Electronic Science
Paper II

Time Allowed : 75 Minutes]   **[Maximum Marks : 100**

Note : This Paper contains `Fifty` (50) multiple choice questions. Each question carries `Two` (2) marks. Attempt *All* questions.

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1. For a reverse biased diode there is :

   (A) No current at all

   (B) Very small current due to minority carriers

   (C) A large current

   (D) Some current due to majority carriers

2. The gain of a certain amplifier decreases by 8 dB when the frequency is reduced from 1 kHz to 10 Hz. The roll-off is :

   (A) –8 dB/decade

   (B) –4 dB/decade

   (C) –4 dB/octave

   (D) –8 dB/octave

3. Channel is established during the fabrication process itself of the following MOSFET :

   (A) Depletion mode MOSFET

   (B) Enhancement mode MOSFET

   (C) n-Channel enhancement MOSFET

   (D) p-channel enhancement MOSFET

4. The capacitor filter is characterized by :

   (A) Poor voltage regulation and high peak current capability

   (B) Poor voltage regulation and low peak current capability

   (C) Good voltage regulation and high peak current capability

   (D) Good voltage regulation and low peak current capability

5. Substitutional impurities that replaces the silicon in a silica polyhedron are called as :

(A) Network modifier

(B) Interstitial impurities

(C) Network formers

(D) Non-bridging oxygen ion producers

6. Superposition theorem is not applicable to networks containing :

(A) Non-linear elements

(B) Dependent voltage sources

(C) Dependent current sources

(D) Transformers

7. If a network contains B branches and N nodes, then the number of mesh current equations would be :

(A) B – N – 1

(B) B – (N – 1)

(C) N – (B – 1)

(D) (B + N) – 1

8. Laplace transform of t is :

(A) $1/s$

(B) s

(C) $\dfrac{1}{s^2}$

(D) s^2

9. z-transform of $\delta(n)$ is :

(A) 1

(B) z^k

(C) z^{-k}

(D) k

10. Which of the statement is correct for $\frac{1}{s^2}$?

   (A) This has two zeros at origin of s-plane

   (B) This has two poles at origin of s-plane

   (C) This has complex conjugate poles on imaginary axis of s-plane

   (D) This has two poles at infinity of s-plane

11. An input of a.c. frequency f is fed to a half wave rectifier. The main component frequency in the ripple will be :

   (A) f

   (B) $2f$

   (C) $f/2$

   (D) ∞ (Infinity)

12. Current output of a Zener diode based voltage regulator :

   (A) is limited by Zener current

   (B) can be augmented with the help of Darlington pair

   (C) is limited by load

   (D) can not be changed

13. The main advantages of a differential amplifier over single stage amplifier are :

   (A) Stability and low noise

   (B) Stability and greater amplification

   (C) CMRR is low and gain is higher

   (D) CMRR is high and gain is higher

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14. For an op-amp based integrator, a feedback capacitor is 1 µF and the input resistance is 100 kΩ. The input voltage is $V_1(t)$. Then the output is :

(A) $-\int\limits_0^t V_1 dt$

(B) $-10\int\limits_0^t V_1 dt$

(C) $-\dfrac{1}{10}\int\limits_0^t V_1 dt$

(D) $\int\limits_0^t V_1 dt$

15. The output of a noisy level detector is fluctuating with + 0.5 volts. An Schmitt trigger is to be used for the triggering. The upper level and lower level for trigger must be separated by at least :

(A) 0.5 V

(B) 1 V

(C) between 0.5 and 1 V

(D) between 0 and 0.5 V

16. The maximum number of 3-input gates in a 16 pin IC will be :

(A) 2

(B) 3

(C) 4

(D) 5

17. Which one of the following is an example of a counter with a truncated modulus ?

(A) Modulus 8

(B) Modulus 32

(C) Modulus 16

(D) Modulus 14

18. The group of bits 10110101 is serially shifted (right most bit first) into 8-bit parallel output shift register with an initial state of 11100100. After two clock pulses, the register contains :

    (A) 01011110

    (B) 10110101

    (C) 01111001

    (D) 00101101

19. A 32-bit data word consists of :

    (A) 2 bytes

    (B) 4 nibbles

    (C) 4 bytes

    (D) 3 bytes and 1 nibble

20. The 74LS83A is an example of a 4-bit parallel adder. To expand this device to an 8-bit adder, you must :

    (A) Use four adders with inter-connections

    (B) Use two adders and connect the sum outputs of one to the bit inputs of the other

