DIPLOMA - COMMON ENTRANCE TEST-2017

EE	COURSE	DAY : SUNDAY DATE : 02-07-2017
	ELECTRICAL AND ELECTRONICS	TIME : 10.00 a.m. to 1.00 p.m.

MAXIMUM MARKS	TOTAL DURATION	MAXIMUM TIME FOR ANSWERING
180	200 MINUTES	180 MINUTES

MENTION YOUR DIPLOMA CET NUMBER	QUESTION BOOKLET DETAILS	
	VERSION CODE	SERIAL NUMBER
	B - 1	216310

DOs :

1. Check whether the Diploma CET No. has been entered and shaded in the respective circles on the OMR answer sheet.
2. This Question Booklet is issued to you by the invigilator after the **2nd Bell i.e., after 09.50 a.m.**
3. The Serial Number of this question booklet should be entered on the OMR answer sheet and the respective circles should also be shaded completely.
4. The Version Code of this question booklet should be entered on the OMR answer sheet and the respective circles should also be shaded completely.
5. Compulsorily sign at the bottom portion of the OMR answer sheet in the space provided.

DON'Ts :

1. **THE TIMING AND MARKS PRINTED ON THE OMR ANSWER SHEET SHOULD NOT BE DAMAGED / MUTILATED / SPOILED.**
2. The **3rd Bell rings at 10.00 a.m., till then;**
   - Do not remove the paper seal / polythene bag of this question booklet.
   - Do not look inside this question booklet.
   - Do not start answering on the OMR answer sheet.

IMPORTANT INSTRUCTIONS TO CANDIDATES

1. This question booklet contains 180 (items) questions and each question will have one statement and four answers. (Four different options / responses.)
2. After the **3rd Bell is rung at 10.00 a.m.,** remove the paper seal / polythene bag of this question booklet and check that this booklet does not have any unprinted or torn or missing pages or items etc., if so, get it replaced by a complete test booklet. Read each item and start answering on the OMR answer sheet.
3. During the subsequent 180 minutes:
   - Read each question (item) carefully.
   - Choose one correct answer from out of the four available responses (options / choices) given under each question / item. In case you feel that there is more than one correct response, mark the response which you consider the best. In any case, choose **only one response** for each item.
   - **Completely darken / shade the relevant circle with a BLUE OR BLACK INK BALL POINT PEN against the question number on the OMR answer sheet.**

Correct Method of shading the circle on the OMR answer sheet is as shown below :

4. Use the space provided on each page of the question booklet for Rough Work. Do not use the OMR answer sheet for the same.
5. After the **last Bell is rung at 1.00 p.m.,** stop marking on the OMR answer sheet and affix your **left hand thumb impression** on the OMR answer sheet as per the instructions.
6. Hand over the **OMR ANSWER SHEET** to the room invigilator as it is.
7. After separating the top sheet (KEA copy), the invigilator will return the bottom sheet replica (Candidate's copy) to you to carry home for self-evaluation.
8. Preserve the replica of the OMR answer sheet for a minimum period of **ONE year.**

PART – A

APPLIED SCIENCE

1. The equation of motion of a body for distance travelled 'S_n' in the 'n^{th}' second is given by

(A) $S_n = u + \frac{a}{2}(2n-1)$ (B) $S_n = u - \frac{a}{2}(2n-1)$

(C) $S_n = u + \frac{a}{2}(2n+1)$ (D) $S_n = u - \frac{a}{2}(2n+1)$

2. A bullet of mass 0.01 kg is fired with a velocity of 960 ms^{-1} from a rifle of mass 3 kg, the velocity of recoil of rifle is

