DIPLOMA - COMMON ENTRANCE TEST-2016

EE	COURSE	DAY : SUNDAY
	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
					A - 1	133837

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. An example of basic S.I. unit is

(A) Newton (B) Joule

(C) Ampere (D) Watt

2. The prefix used for 10^{+2} is

(A) hecta (B) centi

(C) pico (D) peta

3. An example of dimensionless physical quantity is

(A) surface tension (B) strain

(C) impulse (D) period

4. The velocity of a freely falling body gradually _____ as it falls.

(A) decreases (B) increases

(C) remains same (D) increases and then decreases

5. A main scale is divided into half mm and having a vernier containing 20 divisions has a least count of _____ cm.

(A) 2.5×10^{-2} (B) 0.5×10^{-2}

(C) 0.025×10^{-2} (D) 0.25×10^{-2}

6. For a particular mass of the moving body, its friction is minimum when it is

(A) sliding (B) static

(C) rolling (D) dragged

Space For Rough Work

7. All equations of motion hold good under the condition of

(A) constant velocity
(B) constant acceleration
(C) variable velocity
(D) variable acceleration

8. A force of 1.5×10^{-2} N acts for 3 seconds on a body of mass 0.05 kg moving with velocity 4 m/s. The final velocity of the body is

(A) 4.9 m/s
(B) 18 m/s
(C) 9 m/s
(D) 7.5 m/s

9. To check the equilibrium of five coplanar concurrent forces, we use law of

(A) Parallelogram of forces
(B) Triangle of forces
(C) Lami's theorem
(D) Polygon of forces

10. The S.I. unit of momentum is

(A) kg m
(B) $kg\ m^{-1}s^{-1}$
(C) $kg\ m\ s^{-2}$
(D) $kg\ m\ s^{-1}$

11. When three forces acting at a point are in equilibrium, the angle opposite to biggest force is always _____ angle.

(A) biggest
(B) smallest
(C) equal to other
(D) obtuse

12. Towing of a boat by two forces is an illustration of

(A) Law of parallelogram of forces.
(B) Lami's theorem.
(C) Law of triangle of forces.
(D) Law of polygon of forces.

Space For Rough Work

13. Two forces 3N and 5N acts on a body simultaneously making an angle 60° between them. The resultant force on the body is

