

062/2016

Maximum : 100 marks

Time : 1 hour and 15 minutes

1. Article 56 of Indian constitution declares :
 - (A) Election of the President
 - (B) Manner of election of the president
 - (C) Qualifications for election as president
 - (D) Term of office of president

2. Among the following which is not a sub clause of Article 19 :
 - (A) Right to establish and maintain institutions for religious and charitable purposes
 - (B) Right to form associations
 - (C) Right to assemble peaceably and without arms
 - (D) Freedom of speech and expression

3. According to Article 315, Public Service Commission is :
 - (A) A statutory body
 - (B) A governing body for recruitments
 - (C) An independent expert body
 - (D) A quasi-government body with judicial powers

4. A Proclamation of Emergency issued under clause (1) of article 352 may be varied or revoked by :
 - (A) The impeachment of the president
 - (B) A subsequent proclamation
 - (C) A vote on account in the houses of parliament
 - (D) Expiration of a period of 15 days from the date of proclamation

5. The article which states that the president shall appoint a person who is qualified to be appointed a judge of Supreme Court to be Attorney-General for India.
 - (A) Article 75
 - (B) Article 76
 - (C) Article 77
 - (D) Article 78

6. The length of Tran-Siberian rail road :
- (A) 8289 km (B) 9289 km
(C) 8689 km (D) 9689 km
7. Mahatma Gandhi Sethu is built across the river :
- (A) Ganga (B) Yamuna
(C) Sarayu (D) Brahmaputra
8. What is the height of the highest viaduct bridge in Asia which is built in Konkan rail road?
- (A) 46 meters (B) 57 meters
(C) 64 meters (D) 79 meters
9. Light absorbing organic carbon which causes decoulation of Taj is also known as :
- (A) Brown carbon (B) Black carbon
(C) Blue carbon (D) Grey carbon
10. The date on which Malayala Manorama started publication as a weekly :
- (A) January 22, 1888 (B) February 22, 1889
(C) March 22, 1890 (D) April 22, 1891
11. The place where world's first bit coin ATM was set up :
- (A) New York (B) Dublin
(C) Toronto (D) Vancouver
12. The deepest immersed intercontinental tube tunnel rail road is :
- (A) Madrid (B) Prague
(C) Texas (D) Marmaray
13. What do you mean by 'boat people problem'?
- (A) Refugee problem (B) Economic melt-down
(C) Political instability (D) Terrorism
14. What is the old name of INS Vikramaditya?
- (A) Adm. Rustov (B) Adm. Pavlov
(C) Adm. Gorshghov (D) Adm. Vagogue

15. The head office of World Tourism Organisation is situated at :
- (A) Geneva (B) New York
(C) Madrid (D) Manchester
16. The world mothertongue day is observed on :
- (A) March 21 (B) February 21
(C) April 21 (D) May 21
17. Who formed the first trade union movement – Travancore Labour Association in Kerala?
- (A) P. Krishnapillai (B) R. Sugathan
(C) T.V. Thomas (D) P.K. Bava
18. The first book written by E.M.S. Namboodirippad is :
- (A) A short history of the peasant movement in Kerala
(B) Thirinhunokkumbol
(C) Gandhiyum Gandhisavum
(D) Jawaharlal Nehru
19. The name of committee set up in 1995 to study the Prasar Bharathi Act.
- (A) Sengupta committee (B) B.G. Verghese committee
(C) Joshi committee (D) Justice Rajadhyaksha committee
20. The date on which the Akashavani-Doordarshan DTH service came into being :
- (A) 16th January 2004 (B) 16th December 2004
(C) 16th November 2004 (D) 16th October 2004
21. Let A be a 3×3 matrix with characteristic polynomial $p(\lambda) = \lambda(\lambda - 1)(\lambda - 2)$. Which of the following statement is wrong :
- (A) A is not invertible
(B) There are three eigen vectors V_1, V_2, V_3 which form as eigen basis of R^3
(C) Each eigen space of A is one-dimensional
(D) The linear system $(A - 3I)x = B$ has a unique solution for each B in R^3

