to the abscissa is:

(a) 1 : 1 (b) 2 : 1 (c) x : y (d) x^2 : y

114. What is the order and degree of the differential equation $\left[1+\left(\frac{dy}{dx}\right)^2\right]^3 = c^2\left(\frac{d^2y}{dx^2}\right)^3$

(a) 2, 2 (b) 2, 1 (c) 1, 2 (d) 2,3

115. What is the standard form of the Linear differential equation in the dependent variable 'x'

(a) $\frac{dy}{dx} + P(x)y = Q(x)$

(b) $\frac{dy}{dx} + P(y)x = Q(x)$

(c) $\frac{dx}{dy} + P(x)y = Q(y)$

(d) $\frac{dx}{dy} + P(y)x = Q(y)$

116. Find the integrating factor of the differential equation $(1+y^2)\,dx = (\tan^{-1} y - x)\,dy$

(a) $e^{\tan^{-1} y}$

(b) $e^{\tan^{-1} x}$

(c) $e^{\tan^{-1}(x+y)}$

(d) *ln secx*

117. A bag has 20 tickets numbered 1, 2, 3… 20. If you pick a ticket at random, what is the probability that the ticket has a prime number printed on it.

(a) 1/5 (b) 2/5 (c) 3/5 (d) 4/5

118. A coin is tossed twice. Find the probability of getting at most one head

(a) 1/2 (b) 2/3 (c) 1/4 (d) 3/4

119. In how many ways can a committee of 4 gentlemen and 3 ladies be formed out of 7 gentlemen and 6 ladies

(a) 350 (b) 700 (c) 1050 (d) 1400

120. The solution of the following system of equations (by Cramer's rule)

$$2x + y + 2z = 2$$
$$3x + 2y + z = 2$$
$$-x + y + 3z = 6 \text{ is}$$

(a) x = 1, y = 2, z = 1
(b) x= -1, y= -2, z = 1
(c) x= -1, y = 2, z= -1
(d) x= -1, y = 2, z = 1

SECTION - III : ENGINEERING MECHANICS

121. Through dimensional analysis we can
(a) check dimensional homogenity
(b) frame a formula
(c) perform unit conversion
(d) all of the above

122. FBD can be applied only in
(a) static equilibrium problem
(b) dynamic equilibrium problem
(c) both Static and dynamic equilibrium problem
(d) none of the above

123. Geometrical significance of scalar triple product of three vectors is
(a) volume of parallelopiped
(b) area of parallelogram
(c) projection of vector on another vector
(d) all of the above

124. Couple is a
(a) sliding vector (b) bound vector
(c) free vector (d) fixed vector

125. A Force can be replaced by
(a) a force of same magnitude and a couple
(b) a force of different magnitude and a couple
(c) force-couple combination
so that equilibrium is maintained
(d) all of the above

126. For equilibrium of partical the equation are
(a) $\Sigma F = 0, \Sigma M = 0$
(b) $\Sigma F = 0$ only
(c) $\Sigma F_x = 0, \Sigma F_y = 0, \Sigma F_z = 0, \Sigma M_z = 0$
(d) none of the above

127. For equilibrium of rigid body in 2D, the equations are
(a) $\Sigma F_x = 0, \Sigma F_y = 0, \Sigma M_z = 0$
(b) $\Sigma M_x = 0, \Sigma M_y = 0, \Sigma M_z = 0$
(c) $\Sigma M_A = 0, \Sigma M_B = 0, \Sigma M_C = 0$
(d) $\Sigma F_x = 0, \Sigma M_x = 0, \Sigma M_z = 0$

128. Maximum number of unknowns that can be solved through equilibrium equation for a rigid body in space is
(a) 6 (b) 5 (c) 4 (d) 3

129. Laws of equilibrium can be applied for
(a) inertial frame of reference
(b) non-inertial frame of reference
(c) both inertial and non-inertial frame of reference
(d) all of these