(A) 8 N (B) 4 N

(C) 7 N (D) 49 N

14. Dimensional formula for stress is

(A) $[LM^{-1}T^{-2}]$ (B) $[L^{-1}MT^{-2}]$

(C) $[L^{-1}M^{-1}T]$ (D) $[L^{2}M^{-1}T^{-2}]$

15. The pull in the bicycle chain is an example of

(A) tensile stress (B) volume stress

(C) shear stress (D) shear strain

16. Viscosity of water at 20 °C in centipoise is

(A) 1.792 (B) 0.650

(C) 1.005 (D) 0.470

17. Dimensional formula of surface tension is

(A) $[LMT^{-2}]$ (B) $[L^{2}MT^{-2}]$

(C) $[LM^{-1}T^{-2}]$ (D) $[L^{0}MT^{-2}]$

18. A steel needle can be floated on the surface of water because of the

(A) density of steel is greater than water

(B) density of steel is less than water

(C) surface tension

(D) viscosity

Space For Rough Work

19. Thrust on the bottom of the container having a base area of 10 m^2 filled with water to a height of 6 m is

(A) 60×10^2 N (B) 58.8×10^4 N

(C) 60.8 N (D) 600 N

20. Keeping the temperature constant, if the pressure of the gas is doubled its volume

(A) remains constant (B) doubles

(C) reduces to one fourth (D) reduces to half

21. Heat transfer in the absence of the medium is

(A) conduction (B) convection

(C) radiation (D) absorption

22. Zero of absolute scale of temperature is at

(A) 0 °C (B) 100 °C

(C) 273 °C (D) – 273 °C

23. Ripples on water surface is an example of

(A) electromagnetic waves (B) transverse waves

(C) waves travelling in space (D) longitudinal waves

24. The time interval between two consecutive waxing and waning of sound waves is

(A) beat period (B) wave period

(C) beat frequency (D) wave frequency

Space For Rough Work

25. S.I. unit of intensity of sound is

(A) watt per square meter (B) watt per meter

(C) watt square meter (D) watt meter

26. The study of characteristics of buildings with reference to sound is

(A) resonance (B) interference

(C) echo (D) acoustics

27. The distance travelled by the disturbance in the medium for one complete oscillation is

(A) wave velocity (B) wavelength

(C) wave frequency (D) wave amplitude

28. Momentum of a photon is given by

(A) $P = \frac{\lambda}{h}$ (B) $P = \frac{h}{\lambda}$

(C) $P = \lambda h$ (D) $P = \lambda^2 h$

29. The velocity of sound in case of liquids is given by

(A) $\sqrt{\frac{d}{k}}$ (B) $\sqrt{kd}$

(C) $\sqrt{\frac{k}{d}}$ (D) $\sqrt{\frac{d^2}{k}}$

30. A tuning fork vibrating in air is an example of

(A) damped free vibrations (B) resonant vibrations

(C) undamped free vibrations (D) forced vibrations

Space For Rough Work

31. Raman lines are

(A) unpolarised (B) polarised

(C) diffracted (D) reflected

32. A crystal which has two optic axes is

(A) calcite (B) quartz

(C) mica (D) glass

33. Electron microscope is used to

(A) study virus and bacteria

(B) view three dimensional images

(C) automatic switching on and off of street-lights

(D) electronic industry for soldering

34. Which of the following statements is correct in case of γ-rays ?

(A) Penetrating power is less than β-rays.

(B) Penetrating power is less than α-rays.

(C) Penetrating power is very high.

(D) γ particles are nothing but electrons.

35. For destructive interference of light the path difference should always be

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

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

Space For Rough Work

36. The resultant intensity of interference of two monochromatic waves having same amplitude and constant phase difference equal to ϕ is

(A) $2a\cos\left(\frac{\phi}{2}\right)$ (B) $4a^2\cos^2\left(\frac{\phi}{2}\right)$

(C) $4a^2\cos\left(\frac{\phi}{2}\right)$ (D) $4a\cos^2\left(\frac{\phi}{2}\right)$

37. For two objects to be just resolved, the principle maximum should be on

(A) first maximum (B) second maximum

(C) first minimum (D) second minimum

38. Resolving power of microscope is given by

(A) $\frac{\lambda}{2n\sin\theta}$ (B) $\frac{n}{2\lambda\sin\theta}$

(C) $\frac{2\lambda\sin\theta}{n}$ (D) $\frac{2n\sin\theta}{\lambda}$

39. In case of acids, the concentration of H^+ ions is

(A) more than 10^{-7} g ions/litre.

(B) less than 10^{-7} g ions/litre.

(C) equal to 10^{-7} g ions/litre.

(D) between 10^{-7} g ions/litre and 10^{-14} g ions/litre.

40. Corrosion of metal can be prevented by keeping it in

(A) acidic medium (B) basic medium

(C) neutral medium (D) moisture

Space For Rough Work

PART – B

APPLIED MATHEMATICS

41. The value of the determinant $A = \begin{vmatrix} 1 & 1 & 1 \\ 3 & 3 & 3 \\ 4 & 5 & 6 \end{vmatrix}$ is

(A) 1 (B) 3

(C) – 2 (D) 0

42. The value 'x' by Cramer's rule in $3x + 2y = 4$ and $x - 2y = 8$ is

(A) 12 (B) 3

(C) – 13 (D) 15

43. If $A = \begin{bmatrix} 2 & -3 \\ 1 & 5 \end{bmatrix}$ $B = \begin{bmatrix} 1 & 2 \\ 4 & -3 \end{bmatrix}$, then A + 2B is

(A) $\begin{bmatrix} 4 & 1 \\ 9 & -1 \end{bmatrix}$ (B) $\begin{bmatrix} 4 & 1 \\ 9 & 1 \end{bmatrix}$

(C) $\begin{bmatrix} 3 & -1 \\ 5 & 2 \end{bmatrix}$ (D) $\begin{bmatrix} 3 & 1 \\ 5 & 2 \end{bmatrix}$