(A) $-320\ ms^{-1}$ (B) $-0.32\ ms^{-1}$

(C) $-3.2\ ms^{-1}$ (D) $-32\ ms^{-1}$

3. One of the following is not a scalar quantity :

(A) Mass (B) Density

(C) Force (D) Speed

4. If a body fixed about a point rotates in clockwise direction, the moment of force is measured as

(A) Positive (B) Negative

(C) Zero (D) Equal

5. The resultant magnitude of two forces P and Q acting in same line and in same direction is

(A) P – Q (B) P + Q

(C) Q – P (D) $\frac{P}{Q}$

Space For Rough Work

6. The resultant magnitude of two forces 6 N and 8 N acting at right angles to each other is

(A) 100 N (B) 10 N

(C) 48 N (D) 14 N

7. The value of resultant magnitude of two forces acting at a point is maximum, when the angle between the two forces is

(A) 0° (B) 90°

(C) 180° (D) 45°

8. Rise of liquid in a capillary tube is due to

(A) Energy (B) Viscosity

(C) Surface tension (D) Pressure

9. The ratio of volume stress to volume strain is called

(A) Bulk modulus (B) Young's modulus

(C) Rigidity modulus (D) Poisson's ratio

10. The reciprocal of bulk modulus of elasticity is called

(A) Compressibility (B) Rigidity

(C) Plasticity (D) Modulus of elasticity

11. The force of cohesion is maximum in

(A) Solids (B) Gases

(C) Liquids (D) Plasma

Space For Rough Work

12. The value of surface tension is 80 dyne/cm. What will be its value in Nm^{-1} ?

(A) $8\times10^{2}\ Nm^{-1}$ (B) $80\ Nm^{-1}$

(C) $8\times10^{-2}\ Nm^{-1}$ (D) $8\times10^{3}\ Nm^{-1}$

13. Pressure at the bottom of a container having base area of $10\ m^2$ filled with water to a height of 10 m is

(A) 9.8×10^{4} Pa (B) 980×10^{4} Pa

(C) 9.8×10^{-4} Pa (D) 980×10^{-4} Pa

14. 100 °C when expressed in absolute scale is

(A) 100 K (B) 0 K

(C) 273 K (D) 373 K

15. Gas law which gives the relation between pressure and volume changes is

(A) Boyle's law (B) Charles' law

(C) Gay-Lussac's law (D) Hooke's law

16. Amount of heat required to raise the temperature of one gram of water through 1 °C is

(A) Heat capacity (B) Conductivity

(C) Caloric (D) Joule

17. An example of longitudinal wave is

(A) Sound waves (B) Waves on the surface of water

(C) Light waves (D) Electromagnetic waves

Space For Rough Work

18. The relation between velocity of sound v, and absolute temperature T is

(A) $v \propto T$ (B) $v \propto \frac{1}{T}$

(C) $v \propto \sqrt{T}$ (D) $v \propto T^2$

19. The distance between a node and the next antinode in a stationary wave is equal to

(A) one wavelength (B) half wavelength

(C) twice wavelength (D) one fourth wavelength

20. Damage caused by marching military columns to the suspension bridge is due to

(A) Echo (B) Resonance

(C) Beats (D) Interference

21. During forced vibrations, if the forced frequency is F_1 and natural frequency is F_2, the body resonates if

(A) $F_1 > F_2$ (B) $F_2 > F_1$

(C) $F_1 = 2.5\, F_2$ (D) $F_1 = F_2$

22. The fundamental frequency of transverse vibrations of the stretched string is inversely proportional to

(A) tension (B) length of string

(C) square root of tension (D) square root of length of string

23. Minimum length of a hall to produce an echo is

(A) 50 m (B) 34 m

(C) 25 m (D) 17 m

Space For Rough Work

24. The property of light that Huygen's wave theory could explain is

(A) Polarisation (B) Photoelectric effect

(C) Interference (D) Compton effect

25. The spectrum of black body radiation is successfully explained by

(A) Newton's corpuscular theory of light

(B) Huygen's wave theory of light

(C) Maxwell's electromagnetic theory of light

(D) Planck's quantum theory of light

26. For constructive interference of light, the path difference should be

(A) $\frac{2n\lambda}{2}$ (B) $(2n+1)\frac{\lambda}{2}$

(C) $(2n+1)\frac{\lambda}{3}$ (D) $(2n+1)\frac{\lambda}{4}$

27. Two very close objects are just resolved if the central maximum of one object is on