    (C) Use eight adders with inter-connections

    (D) Use two adders with carry output of one connected to the carry input of the other

21. A digital multimeter is an example of an embedded system for :

    (A) Data communication

    (B) Monitoring

    (C) Control

    (D) Data processing

22. Which port of 8051 is 'true bidirectional' ?

   (A) Port 0

   (B) Port 1

   (C) Port 2

   (D) Port 3

23. Which is the addressing mode for the instruction MOV A, @ RO ?

   (A) Direct

   (B) Indirect

   (C) Immediate

   (D) Indexed

24. In case of 8051 microcontrollers, what will be the value of 'Program Counter (PC)' after a proper power on reset ?

   (A) FFFFH

   (B) 0007H

   (C) Random Value

   (D) 0000H

25. For the 8051 microcontroller, name the register which acts as the 'Receive' and 'Transmit' buffer in serial communication operation :

   (A) SCON

   (B) PCON

   (C) SBUF

   (D) Accumulator

26. What will be the output of the following C program module ?

```
main( )
{
    int i, j;
    for(i=0; i < =10, i++)
    { j = 5 * i;
    j++;
    }
    print ("%d %d", i, j);
```

(A) 10 51

(B) 11 50

(C) 10 50

(D) 11 51

27. What of the following header file must be included in a C code while drawing some diagrams on the screen ?

(A) stdio.h

(B) graphics.h

(C) math.h

(D) string.h

28. Setting up of baud rate is a must for :

(A) mathematical expression evaluation

(B) parallel port operations

(C) sound generation

(D) serial port operations

29. Dummy variables are used to :

(A) restrict their scope within a function

(B) allow transfer of values between the functions

(C) expand list of variables

(D) fix the constants

30. The evaluation of the following integer expression :

   ((5+3/2) +7/4)/3

   result into :

   (A) 2

   (B) 0

   (C) 1

   (D) 3

31. It is observed that for a load, the voltage first minimum occurs at a distance of $\lambda/8$ from the load. If $|\rho|=1$, the reflection coefficient is :

   (A) 1

   (B) i

   (C) $-i$

   (D) $1+i$

32. A transmission line with $z_0 =100$ Ω is connected to a load of 400 Ω through another transmission line of length $\lambda/8$ and characteristic impedance of 200 Ω. The reflection coefficient is :

   (A) 1

   (B) i

   (C) $-i$

   (D) -1

33. In a rectangular waveguide with dimensions 4 cm × 1 cm, condition for single lowest possible mode transmission is satisfied for :

   (A) λ = 0.5 cm

   (B) λ = 4 cm

   (C) λ = 1 cm

   (D) λ = 6 cm

34. Measured beam solid angle for an antenna is π. The gain turns out to be 3. The efficiency factor for antenna is :

(A) 0.5

(B) 0.75

(C) 0.8

(D) 0.9

35. In microwave tunnel diodes :

(A) p is lightly doped but n is highly doped

(B) p and n are lightly doped

(C) p and n are heavily doped

(D) p is heavily doped by n is lightly doped

36. Assume that a binary PCM singal, with polar NRZ signalling, is passed through a communication system with a raised cosine roll-off filtering characteristics and the the roll factor is 0.25. The bit rate of the PCM signal is 64 k bits/sec. The absolute bandwidth of the filtered PCM signal is ....kHz.

(A) 10

(B) 20

(C) 30

(D) 40

37. ....of the following is often called as linear modulation.

(A) AM

(B) FM

(C) PM

(D) FSK

38. ....is an example of a feedback FM dimodulator.

