

**CBT 2**

Computer Based Test - Stage 2

इलेक्ट्रॉनिक्स इंजीनियरिंग

**RRB-JE**

Previous Year Questions Paper With Solutions

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# Preface

Railway Recruitment Board-Junior Engineer has always been preferred by Engineers due to job stability. Indian Railways is one of the biggest Government employers in India. With the exam being just a few months away, it is time for the candidates planning to appear for the exam to pull up their socks and start their RRB-JE preparation.

The RRB-JE exam is conducted in two stages as shown in table given below.

RRB Exam	Subjects	Total Ques.	Total Marks	Duration
CBT – 1	Quantitative Aptitude	30	100	90 Min.
	General Intelligence & Reasoning	25		
	General Awareness	15		
	General Science	30		
CBT – 2	General Awareness	15	150	120 Min.
	Physics and Chemistry	15		
	Basics of Computer and Applications	10		
	Basics of Environment and Pollution control	10		
	Technical Abilities	100		

We hope this book will be proved an important tool to succeed in RRB-JE and Sr. Section Engineer Exams.

It is earnestly hoped that with the extensive additions and revisions, the present edition will facilitate the students not only in preparing themselves for competitive examinations but also in preparing for their regular examinations and prove more useful to the students than the earlier editions.

Even though, enough readings were given for correcting the error and printing mistakes, due to human tendency there could be some minor typos in the book. If any such typos found, they will be highly appreciated and in incorporated in the next edition. Also, please provide your valuable suggestions at :engineers.academy.india@gmail.com

All the Best!



Engineers Academy Editorial Board

# SYLLABUS

## 1. Electronic Components & Materials

Conductors, Semi conductor & Insulators; Magnetic materials; Jointing & Cleaning materials for U/G copper cable & OFC; Cells and Batteries (chargeable and non chargeable); Relays, Switches, MCB & Connectors.

## 2. Electronic Devices and circuits

PN Junction diodes, thyristor; Diode and triode circuits; Junction Transistors; Amplifiers; Oscillator; Multivibrator, counters; Rectifiers; Inverter and UPS.

## 3. Digital Electronics

Number System & Binary codes; Boolean Algebra & Logic gates; Combinational & Sequential logic circuits; A/D & D/A converter, counters; Memories

## 4. Linear Integrated Circuit

Introduction to operational Amplifier; Linear applications; Non Linear applications; Voltage regulators; Timers; Phase lock loop.

## 5. Microprocessor and Microcontroller

Introduction to microprocessor, 8085 microprocessor working; Assembly Language programming; Peripherals & other microprocessors; Microcontrollers.

## 6. Electronic Measurements

Measuring systems; Basic principles of measurement; Range Extension methods; Cathode ray oscilloscope, LCD, LED panel; Transducers

## 7. Communication Engineering

Introduction to communication; Modulation techniques; Multiplexing Techniques; Wave Propagation, Transmission line characteristics, OFC; Fundamentals of Public Address systems, Electronic exchange, Radar, Cellular and Satellite Communication.

## 8. Data communication and Network

Introduction to data communication; Hardware and interface; Introduction to Networks and Networking devices; Local Area Network and Wide area network; Internet working.

## 9. Computer Programming

Programming concepts; Fundamentals of 'C' and C++; Operators in 'C' and C++; Control Statements; Functions, Array String & Pointers, File Structure; Data Structure and DBMS

## 10. Basic Electrical Engineering

DC Circuits; AC fundamentals; Magnetic, Thermal and Chemical effects of Electric current; Earthing - Installation, Maintenance, Testing,

# CONTENTS

S.No.	TOPIC	Page No.
1.	Network Theory .....	01 – 30
2.	Electronics Components and Devices .....	31 – 58
3.	Principles of Digital Electronics .....	59 – 80
4.	Microprocessor .....	81 – 87
5.	Principle of Communication Engineering .....	88 – 95
6.	Measurement .....	96 – 112





6. Electric heater utilizes \_\_\_\_\_ effect of current.

- (a) Chemical
- (b) Heating
- (c) Mechanical
- (d) field

[RRB JE : 16.09.2015, 29.03.2014]

7. When a material becomes superconducting its resistivity becomes

- 1. Very low
- 2. Zero
- 3. about 10% of the normal value
- 4. about 20% of the normal value

- (a) 1
- (b) 2
- (c) 3
- (d) 4

[RRB JE : 28.08.2015]

8. The resistance of a conductor does not depend on which of the following

- (a) Shape of the cross-section
- (b) temperature
- (c) substance
- (d) length

[RRB JE : 18.08.2015]

9. The temperature at which the wire is heated in a safety fuse is directly proportional to

- (a) Square of electric current
- (b) fourth power of electric current
- (c) cube of electric current
- (d) none of these

