DIPLOMA – COMMON ENTRANCE TEST-2013

| **EC** | COURSE | DAY : SUNDAY DATE : 30-JUNE-2013 |
| | ELECTRONICS AND COMMUNICATION ENGINEERING | TIME : 9.00 a.m. to 12.00 Noon |

| 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	**117449**

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 08.50 a.m.
3. The serial number of this question booklet should be entered on the OMR answer sheet.
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 9.00 a.m., till then;
   - Do not remove the seal / staple present on the right hand side of this question booklet.
   - Do not look inside this question booklet.
   - Do not start answering on the OMR answer sheet.

IMPORTANT INSTRUCTIONS

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 9.00 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 ballpoint 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 : |
| ① ● ③ ④ |

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 12.00 Noon**, 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.**

[P.T.O.

DO NOT WRITE HERE

PART – A

It consists of **1 – 40** questions.

1. If $\begin{vmatrix} x+2 & 5 \\ 0 & x-2 \end{vmatrix} = 0$, then $x =$

   (1) 1   (2) 2

   (3) 3   (4) 0

2. In solving the equations by Cramer's rule for $5x - 3y = 1$ and $2x - 5y = -11$, the value of x and y is

   (1) $(3, 2)$ (2) $(-3, -2)$

   (3) $(2, 3)$ (4) $(-2, -3)$

3. If $A = \begin{bmatrix} 2 & 0 & 0 \\ 1 & 2 & 0 \\ 1 & 1 & 2 \end{bmatrix}$ then A adj A is

   (1) Diagonal   (2) Scalar

   (3) Identity   (4) Zero matrix

4. The minor of the element 6 in a matrix $A = \begin{bmatrix} 2 & -3 & 0 \\ 4 & 1 & 6 \\ 3 & 2 & 0 \end{bmatrix}$ is

   (1) 10   (2) 11

   (3) 12   (4) 13

5. The characteristic equation of the matrix $A = \begin{bmatrix} 5 & -3 \\ 2 & 1 \end{bmatrix}$ is

   (1) $\lambda^2 - 6\lambda + 11 = 0$ (2) $\lambda^2 - 6\lambda - 11 = 0$

   (3) $\lambda^2 + 6\lambda + 11 = 0$ (4) $-\lambda^2 + 6\lambda = 0$

SPACE FOR ROUGH WORK

A-1

6. The fourth term in the expansion of $\left(\sqrt{3}+2\right)^7$ is

(1) 2520

(2) – 2520

(3) 1/2520

(4) – 1/2520

7. The constant term in the expansion $(x^2 + 1/x)^{12}$ is

(1) – 495

(2) 495

(3) 1/495

(4) 945

8. The projection of vector $(3, 1, 3)$ on vector $(1, -2, 1)$ is

(1) $2\sqrt{6}/5$

(2) $-2\sqrt{6}/3$

(3) $2\sqrt{6}/3$

(4) $-2\sqrt{6}/5$

9. If vector $a = (1, 1, 1)$ and vector $b = (2, 2, 1)$ then magnitude of vector $a \times b$ is

(1) $\sqrt{26}$

(2) $\sqrt{28}$

(3) $\sqrt{24}$

(4) 1

10. The cosine of the angle between the vectors $(3, -1, 1)$ and vector $(1, 1, -1)$ is

(1) $1/\sqrt{11}$

(2) $-1/\sqrt{33}$

(3) $1/\sqrt{33}$

(4) $-1/\sqrt{11}$

11. The value of $(\sec^6 x - \tan^6 x)$ is

(1) $1 - 3\sec^2 x \tan^2 x$

(2) $1 + \tan^2 x \sec^2 x$

(3) $1 + 3\sec^2 x \tan^2 x$

(4) $1 - \tan^2 x \sec^2 x$

SPACE FOR ROUGH WORK

A-1

12. If x cot 45° cos 60° = sin 60° tan 30° then the value of x is

    (1) $\sqrt{3}$

    (2) $\sqrt{3}/2$

    (3) 1/2

    (4) 1

13. If tan x = 15/8 and x is in the III quadrant then the value of
    (2 sin x – 3 cos x) / (2 cos x + 3 sin x) is

    (1) 61/6

    (2) – 61/6

    (3) – 6/61

    (4) 6/61

14. The value of {[sin (2π – θ) + cos (– θ)] / [tan (– θ) + cot (2π + θ)]} – {[sin (π/2 + θ)
    + cos (3π/2 – θ)] / [cot (π + θ) + tan (2π – θ)]} is

    (1) 0

    (2) – 1

    (3) + 1

    (4) – 2

15. If sin A = 5/13 and sin B = 4/5 then the value of cos (A – B) is

    (1) 65/56

    (2) 56/65

    (3) 16/65

    (4) – 16/65

16. On simplification the value of $(\cos^3 A - \cos 3A) / \cos A + (\sin^3 A + \sin 3A) / \sin A$ is

    (1) 3

    (2) 1

    (3) 2

    (4) 0

17. The value of (sin 100° + sin 20°) / (cos 100° + cos 20°) is

    (1) $\sqrt{3}/2$

    (2) 1/2

    (3) $\sqrt{3}$

    (4) 1

18. The value of $(\tan^{-1} 5/6 + \tan^{-1} 1/11)$ is

    (1) 30°

    (2) 60°

    (3) 90°

    (4) 45°

SPACE FOR ROUGH WORK

A-1

[P.T.O.