44. If $A = \begin{bmatrix} 2 & 3 & 4 \\ -2 & x & -4 \\ -5 & 6 & 7 \end{bmatrix}$ is singular, then the value of x is

(A) –3 (B) 3

(C) $\frac{1}{3}$ (D) $\frac{-1}{3}$

Space For Rough Work

45. The characteristic roots of the matrix $A = \begin{bmatrix} 1 & 4 \\ 3 & 2 \end{bmatrix}$ is

(A) 5, 2 (B) –5, –2

(C) 5, –2 (D) –5, 2

46. If ${}^{n}C_{16} = {}^{n}C_{3}$, then the value of n is

(A) –19 (B) 19

(C) 13 (D) –13

47. The last term in the expansion of $\left(3x^2 + \frac{1}{2x^2}\right)^4$ is

(A) $\frac{1}{8x^8}$ (B) $\frac{1}{16x^8}$

(C) $81\,x^8$ (D) $12\,x^8$

48. The unit vector of $\vec{a} = 2i - 3j + 4k$ is

(A) $\frac{2i-3j+4k}{\sqrt{29}}$ (B) $\frac{2i-3j+4k}{\sqrt{11}}$

(C) $\frac{2i-3j+4k}{\sqrt{3}}$ (D) $\frac{\sqrt{29}}{2i-3j+4k}$

49. If $\vec{a} = i - 4j + 3k$ and $\vec{b} = -2i + j + 6k$, then the projection of $\vec{a}$ on $\vec{b}$ is

(A) $\frac{24}{\sqrt{41}}$ (B) $\frac{12}{\sqrt{26}}$

(C) $\frac{-12}{\sqrt{41}}$ (D) $\frac{12}{\sqrt{41}}$

Space For Rough Work

50. The area of triangle whose two sides are $\vec{a} = 3i + 4j + k$ and $\vec{b} = 5i + 6j + 2k$ is

(A) 3 sq. units (B) $\frac{1}{2}$ sq. units

(C) $\frac{3}{2}$ sq. units (D) $\frac{9}{2}$ sq. units

51. The simplification of $\frac{1}{1+\sin\theta} + \frac{1}{1-\sin\theta}$ is

(A) $2\cos^2\theta$ (B) $2\sec^2\theta$

(C) $\tan^2\theta$ (D) $2\operatorname{cosec}^2\theta$

52. The value of $\tan^2 30° + \sin^2 45° + \cos^2 90° + \cos^2 60°$ is

(A) $\frac{4}{3}$ (B) $\frac{13}{12}$

(C) $\frac{13}{24}$ (D) $\frac{25}{12}$

53. The simplification of $\frac{\sin(180°-A)\cos(360°-A)}{\tan(90°+A)\sin(-A)}$ is

(A) sin A (B) cosec A

(C) – sin A (D) – cosec A

54. If $\cos A = \frac{-3}{5}$ where $90° < A < 180°$, then the value of cot A is

(A) $\frac{3}{4}$ (B) $\frac{4}{3}$

(C) $\frac{-3}{4}$ (D) $\frac{-4}{3}$

Space For Rough Work

55. The value of cos 105° is

(A) $\frac{\sqrt{3}-1}{2\sqrt{2}}$ (B) $\frac{\sqrt{3}+1}{2\sqrt{2}}$

(C) $\frac{2\sqrt{2}}{1-\sqrt{3}}$ (D) $\frac{1-\sqrt{3}}{2\sqrt{2}}$

56. If $\tan\frac{A}{2} = \frac{1-\cos A}{\sin A}$, then the value of $\tan 22\frac{1}{2}^\circ$ is

(A) $\sqrt{2}+1$ (B) $1-\sqrt{2}$

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

57. The value of $\cos 5x \cdot \cos 3x$ is

(A) $\cos 8x + \cos 2x$ (B) $\frac{1}{2}(\cos 8x + \cos 2x)$

(C) $\frac{1}{2}(\sin 8x + \sin 2x)$ (D) $\frac{1}{2}(\cos 8x - \cos 2x)$

58. The simplified value of $\tan^{-1}\left(\frac{1}{2}\right) + \tan^{-1}\left(\frac{1}{3}\right)$ is

(A) $\frac{\pi}{4}$ (B) $\frac{\pi}{3}$

(C) 1 (D) $\tan^{-1}\left(\frac{1}{7}\right)$

59. Distance of a point P(– 2, 5) from the origin is

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

(C) $\sqrt{3}$ (D) 29

60. The co-ordinates of the point which divides the line joining the points A (8, 3) and B(–5, 6) in the ratio of 2 : 3 externally is

(A) (– 34, –3) (B) (34, 3)

(C) $\left(\frac{14}{5}, \frac{21}{5}\right)$ (D) (34, –3)

