

**ROYAL CIVIL SERVICE COMMISSION
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2019
EXAMINATION CATEGORY: TECHNICAL**

**PAPER III: SUBJECT SPECIALISATION PAPER FOR ELECTRONICS AND
COMMUNICATION ENGINEERING**

Date	: October 13, 2019
Total Marks	: 100
Writing Time	: 150 minutes (2.5 hours)
Reading Time	: 15 minutes (prior to writing time)

GENERAL INSTRUCTIONS:

1. Write your Registration Number clearly and correctly on the Answer Booklet.
2. The first 15 minutes is to check the number of pages of Question Paper, printing errors, clarify doubts and to read the instructions. You are NOT permitted to write during this time.
3. This paper consists of **TWO SECTIONS**, namely SECTION A & SECTION B:
 - **SECTION A** has two parts: Part I - 30 Multiple Choice Questions
Part II - 4 Short Answer Questions

All questions under SECTION A are COMPULSORY.
 - **SECTION B** consists of two Case Studies. Choose only **ONE** case study and answer the questions of your choice.
4. All answers should be written on the Answer Booklet provided to you. Candidates are not allowed to write anything on the question paper. If required, ask for additional Answer Booklet.
5. All answers should be written with correct numbering of Section, Part and Question Number in the Answer Booklet provided to you. Note that any answer written without indicating the Section, Part and Question Number will NOT be evaluated and no marks will be awarded.
6. Begin each Section and Part in a fresh page of the Answer Booklet.
7. You are not permitted to tear off any sheet(s) of the Answer Booklet as well as the Question Paper.
8. Use of any other paper including paper for rough work is not permitted.
9. **You are required to hand over the Answer Booklet to the Invigilator before leaving the examination hall.**
10. This paper has **6 printed pages**, including this instruction page.

GOOD LUCK

SECTION A

PART I: Multiple Choice Questions (30 marks)

Choose the correct answer and write down the letter of your chosen answer in the Answer Booklet against the question number e.g. 31 (d). Each question carries ONE mark. Any double writing, smudgy answers or writing more than one choice shall not be evaluated.

1. Which circuit is called as regenerative repeaters?
 - a) Analog circuits
 - b) Digital circuits
 - c) Amplifiers
 - d) A/D converters

2. What type of switch is this?

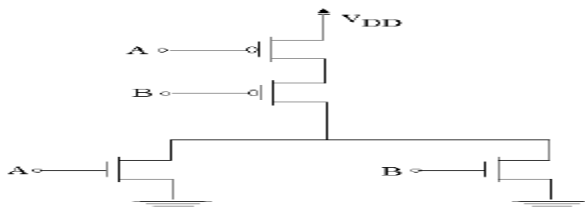


- a) Push button
 - b) SPST
 - c) DPDT
 - d) SPDT

3. What transmission medium is best suited for high-capacity and minimal interference?
 - a) Coaxial cable
 - b) Twisted pair copper wire.
 - c) Satellite
 - d) Optical Fiber

4. What are the advantages of digital circuits?
 - a) Less noise
 - b) Less interference
 - c) More flexible
 - d) All of the above.

5. The circuit shown in Figure below represents _____ gate.



- a) AND
 - b) NAND
 - c) OR
 - d) NOR

6. How many bytes does a gigabyte have?
 - a) 1 million bytes
 - b) 10 million bytes
 - c) 1 billion bytes
 - d) 10 billion bytes

7. What is the ASCII value of space?
 - a) 32
 - b) 48
 - c) 96
 - d) 65

8. Source coding block is used for
 - a) Compressing
 - b) Digitizing
 - c) A/D conversion
 - d) All of the above

9. The range of frequencies of significant amplitude centered around a resonant frequency is called the _____.
 - a) signal-to-noise ratio
 - b) bandwidth
 - c) quality factor
 - d) carrier frequency





10. Digital communication _____ to environmental changes?
 - a) is less sensitive
 - b) is more sensitive
 - c) does not depend
 - d) None of the above.