[RRB JE : 2014]

10. An electric current in a metal wire is caused by the flow of

- (a) Proton electron
- (b) electron
- (c) ion
- (d) None of these

[RRB JE : 2014]

6. विद्युत हीटर में धारा के प्रभाव का उपयोग करते हैं।

- (a) रासायनिक प्रभाव का
- (b) तापीय प्रभाव का
- (c) यांत्रिक प्रभाव का
- (d) क्षेत्रीय प्रभाव का

[RRB JE : 16.09.2015, 29.03.2014]

7. जब कोई पदार्थ अतिचालक हो जाता है, तब उसकी प्रतिरोधकता हो जाती है

- 1. बहुत कम
- 2. शून्य
- 3. सामान्य मान का लगभग 10%
- 4. सामान्य मान का लगभग 20%

- (a) 1
- (b) 2
- (c) 3
- (d) 4

[RRB JE : 28.08.2015]

8. सुचालक का प्रतिरोध निम्न में से किस पर निर्भर नहीं करता

- (a) अनुप्रस्थ काट की आकृति पर
- (b) तापमान
- (c) पदार्थ
- (d) लम्बाई

[RRB JE : 18.08.2015]

9. सुरक्षा फ्यूज में जिस तापमान पर तार तप्त होती है वह किसके अनुक्रमानुपाती होता है ?

- (a) विद्युत प्रवाह के वर्ग के
- (b) विद्युत प्रवाह के चौथे घात (पावर) के
- (c) विद्युत प्रवाह के घन के
- (d) इनमें से कोई नहीं

[RRB JE : 2014]

10. एक धातु की तार में विद्युत धारा \_\_\_\_\_ के प्रवाह के कारण होती है –

- (a) प्रोटोन
- (b) इलेक्ट्रान
- (c) आयन
- (d) इनमें से कोई नहीं

[RRB JE : 2014]

72. Calculate the power in a line having a resistance of 4 Ohms when 8 A direct-current is flowing in the line.  
 (a) 231 Watts (b) 239 Watts  
 (c) 241 Watts (d) 256 Watts  
**[RRB JE : 01.09.2019]**
73. The most commonly used electrical conductor is-  
 (a) Lead (b) Copper  
 (c) Brass (d) Tin  
**[RRB JE : 01.09.2019]**
74. In ideal case, the charging current for 200 Ah battery would be-  
 (a) 15 A (b) 20 A  
 (c) 12 A (d) 10 A  
**[RRB JE : 01.09.2019]**
75. Two ampere hour (Ah) is equal to how many Coulombs?  
 (a) 2 C (b) 8400 C  
 (c) 7200 C (d) 2400 C  
**[RRB JE : 01.09.2019]**
76. Which of the given units are NOT derived Units?  
 (a) Kilogram (b) Watt  
 (c) Pascal (d) Newton  
**[RRB JE : 01.09.2019]**
72. जब 8A दिष्ट धारा लाइन में प्रवाहित हो रही हो तो 4 ओम के प्रतिरोध वाली लाइन में शक्ति की गणना करे।  
 (a) 231 Watts (b) 239 Watts  
 (c) 241 Watts (d) 256 Watts  
**[RRB JE : 01.09.2019]**
73. विद्युतीय चालक में सामान्यतः उपयोग किया जाता है।  
 (a) सीसा (b) तांबा  
 (c) पीतल (d) टिन  
**[RRB JE : 01.09.2019]**
74. एक आदर्श स्थिति में 200 Ah बैट्री के लिए प्रवाहित चार्जिंग धारा का मान होगा ?  
 (a) 15 A (b) 20 A  
 (c) 12 A (d) 10 A  
**[RRB JE : 01.09.2019]**
75. दो एम्पियर घंटे (Ah) कितने कूलॉम के बराबर होते हैं।  
 (a) 2 C (b) 8400 C  
 (c) 7200 C (d) 2400 C  
**[RRB JE : 01.09.2019]**
76. दी गई इकाइयों में से कौन सी इकाईयाँ व्युत्क्रम नहीं है।  
 (a) Kilogram (b) Watt  
 (c) Pascal (d) Newton  
**[RRB JE : 01.09.2019]**

ENGINEERS ACADEMY

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Detailed Solution of Circuit Theory

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## RRB : SENIOR SECTION ENGINEER

1. A fuse wire should have
- Low specific resistance and high melting point
  - Low specific resistance and low melting point
  - High specific resistance and high melting point
  - High specific resistance and low melting point

[RRB SSE : 03.09.2015]

2. To increase the voltage output, several cells are connected in :
- parallel
  - series-parallel
  - resonance
  - series

[RRB SSE : 03.09.2015]