Space For Rough Work

61. The area of triangle with the vertices (5, 3), (4, 6) and (5, 8) is

(A) $\frac{15}{2}$ sq. units (B) 15 sq. units

(C) $\frac{5}{2}$ sq. units (D) $\frac{45}{2}$ sq. units

62. The slope of the line making an angle 150° with the x-axis is

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

(C) $\sqrt{3}$ (D) $-\sqrt{3}$

63. The two point form of a straight line is

(A) $y - y_1 = m(x - x_1)$ (B) $\frac{y - y_1}{x - x_1} = \frac{y_2 - y_1}{x_2 - x_1}$

(C) $\frac{y}{x} = \frac{y_2 - y_1}{x_2 - x_1}$ (D) $\frac{y - y_2}{x - x_2} = \frac{y_2 - y_1}{x_2 - x_1}$

64. The equation of straight line perpendicular to $2x + 5y - 8 = 0$ and passing through $(-1, 2)$ is

(A) $2x + 5y + 9 = 0$ (B) $5x - 2y + 1 = 0$

(C) $5x - 2y + 9 = 0$ (D) $5x + 2y - 9 = 0$

65. The value of $\lim_{x \to 3} \frac{2x^2 - 7x + 3}{2x - 6}$ is

(A) 3 (B) $\frac{2}{5}$

(C) $\frac{5}{2}$ (D) 5

Space For Rough Work

66. The value of $\lim_{x \to 0} \frac{\sqrt{1-\cos x}}{x}$ is

(A) $\frac{1}{\sqrt{2}}$ (B) $\sqrt{2}$

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

67. If $y = e^x (\cos x - \sin x)$, then $\frac{dy}{dx}$ is

(A) $2e^x \cos x$ (B) $-2e^x \cos x$

(C) $2e^x \sin x$ (D) $-2e^x \sin x$

68. If $x + y = \log x + \log y$, then $\frac{dy}{dx}$ at $x = -1$ and $y = 2$ is

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

(C) 4 (D) $\frac{1}{2}$

69. If $x = a \cos^2 \theta$ and $y = b \sin^2 \theta$, then $\frac{dy}{dx}$ is

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

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

70. The second derivative of $y = \log\left(\frac{1}{x}\right)$ is

(A) x (B) 1

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

Space For Rough Work

71. The equation of normal to the curve $y = (2x + 1)^2$ at $(-2, 0)$ is

(A) $x - 16y + 2 = 0$ (B) $x - 12y + 2 = 0$

(C) $x + 16y + 2 = 0$ (D) $x + 12y + 2 = 0$

72. The maximum value of the function $y = 2x^3 + 3x^2 - 36x$ is

(A) -44 (B) -30

(C) 81 (D) -81

73. The value of $\int \sin 3x \cos 2x \, dx$ is

(A) $\frac{-1}{2}\left[\frac{\cos 5x}{5} + \cos x\right] + C$ (B) $\frac{1}{2}\left[\frac{-\cos 5x}{5} + \cos x\right] + C$

(C) $\frac{1}{2}\left[\frac{\cos 5x}{5} + \cos x\right] + C$ (D) $\frac{-1}{2}[\cos 5x + \cos x] + C$

74. The value of $\int x^2 \sin(2x^3) \, dx$ is

(A) $\frac{-\cos(2x^3)}{6} + C$ (B) $\frac{-\cos(2x^3)}{3} + C$

(C) $12x^3 \cos(2x^3) + C$ (D) $\frac{\cos(2x^3)}{6} + C$

75. $\int \log x \, dx$ is

(A) $\frac{1}{x} + C$ (B) $\frac{1}{x} - x + C$

(C) $x \log x + x + C$ (D) $x \log x - x + C$

Space For Rough Work

76. The value of $\int_0^{\pi/2} \sqrt{1+\sin 2x}\, dx$ is

(A) 0 (B) 1

(C) 2 (D) -2

77. $\int_0^1 \frac{x}{1+x^4}$ is

(A) $\frac{\pi}{4}$ (B) $\frac{\pi}{8}$

(C) $\frac{-\pi}{8}$ (D) $\frac{-\pi}{4}$

78. The area formed by the curve $y = (2x + 1)^3$ between the ordinates $x = -1$ and $x = 1$ is

(A) $\frac{41}{4}$ sq. units (B) 2 sq. units

(C) 20 sq. units (D) 10 sq. units

79. The order and degree of differential equation $\left[1+\left(\frac{dy}{dx}\right)^4\right]^{2/3} = \frac{d^2y}{dx^2}$ is