19. If the points $(-3, K)$, $(5, 7)$ and $(-11, 1)$ are collinear, then the value of K is

    (1) 4   (2) 3

    (3) 2   (4) 1

20. The ratio of the line join of the points $(2, 3)$ and $(-5, 6)$ divided by y – axis is

    (1) $5 : 2$ (2) $2 : 5$

    (3) $3 : 2$ (4) $2 : 3$

21. Three vertices of a triangle are $(-2, 3, 1)$, $(-1, 4, 2)$ and $(-6, 5, 2)$, then the centroid of the triangle is

    (1) $(-3, 4, 1)$ (2) $(0, 5/3, 1/3)$

    (3) $(4, 3, 1)$ (4) $(-3, -4, -2)$

22. The equation to the straight line passing through $(3, 2)$ and perpendicular to the line $5x + 2y - 3 = 0$ is

    (1) $2x - 5y - 4 = 0$

    (2) $2x - 5y + 4 = 0$

    (3) $2x + 5y + 4 = 0$

    (4) $5x - 2y + 4 = 0$

23. The slope of a line passing through the points $(-4, -5)$ and $(2, 3)$ is

    (1) $3/4$ (2) $-3/4$

    (3) $4/3$ (4) $-4/3$

24. The acute angle between the lines $2x - y + 3 = 0$ and $x - 3y + 2 = 0$ is

    (1) $30°$ (2) $60°$

    (3) $90°$ (4) $45°$

SPACE FOR ROUGH WORK

A-1

25. The value of $\lim_{n\to\infty} [(3-n)(4-n)(2n-5)]/(4n^3-3)$

(1) $-1/2$
(2) $1/2$
(3) $3/2$
(4) $-3/2$

26. The value of $\lim_{x\to-3} (x^4-81)/(x^3+27)$ is

(1) 3
(2) -3
(3) 4
(4) -4

27. $d/dx\left(\sqrt{\sin^2 x}\right.$ is

(1) $\cos x$
(2) $\sin 2x$
(3) $\cos^2 x$
(4) $\sqrt{\cos x/\sin x}$

28. $d/dx \tan^{-1}\sqrt{(1-\cos 2x)/(1+\cos 2x)}$ is

(1) 1
(2) 0
(3) $\tan x$
(4) $\cos x$

29. If $y = \sin x^x$ then dy/dx is

(1) $x \log \sin x$
(2) $\cos x^x$
(3) $\sin x^x (x \cot x + \log \sin x)$
(4) $\cos x^x (x \tan x + \log \sec x)$

30. $d/dx\left(\sin h^{-1} x\right)$ is

(1) $1/\sqrt{1+x^2}$
(2) $1/\sqrt{1-x^2}$
(3) $1/\sqrt{x^2-1}$
(4) $1/\sqrt{x^2+1}$

SPACE FOR ROUGH WORK

A-1

[P.T.O.

31. The equation to the normal to the curve $y = 5x^2 + 4x - 11$ at the point $(-1, 2)$ is

    (1) $x - 6y + 11 = 0$

    (2) $x + 6y - 11 = 0$

    (3) $6x - y + 11 = 0$

    (4) $6x + y - 11 = 0$

32. The volume of a sphere is increasing at the rate of 4π c.c/sec, then the rate of increase of the radius is when the volume is $288\ \pi$ cc

