

Test Booklet No.

प्रश्नपत्रिका क्र.

F

Paper-II

ELECTRONIC SCIENCE

Signature and Name of Invigilator

Seat No.

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1. (Signature)

(In figures as in Admit Card)

(Name)

Seat No.

(In words)

2. (Signature)

(Name)

OMR Sheet No.

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(To be filled by the Candidate)

DEC - 38213**Time Allowed : 1¼ Hours]****[Maximum Marks : 100****Number of Pages in this Booklet : 16****Number of Questions in this Booklet : 50****Instructions for the Candidates**

- Write your Seat No. and OMR Sheet No. in the space provided on the top of this page.
- This paper consists of 50 objective type questions. Each question will carry two marks. All questions of Paper-II will be compulsory, covering entire syllabus (including all electives, without options).
- At the commencement of examination, the question booklet will be given to the student. In the first 5 minutes, you are requested to open the booklet and compulsorily examine it as follows :
 - To have access to the Question Booklet, tear off the paper seal on the edge of this cover page. Do not accept a booklet without sticker-seal or open booklet.
 - Tally the number of pages and number of questions in the booklet with the information printed on the cover page. Faulty booklets due to missing pages/questions or questions repeated or not in serial order or any other discrepancy should not be accepted and correct booklet should be obtained from the invigilator within the period of 5 minutes. Afterwards, neither the Question Booklet will be replaced nor any extra time will be given. The same may please be noted.**
 - After this verification is over, the OMR Sheet Number should be entered on this Test Booklet.
- Each question has four alternative responses marked (A), (B), (C) and (D). You have to darken the circle as indicated below on the correct response against each item.
Example : where (C) is the correct response.

(A)	(B)	(C)	(D)
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- Your responses to the items are to be indicated in the **OMR Sheet given inside the Booklet only**. If you mark at any place other than in the circle in the OMR Sheet, it will not be evaluated.
- Read instructions given inside carefully.
- Rough Work is to be done at the end of this booklet.
- If you write your Name, Seat Number, Phone Number or put any mark on any part of the OMR Sheet, except for the space allotted for the relevant entries, which may disclose your identity, or use abusive language or employ any other unfair means, you will render yourself liable to disqualification.
- You have to return original OMR Sheet to the invigilator at the end of the examination compulsorily and must not carry it with you outside the Examination Hall. You are, however, allowed to carry the Test Booklet and duplicate copy of OMR Sheet on conclusion of examination.
- Use only Blue/Black Ball point pen.**
- Use of any calculator or log table, etc., is prohibited.**
- There is no negative marking for incorrect answers.**

विद्यार्थ्यांसाठी महत्त्वाच्या सूचना

- परिक्षार्थींनी आपला आसन क्रमांक या पृष्ठावरील वरच्या कोपऱ्यात लिहावा. तसेच आपणांस दिलेल्या उत्तरपत्रिकेचा क्रमांक त्याखाली लिहावा.
- सदर प्रश्नपत्रिकेत 50 बहुपर्याय प्रश्न आहेत. प्रत्येक प्रश्नास दोन गुण आहेत. या प्रश्नपत्रिकेतील सर्व प्रश्न सोडविणे अनिवार्य आहे. सदरचे प्रश्न हे या विषयाच्या संपूर्ण अभ्यासक्रमावर आधारित आहेत.
- परीक्षा सुरु झाल्यावर विद्यार्थ्यांला प्रश्नपत्रिका दिली जाईल. सुरुवातीच्या 5 मिनीटांमध्ये आपण सदर प्रश्नपत्रिका उघडून खालील बाबी अवश्य तपासून पहाव्यात.
 - प्रश्नपत्रिका उघडण्यासाठी प्रश्नपत्रिकेवर लावलेले सील उघडावे. सील नसलेली किंवा सील उघडलेली प्रश्नपत्रिका स्विकारू नये.
 - पहिल्या पृष्ठावर नमूद केल्याप्रमाणे प्रश्नपत्रिकेची एकूण पृष्ठे तसेच प्रश्नपत्रिकेतील एकूण प्रश्नांची संख्या पडताळून पहावी. पृष्ठे कमी असलेली/कमी प्रश्न असलेली/प्रश्नांचा चुकीचा क्रम असलेली किंवा इतर त्रुटी असलेली सदोष प्रश्नपत्रिका सुरुवातीच्या 5 मिनिटातच पर्यवेक्षकाला परत देऊन दुसरी प्रश्नपत्रिका मागवून घ्यावी. त्यानंतर प्रश्नपत्रिका बदलून मिळणार नाही तसेच वेळी वाढवून मिळणार नाही याची कृपया विद्यार्थ्यांनी नोंद घ्यावी.
 - वरीलप्रमाणे सर्व पडताळून पहिल्यानंतरच प्रश्नपत्रिकेवर ओ.एम.आर. उत्तरपत्रिकेचा नंबर लिहावा.
- प्रत्येक प्रश्नासाठी (A), (B), (C) आणि (D) अशी चार विकल्प उत्तरे दिली आहेत. त्यातील योग्य उत्तराचा रकाना खाली दर्शविल्याप्रमाणे ठळकपणे काढा/निळ करावा.
उदा. : जर (C) हे योग्य उत्तर असेल तर.