22. The maximum value of $(xy)^6$ on the ellipse $\frac{x^2}{4} + y^2 = 1$ occurs at a point (x, y) for which y^2 is equal to :

(A) $\frac{\sqrt{2}}{3}$

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

(C) $\frac{2}{3}$

(D) $\frac{5}{4}$

23. Which of the following is the Laplace transform of $f(t) = \begin{cases} 1, & 0 \leq t \leq 2 \\ t^2 - 4t + 4, & t > 2 \end{cases}$

(A) $\frac{2e^{-2s}}{s^3}$

(B) $\frac{1 - e^{-2s}}{s} + \frac{2e^{-2s}}{s^3}$

(C) $\frac{e^{-2s}}{s} + \frac{2 - 2e^{-2s}}{s^3}$

(D) $\frac{2 - 2e^{-2s}}{s^3}$

24. What is the image of $|z| < 1$ under the transformation $w = \frac{i - z}{i + z}$?

(A) right half plane

(B) upper half plane

(C) right half of $|w| < 1$

(D) $|w| < 1$

25. If \vec{u} and \vec{v} are irrotational vectors which of the following is true?

(A) $\vec{u} \cdot \vec{v}$ is irrotational

(B) $\vec{u} \times \vec{v}$ is irrotational

(C) $\vec{u} \times \vec{v}$ is solenoidal

(D) $\vec{u} \times \vec{v} = \vec{0}$

26. When a body of mass moment of inertia I about a given axis is rotated about that axis with an angular velocity ω , then the kinetic energy of rotation is :

(A) $I\omega$

(B) $I\omega^2$

(C) $0.5 I\omega$

(D) $0.5 I\omega^2$

27. The resultant of two forces each equal to 2 N and acting at right angles is :

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

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

(C) $2\sqrt{2}$

(D) $\sqrt{2}$

28. A ridge formed by the intersection of two sloped surfaces having an exterior angle greater than 180° is called :
- (A) gable (B) hip
(C) verge (D) template
29. If magnetic bearing of sun at noon at a place in southern hemisphere is 150° , then magnetic declination at that place is :
- (A) 30° E (B) 30° W
(C) 20° E (D) 20° W
30. When (H) is the difference in heights between the extremities of a chain length (L), then the correction for slope required is :
- (A) H/L (B) H^2/L
(C) $H^2/2L$ (D) $H/2L$
31. An engine of 105 kW capacity requires 10 kW to start the engine. Its mechanical efficiency is :
- (A) 87.2% (B) 91.3%
(C) 85.2% (D) 93.1%
32. In the vapour compression cycle the condition of refrigerant is superheated vapour :
- (A) before passing through the condenser
(B) after passing through the condenser
(C) after passing through the expansion valve
(D) before passing through the expansion valve
33. Specific speed of a turbine depends upon :
- (A) speed and head (B) speed, discharge and head
(C) speed power and discharge (D) speed, power and head
34. Which of the following manufacturing processes be likely to produce the strongest parts?
- (A) investment casting (B) die casting
(C) forging (D) powder metallurgy

35. Climb milling is preferred while machining since :
- (A) the chip thickness increases gradually
 - (B) it enable the cutter to dig in and start the cut
 - (C) better surface finish can be obtained
 - (D) the specific power consumption is reduced
36. Two resistors of 80Ω and 120Ω are connected in parallel. If the current through 80Ω resistor is 7 A, calculate the total current flowing through the circuit :
- (A) 5.6 A
 - (B) 12.6 A
 - (C) 11.6 A
 - (D) 14.6 A
37. The unit of magneto motive force is :
- (A) Weber
 - (B) Ampere/metre
 - (C) Henry
 - (D) Ampere-turn/weber
38. Three equal impedances are first connected in star across a balanced three phase supply. If connected in delta across the same supply :
- (A) Phase current will be tripled
 - (B) Phase current will be doubled
 - (C) Line current will become one third
 - (D) Power consumed will increase three fold
39. The power factor of an alternator is determined by its :
- (A) Speed
 - (B) Load
 - (C) Excitation
 - (D) Prime mover
40. A synchronous machine is called doubly excited machine because :
- (A) It can be over excited
 - (B) It has two sets of rotor poles
 - (C) Both its rotor and stator are excited
 - (D) It needs twice the normal exciting current
41. Temperature compensation of a 18 V zener diode can be achieved by connecting it in :
- (A) Parallel with forward biased Si diodes
 - (B) Series with reverse biased Si diodes
 - (C) Series with forward biased Si diodes
 - (D) Parallel with reverse biased Si diodes