    (1) 6 cm/sec   (2) 1/6 cm/sec

    (3) 1/36 cm/sec   (4) 36 cm/sec

33. $\int \sin^2 x\ dx$ is

    (1) $\cos x + c$ (2) $x/2 - (\sin 2x)/4 + c$

    (3) $x/2 + (\cos 2x)/4 + c$ (4) $x/2 + (\sin 2x)/4 + c$

34. $\int (3x^2 + x - 1)^6 (6x + 1)\ dx$ is

    (1) $6 (3x^2 + x - 1)^5 + c$ (2) $(3x^2 + x - 1)^6 + c$

    (3) $(3x^2 + x - 1)^7 / 7 + c$ (4) $(3x^2 + x - 1)^7 / 21 + c$

35. $\int \tan^{-1} x\ dx$ is

    (1) $x \tan^{-1} x - 1/2 \log (1 + x^2) + c$

    (2) $x \tan^{-1} x + 1/2 \log (1 + x^2) + c$

    (3) $\tan^{-1} x - 1/2 \log (1 + x^2) + c$

    (4) $\tan^{-1} x + 1/2 \log (1 + x^2) + c$

SPACE FOR ROUGH WORK

A-1

36. $\int_0^{\pi/2} \sin 3x \cos 2x \, dx$ is

    (1) 3/5　　　　　　　　　　(2) – 3/5
    (3) 5/3　　　　　　　　　　(4) – 5/3

37. $\int_0^2 (x-1)(x-2) \, dx$ is

    (1) 2/3　　　　　　　　　　(2) – 2/3
    (3) 3/2　　　　　　　　　　(4) – 3/2

38. The area bounded by the curve $y = 2x^2$, the x – axis and the ordinates at x = – 1 and x = 2 is

    (1) – 6 sq units

    (2) 3 sq units

    (3) – 3 sq units

    (4) 6 sq units

39. The differential equation formed by eliminating a and b from $x + y = ae^x + be^{-x}$ is

    (1) $d^2y/dx^2 + y = 0$

    (2) $d^2y/dx^2 - y = 0$

    (3) $d^2y/dx^2 - x - y = 0$

    (4) $d^2y/dx^2 + x - y = 0$

40. The solution of the differential equation $dy/dx = (1 + y^2) / (1 + x^2)$ is

    (1) $\tan^{-1} y + \tan^{-1} x + c = 0$

    (2) $\log(1 + y^2) + \log(1 + x^2) + c = 0$

    (3) $\tan^{-1} y - \tan^{-1} x + c = 0$

    (4) $\log(1 + y^2) - \log(1 + x^2) + c = 0$

SPACE FOR ROUGH WORK

PART – B

It consists of **41-80** Questions :

41. The prefix "mega" stands for
    - (1) 10^3
    - (2) 10^{-3}
    - (3) 10^{-6}
    - (4) 10^6

42. Which of the following is dimensional physical quantity ?
    - (1) pressure
    - (2) strain
    - (3) mechanical advantage
    - (4) sp.gravity

43. The principle of vernier is
    - (1) n VSD = (n + 1) MSD
    - (2) (n – 1) VSD = n MSD
    - (3) n MSD = (n – 1) V SD
    - (4) (n – 1) MSD = n VSD

44. A screw gauge has a pitch of $\frac{1}{2}$ mm and 50 division on sleeve. The reading when the jaws touch is +5 division. While gripping a wire the reading is PSR = 3 PSD and HSR = 17, then the diameter of wire is
    - (1) 1.62 cm
    - (2) 0.162 cm
    - (3) 0.162 mm
    - (4) 16.2 mm

45. The extension of the material by itself without increase of load takes place
    - (1) within elastic limit
    - (2) beyond elastic limit
    - (3) beyond yield point
    - (4) at breaking point

46. If the strain in a wire is 0.1%, then the change in the length of the wire of length 5 m is
    - (1) 5×10^{-2} m
    - (2) 5×10^{-3} m
    - (3) 5×10^{-4} m
    - (4) 5×10^{-3} cm

SPACE FOR ROUGH WORK

A-1

47. Poisson's ratio is the ratio of

(1) $\dfrac{\textit{Lateral strain}}{\textit{Linear strain}}$

(2) $\dfrac{\textit{Linear strain}}{\textit{Lateral strain}}$

(3) $\dfrac{\textit{Lateral strain}}{\textit{Volume strain}}$

(4) $\dfrac{\textit{Volume strain}}{\textit{Lateral strain}}$

48. The pressure at a depth of 100 m below the surface of water density 1000 kgm^{-3} is

(1) $98 \times 10^5\ Nm^{-2}$

(2) $9.8 \times 10^4\ Nm^{-2}$

(3) $980 \times 10^4\ Nm^{-2}$

(4) $98 \times 10^4\ Nm^{-2}$

49. When two capillary tube of different diameters are dropped vertically in a liquid, the height of the liquid is

(1) More in the tube of larger diameter

(2) More in the tube of smaller diameter

(3) Lesser in the tube of smaller diameter

(4) Same in both the tubes

50. The property by virtue of which a liquid opposes relative motion between its different layers is

(1) Viscosity

(2) Elasticity

(3) Surface tension

(4) Inertia

51. The maximum amount of force acting for a short duration is known as

(1) Momentum

(2) Inertia

(3) Power

(4) Impulse

52. A bullet of mass 0.01 kg is fired from a rifle of mass 20 kg with a speed of 10 m/s , then the recoil velocity of rifle is _____ m/s.

(1) –1

(2) –0.05

(3) –200.01

(4) –0.005

SPACE FOR ROUGH WORK

A-1

[P.T.O.

53. Final velocity of a body thrown downwards is _____

(1) Maximum

(2) Minimum

(3) No change

(4) Zero

54. A person throws a sand bag from a boat at rest in a pond then boat moves
    (1) In the same direction
    (2) In the opposite direction
    (3) In a perpendicular direction
    (4) In circular direction

55. Two equal forces at a point, the square of their resultant is equal to three times the product of the forces. Then the angle between the forces is equal to

(1) 30°

(2) 45°

(3) 60°

(4) 90°

56. Equilibrant is a force
    (1) Which brings a body in equilibrium
    (2) Which moves the body along the resultant force
    (3) in zig-zag movement of the body
    (4) Which moves the body in opposite direction to equilibrant force

57. A force of 10 N acting on a body fixed at a point the distance from the fixed point to the line of force is 2 m. Then the moment of the force is _____ N-m.

(1) 0.002

(2) 0.02

(3) 2

(4) 20

58. By Lami's theorem, P Q R are three forces acting in equilibrium and angle between PR, PQ, QR, are α, β, γ respectively then which of the following is correct ?