(A)	(B)	(C)	(D)
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- या प्रश्नपत्रिकेतील प्रश्नांची उत्तरे ओ.एम.आर. उत्तरपत्रिकेतच दर्शवावीत. इतर ठिकाणी लिहिलेली उत्तरे तपासली जाणार नाहीत.
- आत दिलेल्या सूचना काळजीपूर्वक वाचाव्यात.
- प्रश्नपत्रिकेच्या शेवटी जोडलेल्या कोऱ्या पानावरच कच्चे काम करावे.
- जर आपण ओ.एम.आर. वर नमूद केलेल्या ठिकाणा व्यतिरीक्त इतर कोठेही नाव, आसन क्रमांक, फोन नंबर किंवा ओळख पटेल अशी कोणतीही खूप केलेली आढळून आल्यास अथवा असभ्य भाषेचा वापर किंवा इतर गैरमार्गाचा अवलंब केल्यास विद्यार्थ्यांला परीक्षेस अपात्र ठरविण्यात येईल.
- परीक्षा संपल्यानंतर विद्यार्थ्यांने मूळ ओ.एम.आर. उत्तरपत्रिका पर्यवेक्षकांकडे परत करणे आवश्यक आहे. तथापी, प्रश्नपत्रिका व ओ.एम.आर. उत्तरपत्रिकेची द्वितीय प्रत आपल्याबरोबर नेण्यास विद्यार्थ्यांना परवानगी आहे.
- फक्त निळ्या किंवा काळ्या बॉल पेनचाच वापर करावा.**
- कॅलक्युलेटर किंवा लॉग टेबल वापरण्यास परवानगी नाही.**
- चुकीच्या उत्तरासाठी गुण कपात केली जाणार नाही.**

DEC - 38213/II

Electronic Science Paper II

Time Allowed : 75 Minutes]

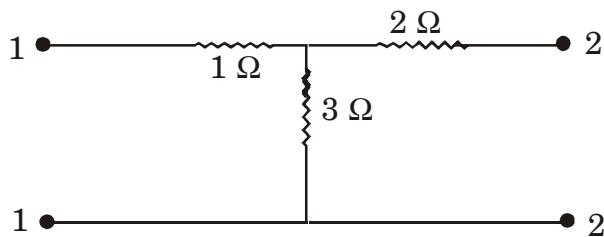
[Maximum Marks : 100

Note : This Paper contains **Fifty (50)** multiple choice questions, each question carrying **Two (2)** marks. Attempt *All* questions.

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- | | |
|---|--|
| <p>1. If the junction temperature of a Zener diode is increased, the breakdown voltage</p> <p>(A) increases</p> <p>(B) decreases</p> <p>(C) remains the same</p> <p>(D) becomes 6.2 volts.</p> <p>2. An ideal OP. AMP is an ideal</p> <p>(A) Voltage controlled current source</p> <p>(B) Voltage controlled voltage source</p> <p>(C) Current controlled voltage source</p> <p>(D) Current controlled current source</p> | <p>3. The most common commercially available tunnel diodes are fabricated from</p> <p>(A) InAs</p> <p>(B) GaAs</p> <p>(C) SiC</p> <p>(D) AlAs</p> <p>4. For IC fabrication, growth of Si is usually favoured along</p> <p>direction.</p> <p>(A) $\langle 100 \rangle$</p> <p>(B) $\langle 101 \rangle$</p> <p>(C) $\langle 110 \rangle$</p> <p>(D) $\langle 111 \rangle$</p> |
|---|--|
-

5. The FET is useful as a voltage controlled resistor in region.
- (A) Pinch-off
 (B) Cut-off
 (C) before pinch-off
 (D) breakdown
6. When applying the Thevenin's theorem to any circuit one of the following is valid ?
- (A) Both voltage source and current source are opened
 (B) Both voltage source and current source are shorted
 (C) The voltage source is opened, the current source is shorted
 (D) The voltage source is shorted, the current source is opened
7. Three equal resistances of 3 ohm are connected in parallel and a 3 Ω resistance is connected in series with this combination. The voltage division ratio resulting out of this arrangement will be :
- (A) 1 : 2
 (B) 1 : 3
 (C) 1 : 4
 (D) 1 : 6
8. Laplace transform of unit impulse function is :
- (A) S
 (B) $\frac{1}{S}$
 (C) 1
 (D) $\frac{1}{S^2}$