(A) order 2 and degree 3 (B) order 2 and degree 1

(C) order 1 and degree 2 (D) order 1 and degree 4

80. The solution of differential equation $\sec^2 x \tan y\, dx + \sec^2 y \tan x\, dy = 0$ is

(A) $\tan^2 x + \tan^2 y = C$ (B) $\tan x + \tan y = C$

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

Space For Rough Work

PART – C

ELECTRICAL & ELECTRONICS

81. Current can be expressed as

(A) amp/sec (B) charge/sec

(C) farad (D) amp-hr/sec

82. The Resistance offered by opposite faces of a unit cube is

(A) specific conductance (B) specific current

(C) Resistivity (D) Conductivity

83. Temperature co-efficient of resistance is expressed as

(A) $\frac{R_1+R_2}{R_1(t_1)}$ (B) $\frac{R_2+R_1}{R_2(t_2)}$

(C) $\frac{R_1(t_2-t_1)}{R_1+R_2}$ (D) $\frac{R_2-R_1}{R_1(t_2-t_1)}$

84. A coil of 100 Ω resistance takes a current of 5 A power taken by the coil

(A) 2500 W (B) 250 W

(C) 5000 W (D) 2000 W

85. The ratio of capacitance of a material to the capacitance of air is _____ constant.

(A) Dielectric (B) Capacitive

(C) Air (D) Electric

86. During discharging of capacitor, discharge current _____ instantaneously.

(A) decreases (B) increases

(C) remain constant (D) sharp decrease

Space For Rough Work

87. The electrolyte used in a Nickel-Iron cell is

(A) H_2SO_4 (B) $2KOH_3$

(C) KOH (D) H_4SO_5

88. Ferromagnetic material looses its magnetic property at a temperature higher than

(A) Boiling point (B) Curie point

(C) Melting point (D) Saturation point

89. Insulating material used to insulate transformer winding is

(A) Mica paper (B) Leather

(C) Impregnated paper (D) Silica

90. When three resistances of R Ω each connected in Star, its equivalent delta resistances will be

(A) 3R each (B) 2R each

(C) R each (D) R/2 each

91. 1 weber of magnetic flux is _____ lines.

(A) 10^4 (B) 10^3

(C) 10^5 (D) 10^8

92. Unit of Reluctance is

(A) volt turns/web (B) amp turns/web

(C) watt turns/web (D) web/amp

93. Inductance 'L' can be expressed as

(A) N^2/M (B) S/N

(C) N^2/S (D) S^2/N^2

Space For Rough Work

94. Average value of a one complete cycle of symmetrical a.c. sine wave is

(A) 0.632 (B) 0

(C) 0.707 (D) 1.11

95. In a pure inductance current lags behind the voltage by

(A) π radians (B) $\pi/2$ radians

(C) $\pi/4$ radians (D) 0 radians

96. The conjugate of 2 + J3 is

(A) – 2 – J3 (B) – 2 + J3

(C) 2 – J3 (D) 2 * J3

97. In an RLC series, circuit at resonance circuit current is _____

(A) Minimum (B) Zero

(C) Moderate (D) Maximum

98. In a delta connected circuit the line voltage is

(A) $\sqrt{3}\, V_{ph}$ (B) $V_{ph}/\sqrt{3}$

(C) V_{ph} (D) $V_{ph}/3$

99. Addition of Pentavalent impurity to a semiconductor creates many

(A) Free holes (B) Free electrons

(C) Valance electrons (D) Bound electrons

100. Base current amplification factor β in a common emitter connection is

(A) $\frac{\Delta I_C}{\Delta I_B}$ (B) $\frac{\Delta I_E}{\Delta I_C}$

(C) $\frac{\Delta I_B}{\Delta I_C}$ (D) ΔI_E

Space For Rough Work

101. During Active region operation of a transistor

(A) Emitter diode is 'ON', collector diode is "OFF"

(B) Emitter diode and collector diode are "OFF"

(C) Emitter diode and collector diode are "ON"

(D) Emitter diode "OFF", collector diode "ON"