(1) $\dfrac{P}{\sin\beta} = \dfrac{Q}{\sin\gamma} = \dfrac{R}{\sin\alpha}$

(2) $\dfrac{P}{\sin\gamma} = \dfrac{Q}{\sin\alpha} = \dfrac{R}{\sin\beta}$

(3) $\dfrac{P}{\sin\alpha} = \dfrac{Q}{\sin\beta} = \dfrac{R}{\sin\gamma}$

(4) $\dfrac{P}{\sin\alpha} = \dfrac{Q}{\sin\gamma} = \dfrac{R}{\sin\beta}$

SPACE FOR ROUGH WORK

A-1

59. If the line of action of the force passes through the point of rotation, then the moment of force is

(1) Maximum
(2) Less than one
(3) Greater than one
(4) Zero

60. 1 Kilo calorie of heat is equal to _____ joule.

(1) 4.186
(2) 41.86
(3) 418.6
(4) 4186

61. The correct relation between °F and K scale is

(1) $5K = 9 (F - 32)$

(2) $9K = -5(F - 32)$

(3) $K = \dfrac{9}{5} (F - 32) - 273$

(4) $K = \dfrac{5}{9} (F - 32) + 273$

62. Absolute zero is the temperature of a gas at which, the _____ of gas is theoretically zero.

(1) Mass
(2) Weight
(3) Volume
(4) Density

63. When the particle is in SHM having amplitude ' r ', then its velocity is

(1) $v = \omega (r^2 - y^2)$
(2) $v = \omega\sqrt{r^2 - y^2}$
(3) $v = r\omega^2$
(4) $v = r\omega^3$

64. Ripples in water are the example for

(1) Transverse wave
(2) Longitudinal wave
(3) Sound wave
(4) Ultrasonic wave

SPACE FOR ROUGH WORK

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[P.T.O.

65. The length of one ventral segment in stationary wave is equal to

    (1) Full wavelength of the wave

    (2) Twice the wavelength of the wave

    (3) Half a wavelength of the wave

    (4) Quarter a wavelength of the wave

66. A stretched string under a tension T vibrates with a frequency f. When the tension is increased by 4 times, then the frequency becomes _____

    (1) same   (2) doubled

    (3) tripled   (4) zero

67. The best value of reverberation time for speech listener _____

    (1) 0.5 to 1.5 s   (2) 0.15 to 0.5 s

    (3) 0.05 to 0.15 s   (4) 0.5 to 5 s

68. 3 strings of equal lengths but stretched with different tensions are made to vibrate, if their masses per unit length are in the ratio 3:2:1 and frequencies are same then the ratio of the tensions _____

    (1) 1:2:3   (2) 2:3:1

    (3) 1:3:2   (4) 3:2:1

69. Newton's formula for velocity of sound was corrected by

    (1) Boyle   (2) Charles

    (3) Laplace   (4) Hertz

70. Light waves are composed of both electric and magnetic field is proposed by

    (1) Newton's corpuscular theory

    (2) Huygen's wave theory

    (3) Maxwell's theory of light

    (4) Plank's theory

SPACE FOR ROUGH WORK

A-1

71. If 'a' and 'b' are the amplitudes of two interfering waves then for destructive interference the amplitude ' R' is

(1) R = ab

(2) R = a/b

(3) R = a − b

(4) R = a + b

72. Two coherent sources 2×10^{-4} m apart are illuminated by the light of wave length 5000×10^{-10} m. The distance between the source and screen is 0.2m, then fringe width is

(1) 0.05×10^{-3} m

(2) 5×10^{-3} m

(3) 0.5×10^{-3} m

(4) 50×10^{-3} m

73. Resolving power of microscope is

(1) Equal to the resolution of the microscope

(2) Reciprocal to the resolution of the microscope

(3) Reciprocal to the focal length of the microscope

(4) Product of wave length and semi vertical angle

74. Which of the following phenomenon confirm that light is transverse wave ?
(1) Diffraction
(2) Interference
(3) Refraction
(4) Polarization

75. In Field emission
(1) High positive voltage is used
(2) Secondary electrons are used
(3) High energy is used
(4) High radiations are used

SPACE FOR ROUGH WORK

A-1

[P.T.O.

76. Which of the following is not true ?

    (1) Photoelectric emission is an instantaneous process

    (2) Photoelectric emission do not takes place below threshold frequency

    (3) The K.E. of the photoelectron depends on the wavelength of incident radiation

    (4) Number of photoelectrons emitted is directly proportional to the intensity

77. The appearance of additional frequencies in scattered beam of light is known as

    (1) Raman effect

    (2) Coherent scattering

    (3) Incoherent scattering

    (4) Bipolar scattering

78. Two properties of LASER are

    (1) Highly monochromatic and extremely intense

    (2) Highly chromatic and extremely fast

    (3) Very high frequency and extremely high wave length

    (4) Very high power and extremely low amplitude

79. To form a galvanic cell

    (1) difference in concentration of electrolyte is required

    (2) difference in concentration of frequency is required

    (3) difference in concentration of amplitude is required

    (4) both (2) and (3)

80. pH value is not having its application in

    (1) determination of quality of soil

    (2) determination of quality of textile dyes

    (3) determination of quality of chemicals

    (4) determination of quality of electron

SPACE FOR ROUGH WORK

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PART – C

It consists of **81-180** Questions :

81. Two resistors of resistance 10 ohms and 20 ohms are connected in parallel, the effective resistance of the combination is _____ ohms.