130. A rigid body is rest. This implies that
(a) force equilibrium exists
(b) moment equilibrium exists
(c) both force and moment equilibrium exists
(d) none of these

131. Sufficient and necessary condition for rotational equilibrium is
(a) $\Sigma F = 0$ (b) $\Sigma \square = 0$
(c) $\Sigma F = 0$ and $\Sigma \square = 0$ (d) all of these

132. A rigid body is at rest on the floor of the bus.The nature of equilibrium is
(a) static equilibrium
(b) dynamic equilibrium
(c) both Static and dynamic equilibrium
(d) cannot be said

133. Lami's theorem can applied for the equilibrium of particle if the number of applied force is
(a) greater than three (b) less than three
(c) equal to three (d) none of these

134. In negative wrench resultant direction of couple and force are
(a) same (b) opposite
(c) forms an angle (d) none of these

135. A pushing force in a rigid body is transformed to a pulling force alonag the same line of action; then equilibrium of the body
(a) will change (b) will not change
(c)cannot be said (d) none of there

136 Centre of mass must be
(a) within the body
(b) Outside the body
(c) any where and bears no relation with the body
(d) Any of the above

137. Centre of gravity of a body is
(a) Always within the body
(b) Always outside the body
(c) May be outside the body and in general within the body
(d) None of these

138. Moment of inertia is required to study problems related to
(a) statics (b) dynamics
(c) strength of material (d) all of the above

139. Mathematically, polar moment of inertia expressed by
(a) $J_0 = I_x I_y$ (b) $J_0 = I_x - I_y$
(c) $J_0 = I_x / I_y$ (d) $J_0 = I_x + I_y$

140. Moment of inertia about a base (width b)of a rectangular area is
(a) $(1/12)bd^3$ (b) $(1/3)bd^3$
(c) $(1/36)bd^3$ (d) $(1/12)db^3$

141. Moment of inertia about a base and parallel to centroidal axis of a rectangle is
(a) $(1/3)bd^3$ (b) $(1/36)bd^3$
(c) $(1/12)bd^3$ (d) $(1/36)db^3$

142. Centroid of quarter circular area of radius r is
(a) $x=y=4r/3\pi$ (b) $x=y=2r/3\pi$
(c) $x=4r/3\pi$, $y=2r/3\pi$ (d) none of these

143. Mass moment of inertia of sphere of radius r and mass M is
(a) $(2/5)Mr^2$ (b) $(1/2)Mr^2$
(c) $(7/5)Mr^2$ (d) none of these

144. Radius of gyration of a thin disc having mass m and radius r is
(a) $r/\sqrt{2}$ (b) $r/\sqrt{3}$ (c) $\sqrt{2r}$ (d) $\sqrt{3r}$

145. Pappus-guldinus theorem can be applied to calculate
(a) A,V, centroid
(b) A and V only
(c) V,centroid only
(d) none of these

146. Friction always
(a) opposes motion (b) opposes relative
(c) help motion some times (d) none of these

147. Coefficient of kinetic friction is always
(a) greater than static friction coefficient
(b) lesser then static friction coefficient
(c) equal to static friction coefficient
(d) cannot be said

148. At impending motion for downward sliding along an incline, the angle of repose will be
(a) equal to the angle of static friction
(b) equal to the angle of kinetic friction
(c) equal to the angle of rolling friction
(d) all of these

149. Friction is basically summation of
(a) n-components of reaction
(b) t-components of reaction
(c) all reaction forces
(d) cannot be said

150. When a body is resting on the ground in a closed container without air then static friction is
(a) zero (b) maximum limiting value (c) between zero and maximum limiting value (d) any of these

151. If a particle Is on the verge of motion from static position then angle of static friction will attain
(a) maximum value (b) minimum value
(c) cannot be predicted

152. When a man walks, friction will act
(a) in direction opposite to that of moment
(b) in direction same as that of movement
(c) at any angle with respect to direction of movement
(d) cannot be said