   (A) Slope detector

   (B) Envelope detector

   (C) Linearity discriminator

   (D) Phase lock loop

39. For 16-PSK and a transmission system with a 10 kHz bandwidth, the maximum bit rate is :

   (A) 16,000 bps

   (B) 10,000 bps

   (C) 40,000 bps

   (D) 20,000 bps

40. The power level in dBm for a signal level of the 10 mW is :

   (A) 10 dBm

   (B) 20 dBm

   (C) 1 dBm

   (D) 1/10 dBm

41. Which of the following is *not* a desired characteristics of a power electronic switching device ?

   (A) zero conduction and switching losses

   (B) instant turn-on and turn-off times

   (C) high leakage current

   (D) ability to withstand current overloads

42. A typical uninterruptible power supply system would require :

(A) DC to DC converter

(B) Inverter

(C) Chopper

(D) Commutator

43. A stepper motor is basically known for :

(A) High holding torque

(B) High speed operation

(C) Synchronous control

(D) AC drive

44. The reason for use of optical fibers in communication system is :

(A) High attenuation

(B) Low flexibility

(C) High noise

(D) High bandwidth

45. Which device among the following will have highest sensitivity ?

(A) Photodiode

(B) Phototransistor

(C) APD

(D) LDR

46. A LVDT has :

    (A) One primary coil and one secondary coil

    (B) Two primary coils and two secondary coils

    (C) One primary coil and two secondary coils

    (D) Two primary coils and one secondary coil

47. An increase in pH value above 7.0 indicates :

    (A) increasing basicity

    (B) decreasing basicity

    (C) increasing alkalinity

    (D) decreasing alkalinity

48. A causal discrete time system is stable if the poles of the transfer function lie :

    (A) within the unit circle

    (B) on the unit circle

    (C) out side the unit circle

    (D) any where over the circle

49. Feedback control systems are

    (A) Low pass filters

    (B) High pass filters

    (C) Band pass filters

    (D) Band reject filters

50. A microphone is classified as a ....transducer

    (A) Thermal

    (B) Magnetic

    (C) Acoustical

    (D) Optical

ROUGH WORK

ROUGH WORK

Test Booklet No.

प्रश्नपत्रिका क्र.

F

Paper-II
ELECTRONIC SCIENCE

Signature and Name of Invigilator

Seat No. [　][　][　][　][　][　]

1. (Signature) ....

(In figures as in Admit Card)

(Name) ....

Seat No. ....

2. (Signature) ....

(In words)

(Name) ....

OMR Sheet No. [　][　][　][　][　][　]

FEB - 38213

(To be filled by the Candidate)

Time Allowed : 1¼ Hours]

[Maximum Marks : 100

Number of Pages in this Booklet : **16**

Number of Questions in this Booklet : **50**

<table>
<tr><td>

Instructions for the Candidates

1. Write your Seat No. and OMR Sheet No. in the space provided on the top of this page.
2. 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).
3. 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 :
   (i) 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.
   (ii) **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.**
   (iii) After this verification is over, the OMR Sheet Number should be entered on this Test Booklet.
4. 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) ● (D)

5. 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.
6. Read instructions given inside carefully.
7. Rough Work is to be done at the end of this booklet.
8. 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.
9. 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.
10. **Use only Blue/Black Ball point pen.**
11. **Use of any calculator or log table, etc., is prohibited.**
12. **There is no negative marking for incorrect answers.**

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विद्यार्थ्यांसाठी महत्त्वाच्या सूचना

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

   (A) (B) ● (D)

5. या प्रश्नपत्रिकेतील प्रश्नांची उत्तरे **ओ.एम.आर. उत्तरपत्रिकेतच दर्शवावीत.** इतर ठिकाणी लिहीलेली उत्तरे तपासली जाणार नाहीत.
6. आत दिलेल्या सूचना काळजीपूर्वक वाचाव्यात.
7. प्रश्नपत्रिकेच्या शेवटी जोडलेल्या कोऱ्या पानावरच कच्चे काम करावे.
8. जर आपण ओ.एम.आर. वर नमूद केलेल्या ठिकाणा व्यतिरीक्त इतर कोठेही नाव, आसन क्रमांक, फोन नंबर किंवा ओळख पटेल अशी कोणतीही खूण केलेली आढळून आल्यास अथवा असभ्य भाषेचा वापर किंवा इतर गैरमार्गांचा अवलंब केल्यास विद्यार्थ्याला परीक्षेस अपात्र ठरविण्यात येईल.
9. परीक्षा संपल्यानंतर विद्यार्थ्याने मूळ ओ.एम.आर. उत्तरपत्रिका पर्यवेक्षकांकडे परत करणे आवश्यक आहे. तथापि, प्रश्नपत्रिका व ओ.एम.आर. उत्तरपत्रिकेची द्वितीय प्रत आपल्याबरोबर नेण्यास विद्यार्थ्यांना परवानगी आहे.
10. **फक्त निळ्या किंवा काळ्या बॉल पेनाचाच वापर करावा.**
11. **कॅल्क्युलेटर किंवा लॉग टेबल वापरण्यास परवानगी नाही.**
12. **चुकीच्या उत्तरासाठी गुण कपात केली जाणार नाही.**

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