    (1) 30
    (2) 1/30
    (3) 200/30
    (4) 30/200

82. The meters used by KPTCL for billing show the energy consumed in

    (1) Joules
    (2) Watt-hours
    (3) Watt-seconds
    (4) KWh

83. The unit of "Rate of doing work" is

    (1) Joule
    (2) Watt
    (3) Watt-hour
    (4) None of these

84. In a transformer

    (1) Iron losses vary with load
    (2) Copper losses vary with load
    (3) Copper losses are independent of load
    (4) None of these

85. The fastest of the following relays is _____ relay.

    (1) Reed
    (2) Thermal
    (3) Electromagnetic
    (4) Solid state

86. In a series RLC circuit, if X_L is lower than X_c , then Phase angle is

    (1) zero
    (2) below 90° lagging
    (3) below 90° leading
    (4) 180°

SPACE FOR ROUGH WORK

A-1

[P.T.O.

87. By default, all a.c values are _____ values.

(1) average

(2) peak

(3) r.m.s.

(4) peak to peak

88. A PIN diode is frequently used as

(1) Voltage regulator

(2) Peak detector

(3) Harmonic generator

(4) High speed switch

89. If V_{cc} = +18 V, voltage-divider resistor R_1 is 4.7 kΩ, and R_2 is 1500 Ω, what is the base bias voltage ?

(1) 8.70V

(2) 4.35V

(3) 2.90V

(4) 0.7V

90. With a PNP circuit, the most positive voltage is probably

(1) Ground

(2) V_c

(3) V_{be}

(4) V_{cc}

91. With a JFET, a ratio of output current change against an input voltage change is called

(1) transconductance

(2) drain resistance

(3) resistivity

(4) gain

92. Once a DIAC is conducting, the only way to turn it off is with

(1) a positive gate voltage

(2) a negative gate voltage

(3) low-current dropout

(4) breakover

93. To get a negative gate-source voltage in a self-biased JFET circuit, one must use a

(1) voltage divider

(2) source resistor

(3) ground

(4) negative gate supply voltage

SPACE FOR ROUGH WORK

A-1

94. When checking a good SCR or TRIAC with an ohmmeter it will
    (1) show high resistance in both directions
    (2) show low resistance with positive on anode and negative on cathode, and high resistance when reversed
    (3) show high resistance with negative on anode and positive on cathode, and low resistance when reversed
    (4) show low resistance in both directions

95. The percentage resolution of an n-bit D/A converter can be computed from
    (1) Percentage resolution = $\{ 1/(2^n - 1)\} \times 100$
    (2) Percentage resolution = $n/100$
    (3) Percentage resolution = $100/2^n$
    (4) Percentage resolution = $(2^{n-1})/100$

96. Stack memory is used to
    (1) provide additional memory to base memory
    (2) save return addresses of a subroutine
    (3) save the status of the microprocessor
    (4) both (2) and (3)

97. Consider a hypothetical number system with a radix of 3 and its three independent digits as 0,2 and 4. The number that would come immediately after 444 is
    (1) 2000
    (2) 4444
    (3) 4440
    (4) 4000

98. Identify the bipolar logic family.
    (1) TTL
    (2) ECL
    (3) I^2L
    (4) All of them

99. The memory device has both high-density, high-speed access and in-circuit electrical eras ability feature is
    (1) EEPROM
    (2) UV EPROM
    (3) Cache memory
    (4) Flash memory

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[P.T.O.

100. The theoretical dividing line between Reduced Instruction Set Computing (RISC) chips and Complex Instruction Set Computing (CISC) chips is

   (1) number of pins in the chip

   (2) number of address and data lines

   (3) instruction execution rate to be one instruction per clock cycle

   (4) none of these

101. $(13)_{10}$ in the Excess-3 code will be

   (1) 01000110

   (2) 00010011

   (3) 00010000

   (4) 01000100

102. A five bit counter

   (1) has a modulus of 5

   (2) has a modulus of 10

   (3) has a modulus of 25

   (4) has a modulus that is less than or equal to 32

103. SRAM devices are made using

   (1) Bipolar, MOS or BiCMOS technologies

   (2) Bipolar technology

   (3) MOS technology

   (4) BiMOS technology

104. As compared to 16-bit processors, 8-bit processors are limited in

   (1) speed

   (2) directly addressable memory

   (3) data handling capability

   (4) all of the above

105. A parity generation circuit required to generate an ODD parity bit may use combination of

   (1) Ex-OR and Ex-NOR gates

   (2) Ex-NOR gates only

   (3) Ex-OR gates only

   (4) AND and OR gates

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106. The Programmable Logic Device (PLD) having a programmable AND – array at the input and a programmable OR – array at the output is called a
    (1) Programmable Logic Array (PLA)
    (2) Programmable Array Logic (PAL)
    (3) Programmable Gate Array (PGA)
    (4) Application-Specific Integrated Circuit (ASIC)