102. Photodiode is normally

(A) Forward biased (B) Reverse biased

(C) No biasing (D) Emits light

103. Octal equivalent of $(76)_{10}$ is

(A) $(115)_8$ (B) $(104)_8$

(C) $(114)_8$ (D) $(114)_{10}$

104. Binary equivalent of Hexadecimal no. $(9F2)_{16}$ is

(A) 100111100001 (B) 100100110

(C) 1001011101 (D) 100111110010

105. Digital circuit can be made by the repeated use of _____ gate.

(A) OR (B) NAND

(C) AND (D) EXOR

106. Simplification of

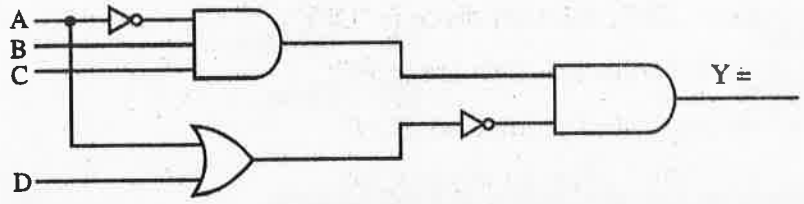
$Y = 1 + A(B \cdot \overline{C} + BC + \overline{B}C) + A\overline{B}C + AC$ is

(A) $A + B$ (B) $A - B$

(C) $\overline{A}$ (D) 1

Space For Rough Work

107. Boolean expression of output to the following logic circuit is _____



(A) $A\bar{B}C\ (A+B)$ (B) $\bar{A}B\ (A-D)$

(C) $\bar{A}BC \cdot (\overline{A+D})$ (D) $(\overline{A+D}) + (\bar{A} \cdot BC)$

108. The time difference between the application of input & occurrence of output is

(A) Threshold (B) Propagation delay

(C) Logical (D) Noise time

109. CMOS logic family uses only

(A) MOSFETs (B) Transistors

(C) Resistor & Diodes (D) XMOS

110. The commonly used filter circuit for effective filtering is

(A) LC (B) LM

(C) Capacitor (D) PIE

111. Crossover distortion occurs in the _____ amplifier.

(A) Class A (B) Push-Pull

(C) Class C (D) Class AB

112. Frequency of oscillation of a crystal is

(A) K^2/t (B) $K \cdot t$

(C) K/t (D) K/t^2

Space For Rough Work

113. Feedback element in an Op-Amp differentiator circuit is

(A) Capacitor (B) Inductor

(C) Resistance (D) Zener

114. Boolean expression for carry output of a full adder is

(A) $(A \oplus B)\, C + AB$ (B) $(A + B) \oplus C + AB$

(C) $(A \oplus B)\, C + (A \oplus B)$ (D) $(\overline{A \oplus B}) \cdot C + \overline{AB}$

115. When the inputs of JK flip-flop, J & K short circuited results in _____ flip-flop.

(A) D (B) M/S

(C) S/M (D) T

116. No. of clock pulses required to load 1011 data into SISO register is

(A) 4 (B) 8

(C) 12 (D) 16

117. Asynchronous counter is also called as _____ counter.

(A) Ring (B) Parallel

(C) Ripple (D) Robin

118. Which one of the following IC is a encoder ?

(A) 74147 (B) 7447

(C) 7400 (D) 7442

119. Op-Amp used in counter type ADC functions as

(A) Inverter (B) Comparator

(C) Voltage follower (D) Subtractor

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120. Emf generated in a wave connected d.c. generator is

(A) Inversely proportional to poles.

(B) Inversely proportional to speed.

(C) Directly proportional to frequency.

(D) Directly proportional to speed.

121. If the polarity of field is reversed in a d.c. shunt generator, then

(A) it fails to run.

(B) runs in reverse direction.

(C) it fails to buildup voltage.

(D) it builds up to maximum voltage.

122. Torque in a D.C. series motor is _____

(A) $\propto 1/I_a^2$

(B) $\propto I_a^2$

(C) $\propto I_a$

(D) $\propto 1/I_a$

123. Speed of d.c. motor can be controlled below the rated speed by _____ method.

(A) Armature control

(B) Flux control

(C) Field control

(D) Rheostatic control

124. Voltage equation of a d.c. motor is

(A) $V = E_b - I_aR_a$

(B) $V = E_b + I_aR_a$

(C) $V = E_b + I_aR_{sh}$

(D) $V = E_b - I_aR_{sh}$

125. The rotor of the following motor is a smooth chrome-steel cylinder with high retentivity :

(A) Repulsion motor

(B) Universal motor

(C) Reluctance motor

(D) Hysteresis motor

126. _____ winding tends to maintain balanced 3ϕ voltage under unbalanced load condition.