(A) central maximum of another

(B) first minimum of another

(C) beyond second minimum of another

(D) between central maximum and first minimum of another

28. The light is incident at polarising angle θ_p and the angle of refraction is r, then

(A) $\theta_p + r = 0^\circ$ (B) $\theta_p + r = 90^\circ$

(C) $\theta_p + r = 180^\circ$ (D) $\theta_p + r = 360^\circ$

Space For Rough Work

29. Minimum energy required to remove an electron from the metal surface is called

(A) Kinetic energy (B) Potential energy

(C) Work function (D) Energy function

30. When the size of the scattering particle is small, the intensity of scattered light is inversely proportional to

(A) fourth power of wavelength (B) square of wavelength

(C) square root of wavelength (D) cube of wavelength

31. Time for which an atom stays in metastable state is of the order of

(A) Seconds (B) Milli-seconds

(C) Micro-seconds (D) Nano-seconds

32. If an element emits β-ray then its atomie number

(A) increases by one (B) decreases by one

(C) remains same (D) decreases by two

33. If the concentration of H^+ ions is more than 10^{-7} gm ion per litre, the solution is

(A) Base (B) Acid

(C) Neutral (D) Both Acid and Base

34. A galvanic cell is one in which

(A) chemical energy produce electric energy

(B) electric energy produce chemical energy

(C) chemical energy will not produce electric energy

(D) electric energy will not produce chemical energy

Space For Rough Work

35. The S.I. unit of Coefficient of Viscosity is

(A) Poise (B) NSm^{-2}

(C) $NS^{-1}m^2$ (D) $NS^{-1}m^{-2}$

36. The prefix used for 10^{+9} is

(A) Mega (B) Tera

(C) Giga (D) Hecta

37. The physical quantity which has the dimensional formula $[ML^0T^{-2}]$ is

(A) Force (B) Surface tension

(C) Viscosity (D) Work

38. The least count of slide callipers is given by

(A) 1 MSD + 1 VSD (B) 1 MSD × 1 VSD

(C) 1 MSD – 1 VSD (D) $\frac{1\text{ MSD}}{1\text{ VSD}}$

39. The product of force and time is

(A) Momentum (B) Moment

(C) Impulse (D) Acceleration

40. The change in position of a particle in a particular direction is referred to as

(A) Speed (B) Displacement

(C) Velocity (D) Acceleration

Space For Rough Work

PART – B
APPLIED MATHEMATICS

41. The sine of the angle between the vectors $(2i - 2j + k)$ and $2i + j + 2k$ is

(A) $\frac{\sqrt{65}}{3}$ (B) $\frac{\sqrt{65}}{\sqrt{3}}$

(C) $\frac{\sqrt{65}}{9}$ (D) $\sqrt{65}$

42. If $x \sin^2 45 = \frac{\tan^2 45 + \cot^2 30}{\sin^2 45 + \cos^2 45}$ then the value of x is

(A) 4 (B) 2

(C) 6 (D) 8

43. The value of $\frac{4}{3}\sec^2\frac{\pi}{3} - \text{cosec}^2\frac{\pi}{6} + \frac{3}{4}\tan^2\frac{\pi}{4} - 2\sin^2\frac{\pi}{3}$ is

(A) $-\frac{11}{12}$ (B) $\frac{53}{12}$

(C) $\frac{7}{12}$ (D) $-\frac{7}{12}$

44. The value of

$$\frac{\sin(90-\theta)}{\cos(360-\theta)} + \frac{\sec\left(\frac{3\pi}{2}+\theta\right)}{\text{cosec}(\pi+\theta)} + \frac{\tan(180-\theta)}{\tan(-\theta)} \text{ is}$$

(A) 1 (B) –1

(C) 3 (D) 2

45. The value of cosec 43 cot 43 cot 47 cos 47

(A) 1 (B) 0

(C) –1 (D) 2

Space For Rough Work

46. The value of $\frac{\tan 69^\circ + \tan 66^\circ}{1 - \tan 69^\circ \tan 66^\circ}$

(A) 1 (B) -1

(C) 0 (D) ∞

47. If $\tan \frac{A}{2} = x$ then sin A + tan A is

(A) $\frac{4x}{1-x^2}$ (B) $\frac{4x}{1+x^2}$

(C) $\frac{4x}{1+x^4}$ (D) $\frac{4x}{1-x^4}$

48. The value of $\sin 70^\circ - \sin 50^\circ - \sin 10^\circ$ is

(A) 1 (B) 0

(C) -1 (D) $\frac{1}{2}$

49. $\sin^{-1} x$ is also equal to

(A) $\text{cosec}^{-1}\left(\frac{1}{x}\right)$ (B) $\text{cosec}\, x$

(C) $\text{cosec}^{-1} x$ (D) $\frac{1}{\sin x}$

50. Centroid divides the median in the ratio

(A) 2 : 1 (B) 1 : 2

(C) 1 : 1 (D) 1 : 4

51. The co-ordinates of a point which divides the line join of the points (a + b, a − b) and (a − b, a + b) in the ratio 2 : 3 is