11. The most commonly used semiconductor material is
 - a) Silicon.
 - b) Germanium.
 - c) mixture of Silicon and Germanium.
 - d) None of the above.

12. Primary batteries, unlike secondary batteries, may be
 - a) charged once.
 - b) used once.
 - c) recharged over and over.
 - d) stored indefinitely.

13. Which of the following is not a scripting language?
 - a) HTML
 - b) XML
 - c) Postscript
 - d) Javascript

14. Advantages of digital communication are
- easy multiplexing.
 - easy processing.
 - reliable.
 - All of the above.
15. Which material may also be considered a semiconductor element?
- Carbon
 - Ceramic
 - Mica
 - Argon
16. Examples of digital communication are
- ISDN
 - Modems
 - Cellular phone
 - All of the above.
17. The interval of frequencies outside which the spectrum is zero is called as _____.
- null to null bandwidth
 - normalized bandwidth
 - absolute bandwidth
 - None of the above
18. AI stands for
- Atomic Interference
 - Artificial Intelligence
 - Automatic Intelligence
 - Artificial Interference
19. What are the main features of a receiver?
- Synchronization
 - Multiple parallel receiver chain.
 - Synchronization and Multiple parallel receiver chain.
 - None of the above.
20. A communication satellite is a repeater between
- a transmitting station and a receiving station.
 - a transmitting station and many receiving station.
 - many transmitting station and many receiving station.
 - None of the above.
21. Radio broadcasting is a familiar example of
- space multiplexing.
 - time multiplexing.
 - frequency multiplexing.
 - None of the above.

22. A geosynchronous satellite
- a) has the same period as that of the earth.
 - b) has a circular orbit.
 - c) rotates in the equatorial plane.
 - d) has all of the above.
23. Ground wave communication occurs in
- a) low frequency band.
 - b) medium frequency band.
 - c) low and medium frequency band.
 - d) None of the above.
24. A signal can be recovered from its sample by using
- a) low pass filter.
 - b) high pass filter.
 - c) band pass filter.
 - d) band stop filter.
25. In the digital communication system, signals in different frequency bands are
- a) Orthogonal.
 - b) Non orthogonal.
 - c) Orthogonal and Non orthogonal.
 - d) None of the above.
26. The battery symbol is
- a) 
 - b) 
 - c) 
 - d) 
27. The causes for error performance degradation in communication systems are
- a) interference.
 - b) electrical noise.
 - c) effect of filtering.
 - d) All of the above.
28. Which of the following diodes is operated in reverse bias mode?
- a) P-N junction
 - b) Zener
 - c) Tunnel
 - d) None of the above.

29. An Atom's atomic number is determined by the number of
- neutron minus proton.
 - protons.
 - neutrons.
 - electrons.
30. A computer communication technology that provides a way to interconnect multiple computers across short distance is
- Local Area Network.
 - Wide Area Network.
 - Metropolitan Area Network.
 - Wireless Network.

PART II – Short Answer Questions (20 marks)

This part has 4 Short Answer Questions. Answer ALL the questions. Each question carries 5 marks.

- What are the advantages and disadvantages of Digital Communication?
- In communication system, what do you understand by term “crosstalk”?
- What is a Repeater?
- Explain Multiplexing and Attenuation?

SECTION B: Case Study (50 marks)

Choose either CASE I or CASE II from this section. Each case study carries 50 marks.

CASE I

You are hired as a consultant by a Cable Operator to design a cable distribution network. The Cable Operator wanted to have a network system that will ensure that there is no disruption to the distribution of his cable television service to his clients. Therefore, as a consultant, design a network system that will ensure that the clients could have access to cable services throughout the year. Explain with diagram which type of network you would suggest and why?

CASE II

You are hired to make a presentation on satellite communication system? As a presenter, you are required to explain the following:

- What is Satellite Communication system? Explain how it works with illustration.
- Advantages and disadvantages of Satellite Communication system.
- Applications of Satellite Communication system.
- Different type of Satellite and its applications.
- Why satellite communication system is important for Bhutan.

TASHI DELEK