



# DIPLOMA – COMMON ENTRANCE TEST-2013

<b>EE</b>	COURSE	DAY : SUNDAY DATE : 30-JUNE-2013
	<b>ELECTRICAL AND ELECTRONICS</b>	TIME : 9.00 a.m. to 12.00 Noon

MAXIMUM MARKS	TOTAL DURATION	MAXIMUM TIME FOR ANSWERING
<b>180</b>	<b>200 Minutes</b>	<b>180 Minutes</b>

MENTION YOUR DIPLOMA CET NUMBER					QUESTION BOOKLET DETAILS	
					VERSION CODE	SERIAL NUMBER
					<b>A-1</b>	<b>121997</b>

**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 2<sup>nd</sup> 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 3<sup>rd</sup> 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.

**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 3<sup>rd</sup> 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 :**

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.]

SEAL

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  $A \text{ adj } A$  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)  $-\lambda^2 + 6\lambda = 0$

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SPACE FOR ROUGH WORK



6. The fourth term in the expansion of  $(\sqrt{3} + 2)^7$  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)  $1 - \tan^2 x \sec^2 x$

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SPACE FOR ROUGH WORK



12. If  $x \cot 45^\circ \cos 60^\circ = \sin 60^\circ \tan 30^\circ$  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  $\{[\sin(2\pi - \theta) + \cos(-\theta)] / [\tan(-\theta) + \cot(2\pi + \theta)]\} - \{[\sin(\pi/2 + \theta) + \cos(3\pi/2 - \theta)] / [\cot(\pi + \theta) + \tan(2\pi - \theta)]\}$  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  $(\sin 100^\circ + \sin 20^\circ) / (\cos 100^\circ + \cos 20^\circ)$  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)  $30^\circ$  (2)  $60^\circ$   
(3)  $90^\circ$  (4)  $45^\circ$

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SPACE FOR ROUGH WORK



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)  $30^\circ$  (2)  $60^\circ$   
(3)  $90^\circ$  (4)  $45^\circ$

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SPACE FOR ROUGH WORK



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

(1)  $-1/2$

(2)  $1/2$

(3)  $3/2$

(4)  $-3/2$

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

(1) 3

(2)  $-3$

(3) 4

(4)  $-4$

27.  $d/dx (\sqrt{\sin^2 x})$  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.  $d/dx (\sinh^{-1} x)$  is

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

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

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

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

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SPACE FOR ROUGH WORK



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

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SPACE FOR ROUGH WORK





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

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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)  $n \text{ VSD} = (n + 1) \text{ MSD}$  (2)  $(n - 1) \text{ VSD} = n \text{ MSD}$   
(3)  $n \text{ MSD} = (n - 1) \text{ VSD}$  (4)  $(n - 1) \text{ MSD} = n \text{ VSD}$
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)  $5 \times 10^{-2}$  m (2)  $5 \times 10^{-3}$  m  
(3)  $5 \times 10^{-4}$  m (4)  $5 \times 10^{-3}$  cm

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SPACE FOR ROUGH WORK



47. Poisson's ratio is the ratio of

(1)  $\frac{\text{Lateral strain}}{\text{Linear strain}}$

(2)  $\frac{\text{Linear strain}}{\text{Lateral strain}}$

(3)  $\frac{\text{Lateral strain}}{\text{Volume strain}}$

(4)  $\frac{\text{Volume strain}}{\text{Lateral strain}}$

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

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

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

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

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

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

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SPACE FOR ROUGH WORK



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)  $30^\circ$  (2)  $45^\circ$   
(3)  $60^\circ$  (4)  $90^\circ$
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  $\alpha, \beta, \gamma$  respectively then which of the following is correct ?
- (1)  $\frac{P}{\sin\beta} = \frac{Q}{\sin\gamma} = \frac{R}{\sin\alpha}$  (2)  $\frac{P}{\sin\gamma} = \frac{Q}{\sin\alpha} = \frac{R}{\sin\beta}$   
(3)  $\frac{P}{\sin\alpha} = \frac{Q}{\sin\beta} = \frac{R}{\sin\gamma}$  (4)  $\frac{P}{\sin\alpha} = \frac{Q}{\sin\gamma} = \frac{R}{\sin\beta}$

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SPACE FOR ROUGH WORK



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

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SPACE FOR ROUGH WORK



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

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SPACE FOR ROUGH WORK



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  $2 \times 10^{-4}$  m apart are illuminated by the light of wave length  $5000 \times 10^{-10}$ m. The distance between the source and screen is 0.2m, then fringe width is

(1)  $0.05 \times 10^{-3}$  m

(2)  $5 \times 10^{-3}$ m

(3)  $0.5 \times 10^{-3}$ m

(4)  $50 \times 10^{-3}$ 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

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SPACE FOR ROUGH WORK



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

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SPACE FOR ROUGH WORK





## PART – C

It consists of **81 – 180** questions.