107. The synchronization between microprocessor and memory is done by
    (1) ALE signal
    (2) HOLD signal
    (3) Ready signal
    (4) None of these

108. The conditional operators ? and : are called as
    (1) relational operators
    (2) logical operators
    (3) ternary operators
    (4) modulus operators

109. The arrays that receive memory allocation at compile time are called
    (1) dynamic array
    (2) static array
    (3) single dimensional array
    (4) multi dimensional array

110. Hierarchy decides which operator
    (1) is most important
    (2) is fastest
    (3) is used first
    (4) operates on largest numbers

111. << operator used for
    (1) right shift
    (2) left shift
    (3) less than
    (4) bit wise compliment

112. The statement that transfers control in the beginning of the loop is
    (1) break statement
    (2) exit statement
    (3) continue statement
    (4) go to statement

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[P.T.O.

113. The && is an example for

    (1) assignment operator
    (2) increment operator
    (3) logical operator
    (4) relational operator

114. Which of the following is the correct operator to compare two variables ?

    (1) :=
    (2) =
    (3) ;
    (4) ==

115. C programs are converted into machine languages with the help of

    (1) an editor
    (2) a compiler
    (3) an operating system
    (4) an assembler

116. The gain of the multi-stage amplifier is equal to

    (1) the sum of individual gains

    (2) the product of individual gains

    (3) the difference of individual gains

    (4) none of these

117. The output voltage of a Op-amp increases 8 V in 12 micro-seconds in response to a step voltage on the input. The slew rate is

    (1) $0.667 \text{ V}/\mu s$
    (2) $0.75 \text{ V}/\mu s$
    (3) $1.5 \text{ V}/\mu s$
    (4) $96 \text{ V}/\mu s$

118. If the input supply frequency is 50 Hz, the output ripple frequency of a bridge rectifier is

    (1) 100 Hz
    (2) 75 Hz
    (3) 50 Hz
    (4) 25 Hz

119. Crossover distortion occurs in _____ amplifier.

    (1) class A
    (2) class C
    (3) push pull
    (4) class AB

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120. The most commonly used biasing circuit is

    (1) base bias
    (2) voltage divider bias
    (3) emitter bias
    (4) collector feedback bias

121. The main function of a clipping circuit is to

    (1) remove a certain portion of the input signal
    (2) restore dc level to the signal
    (3) suppress amplitude variations in the input signal
    (4) both (1) and (3)

122. The amplifier which has maximum distortion is

    (1) Class A
    (2) Class AB
    (3) Class B
    (4) Class C

123. The Wien Bridge Oscillator uses

    (1) both positive and negative feedback
    (2) negative feedback
    (3) positive feedback
    (4) all of the above

124. The narrow frequency over which the current is highest in a series resonant circuit is called

    (1) Q-factor
    (2) bandwidth
    (3) cut-off frequency
    (4) resonant frequency

125. The bandwidth of a circuit with a resonant frequency of 28 MHz and a Q of 70 is

    (1) 400 kHz
    (2) 40 kHz
    (3) 4 kHz
    (4) 400 Hz

126. For maximum power to transfer the load resistance should be equal to

    (1) Thevinin's resistance
    (2) Norton's resistance
    (3) Characteristic impedance
    (4) Input impedance of the source network

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[P.T.O.

127. The ratio of the peak modulating signal voltage to the peak carrier voltage is referred to as

    (1) The voltage ratio   (2) Decibels

    (3) The modulation index   (4) The mix factor

128. Over modulation occurs when

    (1) $V_m > V_c$ (2) $V_m < V_c$

    (3) $V_m = V_c$ (4) $V_m = V_{c=0}$

129. In AM signal the transmitted information is contained with in the

    (1) Carrier   (2) Modulating signal

    (3) Sidebands   (4) All of these

130. The pre-emphasis circuit is a

    (1) Low-pass filter   (2) High-pass filter

    (3) Phase shifter   (4) Band-pass filter

131. Test leads of a CRO are normally shielded to

    (1) To prevent electric shock

    (2) For impedance matching

    (3) To avoid loading of circuit under test and to prevent oscillation

    (4) To prevent picking of hum

132. _____ method is best suited for measuring low resistances.