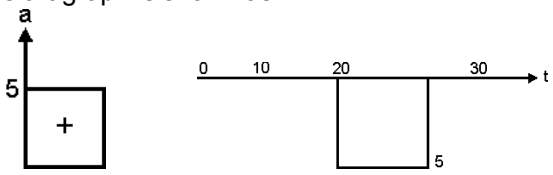
153. Value of friction coefficient
(a) always less than1
(b) always greater than1
(c) in special case greater than
1 and in general case less than1
(d) any value between zero to any other number

154. Side slope of earthen dam depends on
(a) angle of repose
(b) angle of limiting static friction
(c) angle of limiting kinetic friction
(d) all of these

155. A disc is rotating on the horizontal ground,friction force will act
(a) in the direction of motion of disc
(b) in the direction opposite to the motion of disc
(c) cannot be predicted

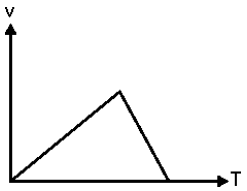
156. Slope and area of v-t curve represents
(a) acceleration, total displacement
(b) instantaneous acceleration, displacement
(c) none of these
(d) all of these

157. The a-t graph is shown as

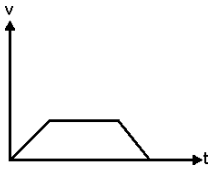


Choose the corresponding v-t graph from the following

(a)



(b)



158. Rain is falling vertically at the speed of 3m/s. A man is walking at the rate of 3m/s horizontally. The direction at which he should hold the umbrella is_____to the direction of horizontal motion
(a) 45^0 ccw (b) 60^0 cw
(c) 45^0 cw (d) 90^0 cw

159. Belt pulley motion depends upon
(a) no of DOF
(b) available constraint equation
(c) choice of datum and coordinates
(d) all of these

160. If two balls are are projected from different heights from the ground then relative acceleration between them is
(a) zero
(b) 2g
(c) g
(d) cannot be said

161. A pendulum bob is rotating. To study kinematics of bobs we can use
(a) x-y coordinate system
(b) r-θ coordinate system
(c) n-t coordinate system

162. A stone is dropped from a height h from ground and simultaneously a bullet is fired from some height in horizontal direction then
(a) the bullet cannot hit stone
(b) bullet may hit the stone
(c) bullet will hit the stone
(d) cannot be said

163. Depending on which coordinate system is used,the absolute velocity and acceleration of a moving particle
(a) varies
(b) varies in only direction not magnitude
(c) are basically same irrespective coordinate system

164. Relative velocity
(a) has no physical significance
(b) can be measured mechanically
(c) can be measured theoretically
(d) all of these are true

165. For analysis of absolute motion of a rigid body
(a) fixed coordinate system is necessary
(b) moving or fixed either coorditate system will suffice
(c) idealization of rigid body to a particle is necessary
(d) none of these

166. D' Alembert's concept can be applied to
(a) Any accelerating body
(b) A body that moves with respect to a accelerating frame of reference
(c) a body that moves with respect to a static frame of reference
(d) only when $\Sigma F = 0$

167. The equivalent of pseudo force in rotation is
(a) pseudo torque
(b) angular momentum
(c) moment of inertia
(d) none of the above

168. Impulse can be derived by calculating the are under
(a) force-time curve
(b) momentum-time curve
(c) velocity-time curve
(d) none of the above

169. Angular momentum of a particle
(a) depends on the particle position
(b) is proportional to linear momentum
(c) follows principle of momentum conservation
(d) all of the above

170. Under impact between two colliding bodies they gain common velocity
(a) after deformation takes place
(b) the moment they collide
(c) after period of restitution
(d) if the impact is only 'direct'type