81. The practical unit of Resistance is

- |            |          |
|------------|----------|
| (1) Ampere | (2) Ohm  |
| (3) Volt   | (4) Watt |

82. Ohm's law holds good for

- |                |                    |
|----------------|--------------------|
| (1) Insulators | (2) Semiconductors |
| (3) Conductors | (4) Electrolytes   |

83. The electrostatic potential inside the positively charged sphere is

- |             |              |
|-------------|--------------|
| (1) maximum | (2) minimum  |
| (3) zero    | (4) constant |

84. The absolute permittivity of vacuum is

- |                            |                             |
|----------------------------|-----------------------------|
| (1) $8.854 \times 10^{12}$ | (2) $8.854 \times 10^{-9}$  |
| (3) $8.854 \times 10^9$    | (4) $8.854 \times 10^{-12}$ |

85. The unit of capacitance is

- |            |             |
|------------|-------------|
| (1) Farads | (2) Coulomb |
| (3) Volt   | (4) Metre   |

86. In a lead-acid battery, the level of the electrolyte should be

- (1) equal to that of plates
- (2) below the level of plates
- (3) above the level of plates
- (4) half the level of plates

87. Plastic is a

- (1) Good conductor of electricity
- (2) Good conductor of heat
- (3) Bad conductor of electricity
- (4) Semiconductor material

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**SPACE FOR ROUGH WORK**



88. Insulation used in commutator is
- |          |             |
|----------|-------------|
| (1) Wood | (2) Plastic |
| (3) Mica | (4) Glass   |
89. Alnico is
- |                   |                  |
|-------------------|------------------|
| (1) An alloy      | (2) An insulator |
| (3) Semiconductor | (4) A dielectric |
90. The algebraic sum of an IR drops according to Kirchhoff's law primarily depends upon
- (1) Direction of flow of currents
  - (2) Connection of the battery
  - (3) Value of resistance
  - (4) Magnitude of current flowing through it
91. The unit of MMF is
- |           |                   |
|-----------|-------------------|
| (1) AT    | (2) Webers/ampere |
| (3) Henry | (4) AT/m          |
92. The property of material which opposes the production of magnetic flux in it is known as
- |               |                  |
|---------------|------------------|
| (1) MMF       | (2) Reluctance   |
| (3) Permeance | (4) Permittivity |
93. The principle of dynamically induced emf is utilized in a
- |                        |                 |
|------------------------|-----------------|
| (1) Choke              | (2) Transformer |
| (3) Electric generator | (4) Starter     |
94. The magnetism present in a piece of soft steel held near a magnet is called
- (1) Residual magnetism
  - (2) Insulated magnetism
  - (3) Induced magnetism
  - (4) Stray magnetism

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95. Power in a single phase ac circuit is given by
- (1)  $VI$  (2)  $V\sin\phi$   
(3)  $V\cos\phi$  (4)  $3V\cos\phi$
96. In a RL series circuit, the pf is
- (1) leading (2) lagging  
(3) zero (4) unity
97. In an ac circuit the ratio of active power to apparent power is called
- (1) Form factor (2) Load factor  
(3) Power factor (4) Power ratio
98. In a star connected circuit, the relationship between line voltage and phase voltage is
- (1)  $V_L = V_{ph}$  (2)  $V_L = V_{ph} / \sqrt{3}$   
(3)  $V_L = \sqrt{3} \cdot V_{ph}$  (4)  $V_L = \sqrt{2} \cdot V_{ph}$
99. The addition of Trivalent impurity to an intrinsic semiconductor creates
- (1) n type semiconductor (2) excess free electrons  
(3) excess holes (4) electron-hole pairs
100. Zener diode, when used in a circuit is always
- (1) connected in series (2) connected in parallel  
(3) forward biased (4) reverse biased
101. The resistance of a Reverse biased diode is
- (1) zero (2) low  
(3) negative (4) infinity
102. The materials generally used for LED are
- (1) compounds of silica (2) compounds of gallium  
(3) compounds of phosphorous (4) compounds of sulphur