    (1) Megger   (2) Direct deflection

    (3) Wheat Stone Bridge   (4) Kelvin's Double Bridge

133. At higher frequencies, voltages and currents can not be easily measured because of

    (1) Standing waves

    (2) Impedance mismatching

    (3) Non availability of suitable meters

    (4) None of these

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134. Bandwidth of a complex signal can be known by

    (1) CRO

    (2) B-scope

    (3) M-type display

    (4) Spectrum analyser

135. The measure of reproducibility of readings in an instrument is called

    (1) Resolution

    (2) Accuracy

    (3) Precision

    (4) Sensitivity

136. From basic PMMC instrument, multi range ammeter is obtained by using

    (1) A single shunt

    (2) Many series resistors

    (3) Many shunts

    (4) A single series resistor

137. Time, frequency and phase measurements normally make use of

    (1) Amplifiers followed by rectifiers

    (2) Oscillators followed by displays

    (3) Counters followed by displays

    (4) None of these

138. For frequencies above 200 MHz, normally the attenuators used are of _____ type.

    (1) Resistive

    (2) Wave guide

    (3) Inductive

    (4) Capacitive

139. A thermocouple generates _____ when its two junctions are at different temperatures.

    (1) EMF

    (2) Capacitance change

    (3) Inductance change

    (4) Change of coupling factor

140. The resonant frequency of series RLC circuit depends on

    (1) R

    (2) L

    (3) C

    (4) All of these

141. The maximum range of address that can be indirectly addressed by using R0 and R1 in 8051 is

    (1) 00h to 000Fh

    (2) 00h to 00FFh

    (3) 00h to 0FFFh

    (4) 00h to FFFFh

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[P.T.O.

142. When SM0 and SM1 of SCON are made 01, SBUF

    (1) operate in mode 0   (2) operate in auto reload mode

    (3) acts as UART   (4) none of these

143. In 8051, RS0 and RS1 are

    (1) not in the PSW as these are not the flags

    (2) in the register sets

    (3) the bits 4 and 5 respectively for selecting the register banks

    (4) the bits 3 and 4 respectively for selecting the register banks in PSW

144. If IP register has only the default priorities then

    (1) INT1 (external interrupt 1) has the highest priority

    (2) INT0 (external interrupt 1) has the highest and serial interrupt has the lowest priority

    (3) Timer overflows have the highest priorities

    (4) There is no priority, interrupt processes in the order of its occurrence

145. The delay between the two bits for the baud rate of 1200 is

    (1) 0.83 m sec.   (2) 125 m sec.

    (3) 8 sec.   (4) 0.125 sec.

146. The status of IP register in 8051 on reset is

    (1) xxx00000B   (2) 0xxx0000B

    (3) 0xx00000B   (4) unknown

147. EA bit in Interrupt Enable (IE) SFR is a

    (1) enable serial port interrupt   (2) enable/disable Timer 1 interrupt

    (3) enable/disable Timer 0 interrupt (4) enable/disable global interrupt

148. Which of the following spans largest distance among category of computer networks ?

    (1) LAN   (2) MAN

    (3) WAN   (4) Ethernet

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149. The simplest of networking and internetworking devices is

(1) Repeater

(2) Bridge

(3) Router

(4) Gateway

150. Which multiplexing technique shifts each signal to a different carrier frequency ?

(1) FDM

(2) TDM

(3) Both (1) and (2)

(4) None of the above

151. If there are 10 nodes connected by mesh topology, then number of cables or links required is

(1) 40

(2) 45

(3) 42

(4) 50

152. The IP address 125.255.255.255 belongs to

(1) Class B

(2) Class C

(3) Class A

(4) Class D

153. MAN stands for

(1) Mass Area Network

(2) Man Area Network

(3) Metropolitan Area Network

(4) Main Area Network

154. The switching that is more suitable for computer communication

(1) circuit switching

(2) packet switching

(3) message switching

(4) none of the above

155. Layer 3 from bottom in TCP/IP is

(1) physical layer

(2) application layer

(3) transport layer

(4) internet layer

156. In pulse modulation, the number of samples required to ensure no loss of information is given by

(1) Nyquist theorem

(2) Parseval's theorem

(3) Fourier transform

(4) Superposition theorem

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157. The signal to quantization noise ratio in a PCM system depends on

    (1) sampling rate

    (2) number of quantization levels

    (3) message signal bandwidth

    (4) none of these

158. Pulse gate triggering is achieved by means of an

    (1) L-C Circuit   (2) UJT

    (3) Diac-Triac Circuit   (4) Rheostat

159. The single phase half-wave controlled bridge uses

    (1) 4 SCRs   (2) 6 SCRs

    (3) 2 SCRs   (4) 1 SCRs

160. Value of output frequency of an inverter depends on

    (1) voltage ratio of step-up transformer

    (2) level of DC voltage applied

    (3) type of the circuit used

    (4) values and combinations of the resonant elements

161. Load voltage in a DC-chopper circuit is given by

    (1) $V_L = V_{dc} \times$ duty cycle   (2) $V_L = V_{dc}/$duty cycle

    (3) $V_L =$ duty cycle$/V_{dc}$ (4) $V_L = 2 \times$ duty cycle$/V_{dc}$

162. The main application of a cyclo-converter circuit is found in

    (1) tractions   (2) speed control of synchronous motors

    (3) speed control of DC shunt motors   (4) elevators

163. The average value of the output voltage of a half-wave converter is

    (1) $V_{o(av)} = (V_m / 2\pi)(1 - \cos\alpha)$ (2) $V_{o(av)} = (2\pi\,V_m)(1 - \cos\alpha)$