9. What is the driving-point impedance at port one with port two open circuited for the network shown below ?



- (A) 4 Ω
 (B) 5 Ω
 (C) 2.2 Ω
 (D) 1 Ω
10. A system is described by :

$$\frac{dx}{dt} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} X + \begin{bmatrix} 0 \\ 1 \end{bmatrix} U$$

$$Y = [1 \ 0]X.$$

The system is :

- (A) Controllable and observable
 (B) Uncontrollable and observable
 (C) Controllable and unobservable
 (D) Uncontrollable and unobservable

11. The harmonic content of a precision rectifier as compared to ordinary rectifier

- (A) increases
 (B) decreases
 (C) equal
 (D) irrelevant

12. Differential amplifier offers

- (A) Low I/P impedance
 (B) Low O/P impedance
 (C) Low I/P capacitance but high

R_{in}

- (D) Large CMRR

13. A multistage amplifier is to amplify dc signal, then one must usecoupling.
- (A) RC
 - (B) Transformer
 - (C) Divert
 - (D) LC
14. The edge triggered phase detector is preferred if the f_{In} and f_{Out} are
- (A) Pulse waveforms with less than 50% duty cycle
 - (B) Continuous waveforms with 100% duty cycles
 - (C) Square waveforms with duty cycle $> 50\%$
 - (D) Triangular waveforms with equal charging and discharging times
15. In case of PLL, capture range is always
- (A) Smaller than lock range
 - (B) Larger than lock range
 - (C) Equal to the lock range
 - (D) Twice the lock range
16. A 4-bit synchronous counter uses flip-flops with propagation delay of 15 ns each. The maximum possible time required for change of state will be :
- (A) 15 ns
 - (B) 30 ns
 - (C) 45 ns
 - (D) 60 ns

17. The main reason why digital computers use complemented subtraction is that it :

- (A) Simplifies the circuitry
- (B) is a very simple process
- (C) can handle negative numbers easily
- (D) avoids direct subtraction

18. CMOS circuits are extensively used for ON-chip computers mainly because of their extremely :

- (A) low power dissipation
- (B) high noise immunity
- (C) large packing density
- (D) low cost

19. Shifting a register content to left by one bit position is equivalent to :

- (A) division by two
- (B) multiplication by two
- (C) addition by two
- (D) subtraction by two

20. For JK flip-flop with $J = 1$, $K = 0$, the output after clock pulse will be :

- (A) 0
- (B) 1
- (C) high impedance
- (D) no change

21. In case of 8051, what is the address range of SFR register bank ?
- (A) 00—77 H
 - (B) 40—80 H
 - (C) 80—7F H
 - (D) 80—FF H
22. Serial port interrupt in 8051 is generated if bits are set.
- (A) IE
 - (B) RI, IE
 - (C) IP, TI
 - (D) RI, TI
23. In 8051, which interrupt has the highest priority ?
- (A) IEI
 - (B) TFO
 - (C) IEO
 - (D) TFI
24. Which pin of port 3 of 8051 has an alternative function as write control signal for external data memory ?
- (A) P3.8
 - (B) P3.3
 - (C) P3.6
 - (D) P3.1
25. In the microprocessor or microcontroller (8085/8086) design the processor architecture mainly used is
- (A) RISC
 - (B) CISC
 - (C) VLIW
 - (D) EPIC

26. What does the following statement mean ?

```
int (*ptr) [10];
```

- (A) ptr is array of pointers to 10 integers
- (B) ptr is pointer to array of 10 integers
- (C) ptr is an array of 10 integers
- (D) ptr is a pointer to array

27. Which of the following header files must be included in a 'C' code while accessing data from serial port ?

- (A) Stdio.h
- (B) Math.h
- (C) IO.h
- (D) Serial.h

28. Logical if statement supports branches, whereas arithmetic if statement support branches.

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

29. What will be the output if you compile and execute the following 'C' code :

```
#define call (x, y) x ## y
```

```
void name {int x = 5, y = 10,  
xy = 20;
```

```
printf("%d", xy + call (x, y));}
```

- (A) 35
- (B) 510
- (C) 15
- (D) 40

30. What will be the output of the following code ?

```
void main( )
{
    int c = 3;

    switch(c)
    {
        case '3':

            printf("hi");

            break;

        case '3':

            printf("hello");

            break;

        default:

            printf("how are you");

    }
}
```