(A) LAP

(B) WAVE

(C) DAMPER

(D) COPPER

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127. According to synchronous impedance method Z_s =

(A) $\frac{\text{Open ckt voltage}}{\text{Short ckt current}}$ (B) $\frac{\text{Open ckt current}}{\text{Short ckt current}}$

(C) $\frac{\text{Short ckt voltage}}{\text{Open ckt current}}$ (D) $\frac{\text{Short ckt current}}{\text{Open ckt voltage}}$

128. The armature reaction mainly depends on _____ in an alternator.

(A) Power input (B) Power factor of load

(C) Commutator (D) Impedance

129. Average rate of change of flux in a transformer is

(A) $\frac{\phi m}{4}$ (B) $\phi m/2$

(C) $\frac{\phi m}{(1/2f)}$ (D) $\frac{\phi m}{(1/4f)}$

130. Impedance of a transformer can be determined by _____ test.

(A) Swinburns (B) Hopkinson

(C) Short circuit (D) Open ckt

131. Which of the following equipment is generally used for arc welding ?

(A) Transformer (B) 3ϕ alternator

(C) Generator (D) Motor

132. Scott connection of 3ϕ transformer is also called as

(A) V-V connection (B) T-T connection

(C) L-L connection (D) Open delta connection

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133. Which of the following motor has flat stator & flat squirrel cage rotor ?

(A) Sector IM (B) Wound Rotor IM

(C) Non-linear IM (D) Linear IM

134. Induction motor can be generalized as

(A) D.C. series motor (B) Repulsion motor

(C) Transformer (D) Universal motor

135. The tendency of squirrel cage type IM running at one-seventh of its N_s is

(A) Crawling (B) Sprawing

(C) Cogging (D) Magnetic locking

136. Synchronous motor is electrically identical to

(A) Induction generator (B) Alternator

(C) Induction motor (D) D.C. generator

137. If E_b in a synchronous motor is greater than supply voltage V, then the armature current I

(A) in phase with voltage (B) lags the voltage

(C) leads the voltage (D) becomes zero

138. The starting winding of 1ϕ IM is placed in the

(A) Rotor (B) Armature

(C) Field (D) Stator

139. If damping torque is more than critical damping, the instrument is called

(A) over damped (B) under damped

(C) critical damped (D) level damped

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140. Moving coil instrument has ____ scale.

(A) non-uniform (B) uniform

(C) nonlinear (D) squared

141. Minimum number of watt meters require to measured 3ϕ balanced/unbalanced power is

(A) One (B) Three

(C) Two (D) One LPF

142. Range extension of a.c. ammeters and voltmeters can be done by

(A) only CT (B) only PT

(C) Shunts and multipliers (D) C.T & P.T. respectively.

143. Secondary of C.T. should always be kept

(A) Short circuited (B) Open circuited

(C) Vertical (D) Horizontal

144. Shading ring in an energy meter is also called _____ compensator.

(A) Load (B) Power factor

(C) Power (D) Supply

145. If the water head is less than 30 m that hydro plant is _____ head plant.

(A) Light (B) High

(C) Low (D) Medium

146. _____ are used to slowdown the neutrons released during fission in nuclear power plant.

(A) Moderators (B) Modulators

(C) Mixers (D) Moulders

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147. Annual load factor is determined from _____ curve.

(A) Daily load (B) Monthly load

(C) Annual load (D) Annual speed-time

148. Diversity factor is given by

(A) $\frac{\text{Individual Average Demand}}{\text{Average Demand}}$ (B) $\frac{\text{Sum of individual max. demands}}{\text{Max. demand of power station}}$

(C) $\frac{\text{Average Demand}}{\text{Max. Demand}}$ (D) $\frac{\text{Max. Demand of power}}{\text{Average demand of load}}$

149. _____ is a feed water heater driving heat from fuel gases discharged from boiler.