(A) $\frac{5a+5b}{5}, \frac{5a-5b}{5}$ (B) $\frac{a+b}{5}, \frac{a-b}{5}$

(C) $\frac{5a+b}{5}, \frac{5a-b}{5}$ (D) $\frac{5a-b}{5}, \frac{a+5b}{5}$

Space For Rough Work

52. The equation of straight line whose intercepts are 3 and 5 on the axes is

(A) $5x - 3y = 15$ (B) $5x + 3y = 15$

(C) $5x + 3y = 1$ (D) $15x + 15y = 1$

53. The angle between the lines whose slopes are $\sqrt{3}$ and $\frac{1}{\sqrt{3}}$ respectively is

(A) $\frac{\pi}{6}$ (B) $\frac{\pi}{3}$

(C) $\frac{\pi}{4}$ (D) $\frac{\pi}{2}$

54. The equation of the straight line passing through (2, 3) and x intercept is twice its y intercept is

(A) $x + 2y = 8$ (B) $x - 2y = 8$

(C) $x + y = 4$ (D) $2x + 2y = 8$

55. The equation to the line passing through the point (–6, 7) and parallel to the line joining (3, 4) and (6, –8) is

(A) $4x + y + 31 = 0$ (B) $x + 4y - 1 = 0$

(C) $x - 4y + 1 = 0$ (D) $4x + y + 17 = 0$

56. $\lim_{\theta \to \pi/2} (\sec\theta - \tan\theta)$ is equal to

(A) 0 (B) 1

(C) $\frac{\pi}{2}$ (D) π

57. $\lim_{x \to 4} \frac{x-4}{3-\sqrt{13-x}}$ is equal to

(A) 3 (B) 9

(C) 6 (D) 0

Space For Rough Work

58. If $y = (1 + \log x)^5$, then $\frac{dy}{dx}$ is

(A) $5(\log x)^4$ (B) $\frac{5}{x}(1 + \log x)^4$

(C) $5(1 + \log x)^4$ (D) $5x^4 \log x$

59. If $x = \cos^{-1} t$ and $y = \sin^{-1} t$, then $\frac{dy}{dx}$ is

(A) -1 (B) 1

(C) $\frac{1}{2\sqrt{1-t^2}}$ (D) $\frac{2}{\sqrt{1-t^2}}$

60. If $y = x \log y$, then $\frac{dy}{dx}$ is

(A) $\frac{\log x^x}{x-y}$ (B) $\frac{\log y^x}{x-y}$

(C) $\frac{\log y^y}{x-y}$ (D) $\frac{\log y^y}{y-x}$

61. If $y = \frac{x+1}{x+2}$, then $\frac{dy}{dx}$ is

(A) $\frac{1}{(x+2)^2}$ (B) $\frac{2x+3}{(x+2)^2}$

(C) $-\frac{1}{(x+2)^2}$ (D) $\frac{2x-3}{(x+2)^2}$

62. The equation of tangent to the curve $y^2 = 4x$ at (1, 2) is

(A) $x + y - 3 = 0$ (B) $x - y + 1 = 0$

(C) $2x - y = 0$ (D) $2x + y - 4 = 0$

Space For Rough Work

63. The maximum value of $7 - 8x - 2x^2$ is

(A) 15 (B) -4

(C) -2 (D) 31

64. The value of $\int \log 2x \, dx$ is

(A) $x \log 2x + x + C$ (B) $x \log 2x - x + C$

(C) $\frac{1}{2x} + C$ (D) $\frac{1}{x} + C$

65. The value of $\int \sec^4 x \cdot \tan x \, dx$

(A) $\frac{\sec^4 x}{4} + C$ (B) $4 \sec^4 x + C$

(C) $3 \sec^2 x + C$ (D) $\frac{\tan^4 x}{4} + C$

66. The value of $\int x \log x \, dx$ is

(A) $\frac{x^2}{2} \log x - \frac{x^2}{2} + C$ (B) $\frac{x^2}{2} \log x + \frac{x^2}{2} + C$

(C) $\frac{x^2}{2} \log x - \frac{x^2}{4} + C$ (D) $\frac{x^2}{2} \log x + \frac{x^2}{4} + C$

67. $\int_0^{\pi/4} \tan^2 x \, dx$ is equal to

(A) $\frac{\pi}{4} - 1$ (B) $1 - \frac{\pi}{4}$

(C) $\frac{\pi^2}{16}$ (D) $\frac{\pi^2}{16} - 1$

Space For Rough Work

68. The value of $\int_0^1 x\sqrt{1-x^2}\,dx$ is

(A) $-\frac{1}{3}$ (B) 0

(C) ∞ (D) $\frac{1}{3}$

69. The volume generated by revolving the line $y = x + 1$ about the x-axis between the ordinates $x = 0$ and $x = 2$

(A) $\frac{26\pi}{3}$ units (B) $\frac{10\pi}{3}$ units

(C) $\frac{26}{3}$ units (D) 4 units

70. The degree and order of the differential equation $\frac{d^2y}{dx^2} = \left[1+\left(\frac{dy}{dx}\right)^2\right]^{1/3}$ are

(A) 2 and 1 (B) 1 and 2

(C) 3 and 2 (D) 2 and 3

71. The solution of differential equation $\frac{dy}{dx} + y \tan x = \sec x$ is

(A) $y \sec x = \tan x + C$

(B) $y \sin x = \sec x + C$

(C) $\log(\sec x) = \tan x + C$

(D) $y \sec x = -\cot x + C$

Space For Rough Work

72. The value of x if $\begin{vmatrix} 1 & 2 & 3 \\ 2 & x & 3 \\ 3 & 4 & 3 \end{vmatrix} = 0$ is

(A) 0 (B) -3

(C) 3 (D) 18

73. The value of x, if $4x + y = 7$, $3y + 4z = 5$ and $3z + 5x = 2$ is

(A) 0 (B) 1

(C) 3 (D) -1

74. If $A = \begin{bmatrix} 2 & -1 \\ 3 & -4 \end{bmatrix}$, then A^{-1} is

(A) $-\frac{1}{5}\begin{bmatrix} -4 & -3 \\ 1 & 2 \end{bmatrix}$ (B) $-\frac{1}{5}\begin{bmatrix} -4 & 1 \\ -3 & 2 \end{bmatrix}$