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103. The most commonly used transistor circuit arrangement is
- (1) CE (2) CB  
(3) CC (4) Common base collector
104. The input and output signals of a CE transistor amplifier are
- (1) always equal (2) always negative  
(3) always in phase (4) always out of phase
105. The emitter follower is mainly used as
- (1) an impedance matching device  
(2) a power amplifier  
(3) a follower of a base signal  
(4) a voltage amplifier
106. Binary equivalent of decimal 22 is
- (1) 11010 (2) 10110  
(3) 11111 (4) 10001
107. An EX-OR gate produces output only when two inputs are
- (1) high (2) low  
(3) different (4) equal
108. Multiplication of two binary numbers 011 and 110 is
- (1) 10010 (2) 11001  
(3) 11100 (4) 01110
109. The race-around problem does not exist in
- (1) RS ff (2) D ff  
(3) Master slave JK ff (4) T ff

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110. In a half adder the sum is obtained by using
- (1) AND (2) EX-OR  
(3) NOR (4) NAND
111. The efficiency of Half wave rectifier is
- (1) 80.6% (2) 40.6%  
(3) 20.6% (4) 30%
112. CC configuration is used for impedance matching because its
- (1) input impedance is very high  
(2) input impedance is very low  
(3) output impedance is very high  
(4) output impedance is very low
113. If the voltage gain of an amplifier is 10, its decibel gain is
- (1) 20 dB (2) 40 dB  
(3) 60 dB (4) 10 dB
114. The crystal oscillator frequency is very stable due to \_\_\_\_\_ of the crystal.
- (1) Rigidity (2) High Q  
(3) Vibration (4) Damping
115. The number of ffs used to construct a decade counter
- (1) 10 (2) 8  
(3) 5 (4) 4
116. To serially shift a nibble data into a shift register, there must be \_\_\_\_\_ clock pulses.
- (1) 1  
(2) 2  
(3) 8  
(4) 1 clock pulse for each one on the data

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117. An inverting amplifier has  $R_1 = 10$  kilo ohms,  $R_f = 10$  kilo ohms, its scale factor is
- (1) 1 (2) -1  
(3) 2 (4) -2
118. If biasing is not done in an amplifier circuit, it results in
- (1) decrease in base current  
(2) un faithful amplification  
(3) excessive collector bias  
(4) increase in collector emitter voltage
119. The armature of a DC machine is laminated in order to reduce
- (1) eddy current loss (2) hysteresis loss  
(3) copper loss (4) frictional loss
120. The field structure of large DC machine uses
- (1) Salient poles  
(2) Non-salient poles  
(3) Solid poles  
(4) Either laminated or solid poles
121. In a lap winding, the number of brushes required is equal to
- (1) No. of poles (2) No. of pole pairs  
(3) 2 (4) Commutator pitch
122. \_\_\_\_\_ motor is a variable speed motor
- (1) DC Series motor (2) DC shunt motor  
(3) AC induction motor (4) Synchronous motor
123. Over heating of a DC motor is often due to
- (1) insufficient end-play (2) loose parts  
(3) over loads (4) rough commutator

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124. Friction and windage losses in a DC motor depends on
- (1) Speed
  - (2) Flux
  - (3) Armature current
  - (4) Armature resistance
125. Voltage regulation of an alternator for a pf of 0.8 lagging is \_\_\_\_\_ at UPF.
- (1) Greater than
  - (2) Smaller than
  - (3) Same as
  - (4) Negligible
126. When number of alternators are operating in parallel, the pf at which each operates is determined by
- (1) pf of load
  - (2) driving torque of the prime mover
  - (3) its field excitation
  - (4) speed
127. Damper windings are used in alternators to
- (1) prevent hunting
  - (2) reduce windage loss
  - (3) maintain synchronism
  - (4) connect them to bus bars
128. The capacitor start-capacitor run motor with a single capacitor has
- (1) no centrifugal switch
  - (2) low pf
  - (3) noisy operation
  - (4) low efficiency
129. Open circuit test in a transformer is preferred with
- (1) rated transformer voltage
  - (2) rated transformer current
  - (3) direct current
  - (4) high frequency supply