    (3) $V_{o(av)} = (2\pi\,V_m)(1 + \cos\alpha)$ (4) $V_{o(av)} = (V_m / 2\pi)(1 + \cos\alpha)$
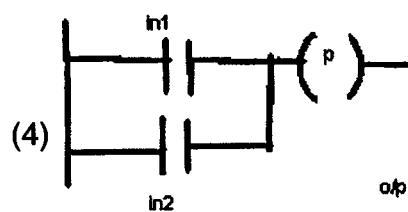
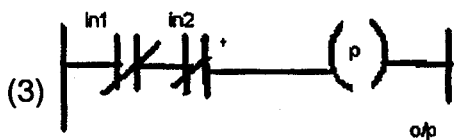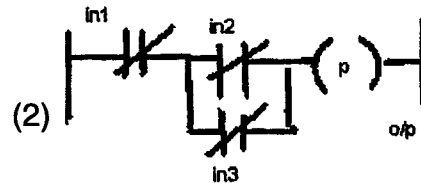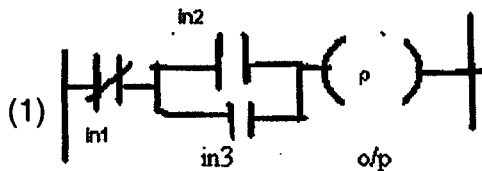**SPACE FOR ROUGH WORK**

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164. PLC equivalent of 3 input OR gate is
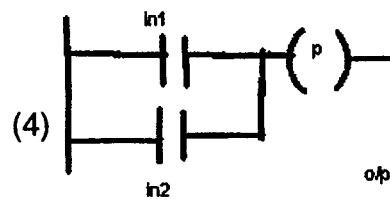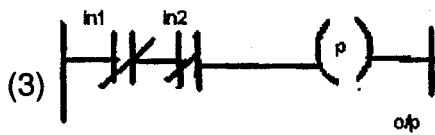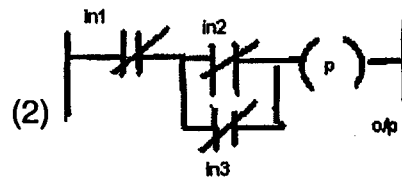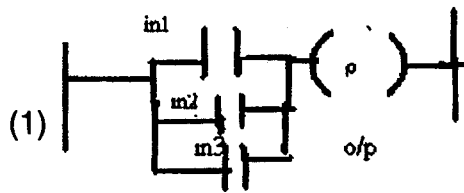
165. PLC logic diagram for the following conditions is

　　　(a) IN1 is off　　　　　(b) IN2 is on or IN3 is on or both IN2 and IN3 are on

166. In PLC, Register that is readily accessible by the input port is

　　(1) hold register　　　　　　　　(2) input register

　　(3) working register　　　　　　(4) both input and output registers

167. BHE signal of 8086 microprocessor is used to interface the

　　(1) Even bank memory　　　　　(2) Odd bank memory

　　(3) I/O　　　　　　　　　　　　(4) DMA

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168. In 8086 microprocessor, the highest priority among all interrupts is

    (1) NMI
    (2) DIV 0
    (3) TYPE 255
    (4) OVER FLOW

169. In 8086, the addressing mode of MOV AX,[5000h] is

    (1) Direct
    (2) Register
    (3) Immediate
    (4) Register relative

170. The 8257 DMAC can transfer

    (1) with Ch0 highest priority
    (2) with Ch0 highest priority as well as rotating priority
    (3) with Ch3 highest priority
    (4) with Ch3 highest priority as well as rotating priority

171. How many I/O modes do 8255 have ?

    (1) 3
    (2) 4
    (3) 5
    (4) 6

172. 8086 is interfaced to 8259s (Programmable interrupt controllers). If 8259s are in master slave configuration the number of interrupts available to the 8086 microprocessor is

    (1) 8
    (2) 16
    (3) 15
    (4) 64

173. In dialysis, the waste products are transferred to dialysate by

    (1) Surface tension
    (2) Centrifusion
    (3) Diffusion
    (4) Viscosity variation

174. To reduce haemolysis, the blood pump design should provide a flow that minimizes

    (1) oxygen tension
    (2) turbulence
    (3) body temperature
    (4) continuous flow

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175. To produce ventricular contraction with an electric pulse, the minimum energy required is

    (1) 10 μJ
    (2) 1 J
    (3) 10 mW
    (4) 1 W

176. The conduction velocity in a motor nerve is normally

    (1) 10 m/s
    (2) 50 m/s
    (3) below 10 m/s
    (4) 1550 m/s

177. As the person falls deeper into sleep, the EEG waveform

    (1) Frequency increases

    (2) Frequency decreases

    (3) Amplitude decreases

    (4) Becomes non rhythmic

178. The disadvantage of MRI is

    (1) 3D imaging is not possible

    (2) Longer time for image formation

    (3) Harmful radiation

    (4) None of these

179. In human body, the interface which acts as a perfect mirror for ultrasonics is

    (1) Soft tissue/gas interface

    (2) Soft tissue/bone interface

    (3) Soft tissue/fat interface

    (4) Electrolyte/gas interface

180. The sectional ultrasonic images are known as

    (1) Ultrasonic tomograms
    (2) Ultrasonic echograms
    (3) Ultrasonic nomograms
    (4) Ultrasonic topograms

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