(C) $-\frac{1}{11}\begin{bmatrix} -4 & -3 \\ 1 & 2 \end{bmatrix}$ (D) $-\frac{1}{11}\begin{bmatrix} -4 & 1 \\ -3 & 2 \end{bmatrix}$

75. The characteristic equation of the matrix $A = \begin{bmatrix} 2 & -1 \\ 5 & -6 \end{bmatrix}$ is

(A) $A^2 + 8A - 7I = 0$ (B) $A^2 + 4A - 17I = 0$

(C) $A^2 + 4A + 7I = 0$ (D) $A^2 + 4A - 7I = 0$

Space For Rough Work

76. If $\begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix} + A = \begin{bmatrix} 5 & 1 \\ 3 & 2 \end{bmatrix}$, then A is

(A) $\begin{bmatrix} 3 & 2 \\ -2 & 0 \end{bmatrix}$ (B) $\begin{bmatrix} 3 & -2 \\ 2 & 0 \end{bmatrix}$

(C) $\begin{bmatrix} -2 & 3 \\ 2 & 0 \end{bmatrix}$ (D) $\begin{bmatrix} 0 & 3 \\ -2 & 2 \end{bmatrix}$

77. The middle term of the expansion of $\left(x^2 - \frac{2}{x}\right)^{24}$ is

(A) ${}^{24}C_{10}2^{10}x^{12}$ (B) ${}^{24}C_{11}2^{12}x^{12}$

(C) ${}^{24}C_{13}2^{10}x^{10}$ (D) ${}^{24}C_{12}2^{12}x^{12}$

78. The term independent of x in $\left(x^2 - \frac{4}{3x}\right)^9$ is

(A) ${}^{9}C_{6}(4)^{6}$ (B) ${}^{9}C_{6}(3)^{6}$

(C) ${}^{9}C_{6}\left(\frac{4}{3}\right)^{6}$ (D) ${}^{9}C_{6}\left(\frac{3}{4}\right)^{6}$

79. If $3i - 2j + k$, $i - 3j + 5k$, $2i + j - 4k$ are the sides of a triangle, then the triangle is

(A) Right angled triangle (B) Equilateral triangle

(C) Isosceles triangle (D) Isosceles right angled triangle

80. If $\vec{a} = (2, -1, 4)$ and $\vec{b} = (2, -3, 4)$, then projection of $\vec{a}$ on $\vec{b}$ is

(A) $\frac{23}{\sqrt{21}}$ (B) $\frac{23}{\sqrt{29}}$

(C) $\frac{-23}{\sqrt{29}}$ (D) $\frac{-23}{\sqrt{21}}$

Space For Rough Work

PART – C

ELECTRICAL & ELECTRONICS ENGINEERING

81. The peak factor for a sine wave is given by

(A) RMS value / Peak value (B) Peak value / RMS value

(C) Mean value / Peak value (D) Mean value / RMS value

82. _____ is a phenomena due to which an emf is induced in the second coil due to a change in current in the first coil.

(A) Dynamic induction (B) Self induction

(C) Mutual induction (D) Static induction

83. The power dissipation of pure capacitor is

(A) Low (B) Zero

(C) High (D) Less than one

84. In RLC series circuit if $X_L = X_C$, then the power factor is

(A) leading (B) lagging

(C) 1 (D) zero

85. The energy stored in a capacitor is given by all the equations except

(A) $E = \frac{QV}{2}$ (B) $E = \frac{CV^2}{2}$

(C) $E = \frac{Q^2}{2C}$ (D) $E = \frac{QCV}{2}$

86. Power taken by 3 phase load is given by expression

(A) $V_L I_L \cos \phi$ (B) $\sqrt{3}\, V_L I_L \cos \phi$

(C) $V_{ph} I_{ph} \cos \phi$ (D) $\sqrt{3}\, V_{ph} I_{ph} \cos \phi$

87. N type semiconductors are formed when _____ impurity is added to a pure semiconductor.

(A) Trivalent (B) Tetravalent

(C) Bivalent (D) Pentavalent

Space For Rough Work

88. PN diode is mainly used in _____.

(A) Rectifiers (B) Amplifiers

(C) Voltage Regulators (D) Oscillators

89. Transistor is used as amplifier in _____ mode.

(A) CC (B) CE

(C) CB (D) None of the above

90. The input impedance of JFET is

(A) zero (B) low

(C) high (D) 100

91. The material used for LED is

(A) Silver oxide (B) Germanium oxide

(C) Platinum trioxide (D) Gallium arsenide

92. When one of the inputs to a two input NAND gate is at logic 'zero' the output will be _____.

(A) logic 'zero'

(B) logic 'high'

(C) dependent on the other input condition

(D) None of the above

93. 2's complement of 10100 is _____.