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130. Core flux in a transformer depends mainly on
- (1) supply voltage
  - (2) supply voltage and frequency
  - (3) load
  - (4) supply voltage and load but independent of frequency
131. The transformer does not transform
- (1) power
  - (2) voltage
  - (3) current
  - (4) impedance
132. Copper losses at half full load in a transformer is 300 watts. Then the copper losses at  $\frac{3}{4}$  full load will be
- (1) 450 watts
  - (2) 675 watts
  - (3) 225 watts
  - (4) 300 watts
133. If the value of rotor resistance is increased, then the max.torque
- (1) becomes zero
  - (2) increases
  - (3) decreases
  - (4) is independent of rotor resistance
134. Blocked rotor test of an induction motor corresponds, in case of a transformer to
- (1) full load
  - (2) half load
  - (3) no load
  - (4) short circuit operations
135. In a 3 phase wound rotor induction motor, the short circuit gear is used to short circuit
- (1) stator phases of motor
  - (2) rotor at slip rings
  - (3) starting resistance in starter
  - (4) phases of stator and rotor

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SPACE FOR ROUGH WORK





136. The speed of 3 phase synchronous motor can be changed by varying
- (1) mechanical load
  - (2) field excitation
  - (3) supply frequency
  - (4) armature current
137. When load on synchronous motor is increased, its armature current is increased provided, it is
- (1) normally excited
  - (2) over excited
  - (3) under excited
  - (4) under all excitation conditions
138. Damper windings in a synchronous motor
- (1) reduces windage losses
  - (2) serves to start the motor
  - (3) improves power factor of the motor
  - (4) increases hunting of the motor
139. A dynamometer instrument is chiefly used as
- (1) DC ammeter
  - (2) DC voltmeter
  - (3) Wattmeter
  - (4) Energy meter
140. Which of the following is likely to have the largest resistance ?
- (1) Moving coil galvanometer
  - (2) Voltmeter of range 10v
  - (3) Ammeter of range 1 A
  - (4) A copper wire of length 1 meter and dia 3mm
141. A hall effect transducer can be used for the measurement of
- (1) power
  - (2) current
  - (3) displacement
  - (4) all of above
142. If an induction type energymeter rotates fast, it can be slowed down by
- (1) lag adjustment
  - (2) light load adjustment
  - (3) brake magnet adjustment
  - (4) voltage shunt adjustment

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143. Kelvin's double bridge is used to measure
- (1) high resistance
  - (2) inductance
  - (3) capacitance
  - (4) low resistance
144. Range extension of a PMMC voltmeter is normally done by using
- (1) PT
  - (2) CT
  - (3) Shunts
  - (4) Multipliers
145. Which of the following is not a major benefit of fibre optic cable ?
- (1) excellent data security
  - (2) immunity from interference
  - (3) low cost
  - (4) no hazard of electric shock
146. The communication medium causes the signal to be
- (1) modulated
  - (2) demodulated
  - (3) amplified
  - (4) attenuated
147. The main benefit of using microwaves is
- (1) simpler equipment
  - (2) lower cost of equipment
  - (3) more spectrum space for signals
  - (4) greater transmission distances
148. Communication between a computer and a key board involves
- (1) half duplex
  - (2) simplex
  - (3) full duplex
  - (4) automatic
149. Dialog control is the function of
- (1) session layer
  - (2) physical layer
  - (3) transport layer
  - (4) network layer

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150. The device that operates on only the physical of the OSI model regenerates a signal is

- (1) Amplifier
- (2) Repeater
- (3) Router
- (4) Bridge

151. A hydrograph indicates

- (1) the discharge at any time
- (2) the maximum and minimum run off during the period
- (3) the average run off during the period
- (4) all of the above

152. The main function of economizer in thermal power plant is to

- (1) increase steam production
- (2) reduce fuel consumption
- (3) increase steam pressure
- (4) condense the steam exhausted from turbine

153. In diesel power plant the function of governing system is to

- (1) provide required amount of fuel to the engine
- (2) maintain the speed of the engine at constant value
- (3) reduce the friction of the moving parts
- (4) carry the heat from engine cylinder

154. A linked collection of photo voltaic modules is called

- (1) photo voltaic array
- (2) solar panel
- (3) solar module
- (4) energy collector