(A) Ecologer (B) Reactor

(C) Emitter (D) Economiser

150. Hydrograph is the curve drawn between

(A) Time and Load (B) Discharge and Time

(C) Charge and Voltage (D) Current and Power

151. After firing SCR, the gate pulse is removed. The current in SCR will

(A) immediately fall to zero (B) rise to max value

(C) rise a little and then fall to zero (D) Remain the same

152. The function of a snubber circuit connected across SCR is to

(A) supress dv/dt (B) increase dv/dt

(C) decrease dv/dt (D) keep transients at constant value

153. In a normal 3ϕ SCR controlled rectifier an SCR cannot be fired during first _____ of anode voltage

(A) 20° (B) 30°

(C) 45° (D) 90°

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154. The firing angle can be controlled in RC firing ckt from

(A) 0 to 90° (B) 0 to 260°

(C) 0 to 180° (D) 0 to 275°

155. the duty cycle of a chopper circuit is expressed as

(A) $t_{ON} + t_{OFF}$ (B) t_{ON} / t_{OFF}

(C) $\frac{1}{t_{ON} + t_{OFF}}$ (D) $\frac{t_{ON} + t_{OFF}}{t_{ON}}$

156. SMPS uses _____ transformer.

(A) Iron core (B) Steel core

(C) Ferrite core (D) Air core

157. Buck converter can be used as

(A) Step down transformer (B) D.C. Step down transformer

(C) D.C. Step up transformer (D) A.C. Step up transformer

158. _____ circulates energy stored in the load inductor into the load itself.

(A) Free wheeling diode (B) Zener diode

(C) Free wheeling resistor (D) Bleeder resistor

159. _____ is a 3 terminal bidirectional switch.

(A) BJT (B) DIAC

(C) UJT (D) TRIAC

160. Latching current of an SCR is _____ than the holding current.

(A) smaller (B) lesser

(C) greater (D) equal to

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161. Specification of Fiber optic cable is given in terms of

(A) alteration (B) attenuation

(C) amperes (D) hertz

162. Frequency range of micro wave is

(A) > 1 GHz (B) < 1 GHz

(C) 3000 Hz (D) 3 MHz

163. Klystron works on the principle of _____ modulation.

(A) amplitude (B) frequency

(C) velocity (D) phase

164. Central node of star topology is called

(A) Station (B) WEB

(C) PSTN (D) HUB

165. Fast Ethernet has _____ data rate.

(A) 10 Mbps (B) 100 Mbps

(C) 1000 Mbps (D) 100 kbps

166. Encryption of data handled by _____ layer.

(A) Presentation (B) Network

(C) Data link (D) Session

167. If the dielectric strength builds up between the contacts more rapidly than restriking voltage, then arc will be

(A) distinguished (B) increased

(C) extinguished (D) explosion takes place

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168. Overload protection is not generally provided for

(A) Alternator (B) Synchronous motor

(C) Generator (D) Transformer

169. Current chopping mainly occurs in _____ circuit breaker.

(A) Oil (B) Min oil

(C) SF6 (D) Air blast

170. Distance relay is also called as _____ relay.

(A) Resistance (B) Impedance

(C) Over current (D) Reverse power

171. _____ drive is also a line shaft drive.

(A) Multi motor (B) Group

(C) Individual (D) Belt

172. Ideal electric motor used in Electric traction is _____ motor.

(A) D.C. Series (B) Stepper

(C) 1ϕ Induction (D) Repulsion

173. The tractive effort F_t during free run period when train moving down gradient is

(A) $F_a + F_r$ (B) $F_g + F_r$

(C) $F_a + F_g + F_r$ (D) $F_a - F_g + F_r$

174. Electric motor normally used in crushers and cranes is _____ motor.

(A) 3ϕ Hysteresis (B) A.C. Servo motor

(C) Double squirrel cage (D) BLDC Motor

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175. Graphical representation of run of a vehicle is called _____ curve.

(A) Current-time (B) Speed-time

(C) Distance-time (D) Velocity-time

176. _____ method of heating is used for heating insulators.

(A) Arc (B) Resistance

(C) Induction (D) Dielectric

177. _____ welding is not a resistance welding process.

(A) Projection (B) Seam

(C) Carbon arc (D) Flush

178. Which of the following is a refrigerant ?

(A) SO_2 (B) NO_2

(C) PbO_2 (D) NiFe

179. A Mercury vapour lamp gives _____ light.

(A) White (B) Greenish blue

(C) Yellow (D) Red

180. The unit of luminous flux is

(A) W/m^2 (B) $lumen/m^2$

(C) W/m^3 (D) lumen

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