42. The transformer utilization factor of a full wave rectifier is :
- (A) 0.287 (B) 0.693
(C) 0.487 (D) 0.675
43. Identify the wrong statement regarding the Miller capacitance of a CE amplifier :
- (A) It increases the input capacitance
(B) It decreases the input capacitance
(C) It decreases the gain at high frequencies
(D) It increases the level of output capacitance
44. An AM transmitter has an rms antenna current of 11 A when unmodulated and 13 A when sinusoidally modulated. The modulation index is :
- (A) 0.79 (B) 0.98
(C) 0.33 (D) 0.89
45. In the visual display on the CRT screen, the sweep voltage causes the spot to move about the screen :
- (A) horizontally from left to right at a constant velocity
(B) vertically from top to bottom with constant velocity
(C) horizontally from left to right with linearly increasing velocity
(D) vertically from top to bottom with linearly increasing velocity
46. Central Processing Unit is a combination of :
- (A) Control and storage (B) Control and output unit
(C) Arithmetic logic and input unit (D) Arithmetic logic and control unit
47. Which of the following memories needs refreshing?
- (A) SRAM (B) DRAM
(C) ROM (D) All of above
48. Recursion is a process in which a function calls :
- (A) itself (B) another function
(C) main() function (D) none of the above

49. What will be the final values of x and y?

```
void main ()
{
    int x = 1, y = 1;
    clrscr();
    do while (x<=7)
    {
        x++, y++;
    }
    while (y<=5);
    printf("\n x = %d y = %d", x, y);
}
```

(A) x = 6 y = 6

(B) x = 8 y = 6

(C) x = 8 y = 8

(D) none of the above

50. What will be the output of the following program?

```
void main()
{
    char x = 'd';
    clrscr();
    switch (x)
    {
        case 'b'
            puts("0 1 001");
            break;
        default :
            puts("3 2 1");
            break;
        case 'R' :
            puts("I II III");
    }
}
```

(A) 0 1 001

(B) 3 2 1

(C) I II III

(D) none of the above

51. A zener diode voltage regulator has load requirement of 12 V and 2 Amp. The zener diode's minimum current requirement is 0.2 A. The minimum voltage at input is 24 V. What is maximum efficiency of circuit? (upto 1 decimal place)?

- (A) 45.5% (B) 35.7%
(C) 50.5% (D) 55.7%

52. How many op-amps are required to implement this equation?

$$V_0 = \frac{R_3}{R_1 + R_3} \frac{R_2 + R_4}{R_2} V_1 - \frac{R_4}{R_2} V_2$$

- (A) 2 (B) 1
(C) 3 (D) 4

53. An FIR system is described by the system function $H(z) = 1 + 7/2 z^{-1} + 3/2 z^{-2}$. The system is :

- (A) maximum phase (B) minimum phase
(C) mixed phase (D) zero phase

54. The forward path transfer function of a unity negative feedback system is given by :

$$G(s) = \frac{K}{(s+2)(s-1)}$$

The value of K which will place both the poles of the closed-loop system at the same location, is k , then $4k$ is?

- (A) 2.25 (B) 5
(C) 4.5 (D) 9

55. A radio system outputs signals with frequency components only in the range 2.5 MHz to 3.5 MHz. The analog-to-digital converter that you want to use to digitise such signals can be operated at sampling frequencies that are an integer multiple of 1 MHz. What is the lowest sampling frequency (in MHz) that you can use without destroying information through aliasing?

- (A) 3 (B) 7
(C) 5 (D) 2