155. The decrease in the value of power plant equipment and building due constant usage is known as

- (1) deterioration
- (2) depreciation
- (3) reduction
- (4) running cost

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SPACE FOR ROUGH WORK



156. The holding current of an SCR is the
- (1) normal operating current
  - (2) current corresponding to breakover
  - (3) minimum current to keep the device on
  - (4) minimum current to turn off the device
157. Free wheeling diode is used in a controlled rectifier in case of
- (1) resistive load
  - (2) inductive load
  - (3) capacitive load
  - (4) constant load
158. For SCR,  $dv/dt$  protection is achieved through the use of
- (1) RL in series with SCR
  - (2) RC across SCR
  - (3) RC in series with SCR
  - (4) L across SCR
159. A single phase full wave half controlled bridge uses
- (1) one SCR
  - (2) two SCRs
  - (3) four SCRs
  - (4) two SCRs and two diodes
160. Chopper control of DC motor provides variation in
- (1) input voltage
  - (2) frequency
  - (3) phase
  - (4) power factor
161. An UPS system consists of
- (1) cyclo converter
  - (2) inverter
  - (3) static contactor
  - (4) both (2) and (3)
162. The output voltage of a boost converter is
- (1) less than the input voltage
  - (2) more than the input voltage
  - (3) equal to the input voltage
  - (4) more or less than input voltage

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163. The full form of SMPS is

- (1) Static Mode Power System
- (2) Switched Mode Power Supply
- (3) Sample Multiplexed Power System
- (4) Simple Method Power Supply

164. SCR inverters are used in

- (1) Variable speed AC motor drives
- (2) Aircraft power supplies
- (3) Induction heating
- (4) All the above

165. The max. firing angle in degrees that can be obtained by a pure resistive triggering circuit for SCR is

- (1) 45
- (2) 90
- (3) 135
- (4) 180

166. The circuit breakers which are suitable for coal mines where explosion hazards are common is

- (1) Sulphur hexafluoride
- (2) Minimum oil circuit breaker
- (3) Bulk oil circuit breaker
- (4) Air blast circuit breaker

167. Domestic fuses of lead and tin alloy has the composition of

- (1) 37% lead and 50% tin
- (2) 63% lead and 37% tin
- (3) 20% lead and 80% tin
- (4) 80% lead and 20% tin

168. The fault clearing time of a circuit breaker is in

- (1) seconds
- (2) hours
- (3) microseconds
- (4) minutes

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169. Resistance of an arc is increased by
- (1) increasing cross section of arc
  - (2) decreasing the length of the arc
  - (3) decreasing the dielectric strength of the medium
  - (4) lengthening of the arc
170. A relay that does not have moving parts in it is
- (1) static relay
  - (2) induction type relay
  - (3) attracted armature type relay
  - (4) solenoid type relay
171. The starting torque of a DC motor is independent of
- |                      |                      |
|----------------------|----------------------|
| (1) armature current | (2) speed            |
| (3) flux             | (4) all of the above |
172. The least significant factor in selecting a motor for a centrifugal pump is
- (1) power rating
  - (2) operating speed
  - (3) speed control
  - (4) starting characteristics
173. Electric drive is becoming more and more popular because it is
- (1) simple, clean and compact
  - (2) provides easy and smooth control
  - (3) less maintenance cost
  - (4) all of the above

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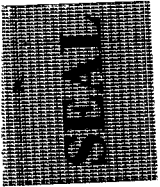
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174. Longer coasting period for a train results in
- (1) lower specific energy consumption
  - (2) higher acceleration
  - (3) higher retardation
  - (4) higher scheduled speed
175. In electric traction if contact voltage exceeds 1500 volts, current collection is via
- (1) Contact rail
  - (2) Over head wire
  - (3) Third rail
  - (4) Conductor rail
176. The material to be used for heating element should have high resistivity so as to
- (1) reduce the length of heating element
  - (2) increase the life of heating element
  - (3) produce large amount of heat
  - (4) reduce the effect of oxidation
177. During resistance welding the heat produced is proportional to
- (1) voltage
  - (2)  $I^2RT$
  - (3) Current
  - (4) volt-amperes
178. The most commonly used refrigerant is
- (1) Organ
  - (2) Neon
  - (3) Freon
  - (4) Nitrogen
179. The function of the capacitor connected across the supply of the fluorescent tube is to
- (1) increase voltage
  - (2) decrease voltage
  - (3) decrease starting current
  - (4) improve power factor
180. Galvanizing is the process of applying a layer of
- (1) Zinc
  - (2) Aluminium
  - (3) Lead
  - (4) Copper

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**A - 1**