(A) 01011 (B) 10100

(C) 01100 (D) 10001

94. According to Boolean algebra $(A + A\bar{B})$ is equal to _____.

(A) A (B) $\bar{B}$

(C) $A\bar{B}$ (D) 1

Space For Rough Work

95. Each individual term in SOP form is called _____.

(A) Max term (B) Min term

(C) SOP term (D) POS term

96. Binary equivalent of hexadecimal number $(6CE)_{16}$ is

(A) $(11001001110)_2$ (B) $(011011001110)_2$

(C) $(011011001010)_2$ (D) $(011011001101)_2$

97. The PIV rating of diode in Full wave Bridge rectifier is

(A) V_m (B) $2V_m$

(C) $V_m/2$ (D) $V_m/4$

98. _____ type Bias is called universal bias for a transistor.

(A) Base resistor bias (B) Emitter feedback bias

(C) Collector feedback bias (D) Potential divider bias

99. With negative feedback, the bandwidth of amplifier _____.

(A) increases (B) decreases

(C) remains unchanged (D) None of the above

100. An oscillator employs _____ feedback.

(A) positive (B) negative

(C) no (D) neutral

101. In a full adder, when inputs A = 1, B = 1 and Ci = 0, the sum(S) and carry(CY) are

(A) S = 0, CY = 0 (B) S = 0, CY = 1

(C) S = 1, CY = 0 (D) S = 1, CY = 1

102. The race around problem is overcome using _____.

(A) SR flip flop (B) JK flip flop

(C) T-flip flop (D) Master-slave JK flip flop

Space For Rough Work

103. The maximum modulus of a counter using 5 flip flops is

(A) 8 (B) 10

(C) 32 (D) 40

104. The number of control inputs for an 8 : 1 multiplexer is

(A) 2 (B) 3

(C) 4 (D) 8

105. The most widely used ADC is _____.

(A) Dual slope ADC (B) Single slope ADC

(C) Counter type ADC (D) Successive approximation ADC

106. _____ requires refreshing by periodic recharging to retain data.

(A) Static RAM (B) Dynamic RAM

(C) Bipolar RAM (D) EPROM

107. To reduce Eddy current losses, the armature of dc machine is

(A) made of silicon steel (B) provided with dummy coils

(C) laminated (D) provided with interpoles

108. In lap winding the number of brushes is always equal to

(A) two only (B) double the number poles

(C) half the number poles (D) same as number of poles

109. Which DC motor is preferred for elevator ?

(A) Shunt motor (B) Differentially compound motor

(C) Synchronous motor (D) Series motor

110. In a DC shunt motor, the supply voltage V is given by

(A) $V = E_b + I_a (R_a + R_{se}) + V_{brush}$

(B) $V = E_b + I_a R_a + V_{brush}$

(C) $V = E_b - I_a (R_a + R_{se}) - V_{brush}$

(D) $V = E_b - I_a R_a$

Space For Rough Work

111. Which characteristic of DC motor is also called mechanical characteristic ?

(A) Speed vs. Torque (B) Torque vs. I_a

(C) Speed vs. I_a (D) E_b vs. I_f

112. Which of the following motor has constant speed ?

(A) Series (B) Shunt

(C) Cumulatively compound (D) Differentially compound

113. Which of the following motor is suitable for computer printer ?

(A) Reluctance motor (B) DC series motor

(C) Stepper motor (D) Hysterisis motor

114. The _____ need not be same for proper parallel operation of 3-ϕ alternators.

(A) Phase sequence (B) Frequency

(C) Terminal voltage (D) Current rating

115. For a 250 rpm, 50 Hz alternator, the number of poles will be

(A) 24 (B) 8

(C) 12 (D) 6

116. In case of alternators, the dark and bright lamp method is used for

(A) Load balancing (B) Phase sequence

(C) Synchronizing (D) Load transfer

117. The emf induced in the windings of a transformer will

(A) Independent of the core flux

(B) In phase with the core flux

(C) Lags the core flux by 90°

(D) Leads the core flux by 90°

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118. The emf induced in the secondary winding of a 50 Hz single-phase transformer having 1000 turns on its secondary is 222 V. The maximum flux density in the core is 0.1 Wb/m^2. The cross-section area of the core is

(A) 0.1 m^2 (B) 0.01 m^2

(C) 1 m^2 (D) 0.001 m^2

119. The ratio of the size of an auto transformer to the two winding transformer is

(A) $(n-1)/n$ (B) $(1-n)/n$

(C) $n/(n-1)$ (D) $n/(1-n)$

120. A 3-phase, 6 poles induction motor is supplied from 50 Hz, 400 V supply which runs at 960 rpm then percentage slip is

(A) 4% (B) 40%

(C) 20% (D) 45%

121. The condition for maximum torque in an induction motor is when

(A) rotor resistance equal to sliptims rotor reactance

(B) rotor resistance greater to sliptims rotor reactance

(C) rotor resistance equal to rotor reactance

(D) rotor resistance greater to rotor reactance

122. The no-load test is conducted in an induction motor to determine

(A) copper loss of rotor only

(B) copper loss of stator only

(C) copper loss of stator, core loss, friction and windage loss

(D) core loss only

123. The torque power factor of an induction motor will be high when

(A) running at no-load (B) running at full load

(C) rotor is blocked (D) the rotor is crawling

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124. The damper windings is provided in a synchronous motor to