- (A) hi
- (B) hello
- (C) how are you
- (D) hi hello

31. If a transmission line with characteristic impedance Z_0 is terminated by load impedance Z_L , then reflection coefficient is given by :

(A) $\frac{Z_L + Z_0}{Z_L - Z_0}$

(B) $\frac{Z_L}{Z_0}$

(C) $\frac{Z_0}{Z_L}$

(D) $\frac{Z_L - Z_0}{Z_L + Z_0}$

32. Normalised impedance at voltage maximum on Smith chart is :

- (A) Purity capacitive and equal in magnitude to VSWR
- (B) Purity resistive and equal in magnitude to VSWR
- (C) Purity inductive and unequal in magnitude to VSWR
- (D) Purity resistive and unequal in magnitude to VSWR

33. Angle of elevation for antenna beam is 20° . If the communication system uses ionospheric transmission that utilises a layer of virtual height of 200 km transmission path distance with flat earth approximation would be :
- (A) 200 km
(B) 1400 km
(C) 1100 km
(D) 300 km
34. Identify the *incorrect* statement :
- (A) half wave dipole is a resonant antenna
(B) EHF frequency are always greater than UHF
(C) Broadside array has its maximum to the normal to the plane of array
(D) Klystron and Magnetron are solid state microwave devices/ generators
35. A negative resistance is exhibited by
- (A) PN diode
(B) Zener diode
(C) Gunn diode
(D) Varactor diode
36. An FM signal has an intelligence frequency of 5 kHz and a maximum deviation of 25 kHz. Its index of modulation is :
- (A) 125
(B) 0.2
(C) 5
(D) 6

37. If the frequency spectrum of a signal has a band width of 500 Hz with the highest frequency at 600 Hz, what should be the minimum sampling rate, according to the Nyquist theorem ?

- (A) 200 samples/sec.
- (B) 500 samples/sec.
- (C) 1000 samples/sec.
- (D) 1200 samples/sec.

38. If the bit rate for an ASK signal is 1200 bps, the baud rate is

- (A) 300
- (B) 400
- (C) 600
- (D) 1200

39. FIR filters :

- (A) use feedback
- (B) are sometimes called recursive filters
- (C) can oscillate if not properly designed
- (D) use truncated coefficients

40. A DSP convolves each discrete sample with four coefficients and they are all equal 0.25. This must be a :

- (A) Low pass filter
- (B) High pass filter
- (C) Band pass filter
- (D) Band stop filter

41. Protection circuit used in power transistor based converter are normally required to keep operating di/dt and dv/dt :
- (A) with equal allowable limits of the transistor
 - (B) above the allowable limits of the transistor
 - (C) within the allowable limits of the transistor
 - (D) much below the allowable limits of the transistor
42. Stepper motor is basically used for :
- (A) High holding torque
 - (B) High speed operation
 - (C) Synchronous operations
 - (D) low torque applications
43. A semiconductor laser diode produces light due to :
- (A) Stimulated emission by transition between quasi-stable states
 - (B) Spontaneous emission between conduction band and valence band
 - (C) Ionizing excitations
 - (D) Auger effect
44. An improved sensitivity photodetector using widened depletion region due to sandwiched intrinsic layer between anode and cathode is known as :
- (A) Phototransistor
 - (B) Solar cell
 - (C) PIN photodiode
 - (D) LASCR

45. Which of the following reduces pulse broadening over an optical fiber link ?
- (A) use of step index multimode fibers
 - (B) electronic amplifiers at periodic intervals
 - (C) graded index fibers
 - (D) sharp cuts and polishing of fiber tips
46. For a piezoelectric quartz crystal thermometer, the natural frequency of vibration depends on its
- (A) applied voltage
 - (B) applied pressure
 - (C) temperature
 - (D) physical dimensions of the crystal
47. The band width for an ECG amplifier is of the order of
- (A) kHz
 - (B) Hz
 - (C) MHz
 - (D) GHz
48. In UV-visible spectrophotometer, the ultraviolet source is mostly the
- (A) tungsten filament lamp
 - (B) molybdenum filament lamp
 - (C) deuterium discharge lamp
 - (D) sodium discharge lamp
49. The system described by the equation
- $$F(S) = S^4 + 2S^3 + 3S^2 + 6S + K$$
- according to Routh-Hurwitz's criteria, is :
- (A) Unstable for all values of K
 - (B) Stable if $K \geq 0$
 - (C) Stable if $K < 0$
 - (D) Stable for all values of K
50. On introduction of a controller in a control system the overshoot was decreased without decreasing the steady state error on ramp input. The controller can be :
- (A) Proportional controller
 - (B) Derivative controller
 - (C) Integral controller
 - (D) On/Off controller

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