171. Coefficient of restitution
(a) cannot be zero
(b) always less than 1
(c) ≤ 1 and ≥ 0

172. The essential condition of rotation is
(a) $\Sigma F = 0$
(b) $\Sigma \square_{cm} = 0$
(c) linear velocity and acceleration should be zero
(d) none of the above

173. The equation $\Sigma \square_{cm} = I_{cm} \alpha$ is
(a) valid for particle as well as rigid body
(b) valid for rigid body only
(c) valid for pure rotation only
(d) none of the above

174. Rolling friction is always
(a) less than static friction
(b) same as kinetic friction
(c) greater than sliding friction
(d) cannot be stated

175. Which form of energy is dependent on frame of reference?
(a) kinetic energy
(b) potential energy
(c) both kinetic and potential energy
(d) none of the above

176. Which of the following is true?
(a) Stress is reactive, pressure is active
(b) Stress is tensor, pressure is scalar
(c) Stress is more relevant for solids,
pressure is more relevant for liquids
(d) all of the above

177. For a given loading, there can be
(a) An unique principal plane
(b) two principal planes
(c) Multiple principal planes
(d) No principal planes.

178. The planes of maximum shear stresses a are
(a) 90^0 apart
(b) 45^0 apart
(c) Parallel
(d) None of these

179. $\Delta\theta$ between θ_p and θ_s is
(a) 45^0
(b) 90^0
(c) $\tan^{-1}\left[2_{xy/\sigma x}\right]$
(d) cannot be stated

180. Which of the following can not be shown in a Mohr's circle?
(a) angle θ made my any plane with X-axis
(b) angle $2\theta_s$ corresponding to $\square_{max}$
(c) average stress on any plane
(d) all of these

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Space for rough work

Space for rough work

ANSWER KEYS CUEE - 2015

B.TECH. – LATERAL ENTRY

SECTION-I – BASIC ELECTRICAL ENGINEERING

ANSWERS:

1. B
2. B
3. C
4. A
5. C
6. D
7. D
8. A
9. A
10. B
11. A
12. A
13. C
14. C
15. A
16. B
17. D
18. A
19. C
20. C
21. D
22. B
23. A
24. A
25. A
26. A
27. B
28. C
29. B
30. A
31. A
32. B
33. D
34. B
35. B
36. D
37. B
38. C
39. B
40. B
41. C
42. A
43. A
44. B
45. A
46. B
47. C
48. D
49. B
50. B
51. B
52. B
53. A
54. C
55. B
56. B
57. C
58. A
59. C
60. A

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SECTION – II : MATHEMATICS

ANSWERS

61. B	**91. A**
62. B	**92. C**
63. D	**93. B**
64. B	**94. C**
65. D	**95. C**
66. A	**96. D**
67. B	**97. C**
68. D	**98. C**
69. A	**99. C**
70. B	**100. A**
71. B	**101. C**
72. D	**102. B**
73. B	**103. B**
74. C	**104. D**
75. C	**105. B**
76. A	**106. D**
77. D	**107. D**
78. B	**108. B**
79. B	**109. B**
80. C	**110. A**
81. C	**111. C**
82. A	**112. D**
83. C	**113. B**
84. D	**114. D**
85. D	**115. D**
86. A	**116. A**
87. B	**117. B**
88. D	**118. D**
89. B	**119. B**
90. D	**120. D**

SECTION-III : ENGINEERING MECHANICS

Answer Keys :

121. D
122. C
123. A
124. C
125. A
126. B
127. A
128. A
129. B
130. D
131. B
132. B
133. C
134. B
135. B
136. A
137. C
138. D
139. D
140. B
141. B
142. A
143. A
144. A
145. A
146. B
147. B
148. A
149. B
150. A

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151. A
152. B
153. C
154. A
155. A
156. B
157. B
158. C
159. D
160. A
161. B
162. C
163. C
164. D
165. A
166. B
167. A
168. A
169. D
170. A
171. B
172. B
173. B
174. A
175. C
176. D
177. B
178. A
179. A
180. A