(A) develop starting current (B) reduce starting current

(C) develop starting torque (D) reduce starting torque

125. Synchronous speed of a synchronous motor

(A) $\mu_s = \frac{120}{Pf}$ (B) $\mu_s = \frac{120\,f}{P}$

(C) $\mu_s = \frac{120\,P}{f}$ (D) $\mu_s = \frac{Pf}{120}$

126. Direction of rotation of slit-phase type induction motor can be reversed by

(A) Reversing the supply terminal

(B) Reversing the connections of only the auxiliary winding terminals

(C) Reversing the connection of either main winding or the auxiliary winding terminals

(D) Reversing the connection of only the main winding terminals

127. The degree of repeatability in a set of measurements is known as _____

(A) Accuracy (B) Precision

(C) Sensitivity (D) Error

128. The example of absolute instrument is _____

(A) Energy meter (B) Wattmeter

(C) 'D' Arsonval galvanometer (D) Tangent galvanometer

129. Wheatstone's Bridge is used to measure _____.

(A) low resistance (B) medium resistance

(C) high resistance (D) insulation resistance

130. The range of DC voltmeter is extended by using _____.

(A) Multipliers (B) Shunts

(C) CTs (D) PTs

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131. Brake magnet are used in _____.

(A) Energymeters (B) Wattmeters

(C) Ammeters (D) Voltmeters

132. If I is the current to be measured, I_m is the current flowing through the ammeter and R_m is the meter resistance, then the value of shunt resistance for extending the range of the DC ammeter is given by R =

(A) $\frac{I_m R_m}{I_m + I}$ (B) $\frac{I_m R_m}{I - I_m}$

(C) $\frac{I + I_m}{I_m R_m}$ (D) $\frac{I - I_m}{I_m R_m}$

133. In _____ transmission, the channel capacity is shared by both communicating devices at all times.

(A) Simplex (B) Half-duplex

(C) Full-duplex (D) Automatic

134. Routing algorithm is handled by _____ layer.

(A) Presentation (B) Network

(C) Datalink (D) Session

135. A carbon microphone is a

(A) variable resistance device (B) variable inductance device

(C) variable capacitance device (D) variable LC device

136. The uplink and downlink frequencies are made different in satellite links in order to

(A) Reduce transmitter power

(B) Increase isolation between transmitter and receiver

(C) Reduce antenna size

(D) Reduce receiver size

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137. Signal propagation in waveguides is by

(A) Electrons (B) Electrical & magnetic field

(C) Holes (D) Neutrons

138. Measuring physical conditions at some remote locations and transmitting this data for analysis is called

(A) Telemetry (B) Demodulation

(C) Modulation (D) Multiplexing

139. Demand factor is given by

(A) Individual average demand / Plant capacity

(B) Maximum demand / Connected load

(C) Average load / Maximum demand

(D) Station output in kWh / Power plant capacity

140. Which of the following is not a major consideration while selecting the site for Nuclear power plant ?

(A) Safety of plant (B) Disposal of waste

(C) Availability of water (D) Head of water

141. In Hydro power plant, the power generated is given by the equation P =

(A) $\frac{735.5}{75}$ QHη kW (B) 73.5 QHη kW

(C) 73.5 QH/η kW (D) $\frac{735.5}{75\eta}$ QH kW

142. Photovoltaic solar energy conversion system makes use of

(A) Fuel cells (B) Solar cells

(C) Solar ponds (D) Surface mirrors

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143. In thermal power plants, the _____ extracts heat from flue gases and makes the air hot before entering into the boiler.

(A) Economizer (B) Superheater

(C) Air preheater (D) Condenser

144. In a thyristor holding current is

(A) equal to latching current (B) less than latching current

(C) more than latching current (D) none of the above

145. Natural commutation of a thyristor takes place when

(A) Anode current becomes zero

(B) Gate current becomes zero

(C) Voltage across the device becomes zero

(D) Voltage across the device becomes negative

146. In a step up chopper output voltage V_0 is

(A) less than V_s (B) more than V_s

(C) equal to V_s (D) none of the above

147. The number of thyristors required for single- phase to single-phase mid-point cyclo-converter

(A) 6 (B) 8

(C) 4 (D) 2

148. A dual converter is generally used where

(A) reversible d.c. is required

(B) a rectifier, the other as an inverter

(C) an inverter, the other as an amplifier

(D) an inverter, the other as an oscillator

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149. SMPS are superior to linear power supplies in respect of

(A) size and efficiency (B) efficiency and regulation

(C) regulation and noise (D) noise and cost

150. In an RC firing circuit the firing angle control range is

(A) 0° to 90° (B) 0° to 180°

(C) 0° to 240° (D) 0° to 360°

151. Inverters are used to convert

(A) AC to DC (B) DC to AC

(C) AC to variable AC (D) fixed dc to variable d.c.

152. Heat sink provided to SCR for

(A) Heating of SCR

(B) Increase forward conduction

(C) Cooling of SCR

(D) Block forward conduction

153. Buck/Boost converter is used to

(A) Stepping up only (B) Step down only

(C) Step up and Step down (D) Constant

154. Buchholz's relay is a _____ actuated relay.

(A) current (B) voltage

(C) gas (D) oil

155. A relay used for protection of motors against overload is

(A) Impedance relay

(B) Electromagnetic attraction type relay

(C) Thermal relay

(D) Translay relay

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156. Outdoor type switch gear is generally used for voltage beyond

(A) 11 kV (B) 66 kV

(C) 33 kV (D) 132 kV

157. In which portion of the transmission system faults occur frequently ?

(A) Transformers (B) Overhead lines

(C) Alternators (D) Underground cables

158. Which of the following circuit breaker has the highest reliability and negligible maintenance ?

(A) Air blast (B) SF_6

(C) Oil (D) Vacuum

159. The basic elements of an electric drive are

(A) Electric motor and transmission system

(B) Electric motor, transmission & control system

(C) Transmission and control system

(D) Electric motor and conversion equipment

160. In crushers, a motor has to start against

(A) Low load (B) Medium load

(C) Normal load (D) Heavy load

161. The motor normally used for crane travel is

(A) slip ring motor

(B) ward-Leonard control dc shunt motor

(C) synchronous motor

(D) differential compound motor

162. Specific energy consumption is least in

(A) Urban service (B) Suburban service

(C) Mainline service (D) City service

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163. When the speed of the train is estimated taking into account the time of stop at a station in addition to the actual running time between stops is known as

(A) Average speed
(B) Schedule speed
(C) Notching speed
(D) Free running speed

164. For heating of cover pages of books in book binding _____ method can be employed.

(A) Eddy current heating
(B) Induction heating
(C) Dielectric heating
(D) Microwave heating

165. The basic principle of refrigeration is _____.

(A) First law of thermodynamics
(B) Second law of thermodynamics
(C) Lambert's cosine law
(D) Planck's law

166. Aluminimum is difficult to weld due to _____.

(A) It is light in weight
(B) It conducts away heat very rapidly
(C) Its melting point is low
(D) It is highly malleable

167. The process of providing an oxide film is known as

(A) Ionizing
(B) Anodizing
(C) Alloying
(D) None of the above

168. The function of choke in fluorescent tube circuit is _____.

(A) reduce flickering
(B) reduce starting current
(C) reduce starting surges
(D) initiate the arc and stabilizing it

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169. The resistance of the conductor is _____

(A) directly proportional to its area of cross-section.

(B) inversely proportional to its length.

(C) inversely proportional to its resistivity.

(D) inversely proportional to its area of cross-section.

170. A parallel combination of two resistances 100 Ω each is connected in series with another parallel combination of two resistances 50 Ω each. The effective resistance will be _____.

(A) 150 Ω (B) 300 Ω

(C) 75 Ω (D) 5000 Ω

171. The capacitance of a capacitor is given by C = _____ Farads.

(A) $Q \cdot V$ (B) $\frac{Q}{V}$

(C) $\frac{V}{Q}$ (D) $\frac{Q^2}{V}$

172. _____ has negative temperature co-efficient of resistance.

(A) Carbon (B) Copper

(C) Silver (D) Gold

173. The power consumed by a bulb having a resistance of 100 Ω when connected across 200 V supply is equal to _____.

(A) 400 W (B) 200 W

(C) 100 W (D) 50 W

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174. A 200 W bulb is used for 5 hours a day. The monthly energy consumption during the month of April will be _____

(A) 1000 kWhr. (B) 100 kWhr.

(C) 30 kWhr. (D) 300 kWhr.

175. In a lead acid battery, the negative plate is made up of _____

(A) Pb (B) PbO_2

(C) $PbSO_2$ (D) $PbSO_4$

176. The capacity of batteries are expressed in _____.

(A) Volt-ampere (B) Ampere-hour

(C) Ampere/hour (D) Volts

177. Which one of the following materials have highest resistivity ?

(A) Nichrome (B) Constantin

(C) Carbon (D) Manganin

178. The ratio of $\frac{V}{I}$ in reciprocity theorem is called

(A) Transfer inductance (B) Transfer conductance

(C) Transfer resistance (D) Transfer reactance

179. A passive network is the one which contains

(A) two sources of emf in it.

(B) only one source of emf in it.

(C) no source of emf in it.

(D) only one source of emf and resistance.

180. The property of material which opposes the creation of magnetic flux in it is known as

(A) Magnetomotive force (B) Permeance

(C) Reluctance (D) Reactance

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