3. The element of electric heater is made of :
- Copper
  - Steel
  - Carbon
  - Nichrome

[RRB SSE : 02.09.2015]

4. If two conductors carry current in the same direction
- Conductors attract each other
  - Conductors are in resonance
  - Conductors repulsion each other
  - Voltage between conductors increases

[RRB SSE : 21.12.2014]

5. A material is said to have become superconductor when
- its resistance becomes negative
  - its resistance becomes very small
  - its resistance becomes very high
  - its resistance becomes zero

[RRB SSE - 21.12.2014]

1. एक फ्यूज तार में होता है।
- निम्न विशिष्ट प्रतिरोध और उच्च गलनांक बिंदु
  - निम्न विशिष्ट प्रतिरोध और निम्न गलनांक बिंदु
  - उच्च विशिष्ट प्रतिरोध और उच्च गलनांक बिंदु
  - उच्च विशिष्ट प्रतिरोध और निम्न गलनांक बिंदु

[RRB SSE : 03.09.2015]

2. किसी सेलों के संयोजन में आउटपुट वोल्टता में वृद्धि होती है, तब संयोजन किस प्रकार का होगा—
- समानांतर
  - श्रेणी समानांतर में
  - अनुनाद में
  - श्रेणी में

[RRB SSE : 03.09.2015]

3. विद्युत हीटर का एलीमेंट बना होता है ?
- तांबा
  - स्टील
  - कार्बन
  - नाईक्रोम

[RRB SSE : 02.09.2015]

4. यदि दो चालक समान दिशा में धारा ले जाने पर —
- चालक एक दूसरे को आकर्षित करेंगे
  - चालकों में अनुनाद होगा
  - चालक एक दूसरे को प्रतिकर्षित करेंगे
  - दोनों चालकों के बीच वोल्टता बढ़ेगी

[RRB SSE : 21.12.2014]

5. एक पदार्थ में क्या होने पर अति चालक पदार्थ होता है ?
- प्रतिरोध का मान ऋणात्मक होता है।
  - प्रतिरोध का मान बहुत कम होता है।
  - प्रतिरोध का मान बहुत अधिक होता है।
  - प्रतिरोध का मान शून्य होगा।

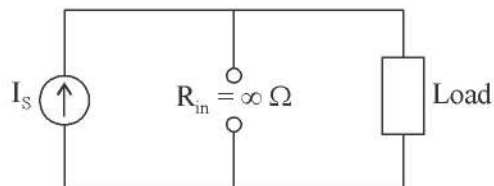
[RRB SSE - 21.12.2014]

## RRB : JE

## ANSWERS AND EXPLANATIONS

1. Ans. (a)

2. Ans. (c)



For the ideal current source, the current is completely independent of voltage source and has infinite internal resistance.

3. Ans. (d)

The total a number of atoms in a face centered cube (FCC) IS 14. It has 8 atoms on its corners and 6 atoms on its faces.

The number of atoms in the unit cell of FCC is 4.

$$\Rightarrow 4 \times \frac{1}{4} + 6 \times \frac{1}{2} = 1 + 3 = 4$$

4. Ans. (c)

5. Ans. (a)

6. Ans. (b)

7. Ans. (b)

8. Ans. (a)

9. Ans. (a)

10. Ans. (b)

11. Ans. (c)

12. Ans. (c)

$$I = 2A \quad T = 3 \mu\text{sec} = 3 \times 10^{-6} \text{ sec}$$

$$e = 1.6 \times 10^{-19} \text{ C}$$

No of electron = ?

$$\therefore q = it = 2 \times 3 \times 10^{-6} = 6 \times 10^{-6}$$

$$q = ne$$

$$\Rightarrow n = \frac{q}{e} = \frac{6 \times 10^{-6}}{1.6 \times 10^{-19}}$$

$$\Rightarrow = \frac{6}{1.6} \times 10^{-6} \times 10^{19}$$

$$\Rightarrow n = 3.75 \times 10^{13}$$

13. Ans. (a)

$$\text{Length (l)} = 100 \text{ m}$$

Cross-section area (a)

$$= 0.1 \text{ mm}^2$$

$$= 1 \times 10^{-7} \text{ m}^2$$

$$R = \frac{\rho l}{a}$$

$$R = \frac{50 \times 10^{-8} \times 100}{1 \times 10^{-7}}$$

$$R = 50 \times 10^{-8} \times 10^7 \times 100$$

$$R = 5 \times 100$$

$$R = 500 \Omega$$

14. Ans. (b)

Formula power loss

$$P = \frac{V^2}{R}$$

$$V^2 = I^2 R^2$$

$$P = \frac{I^2 R^2}{R} = I^2 R$$

$$P = I^2 R$$

15. Ans. (a)

16. Ans. (a)

17. Ans. (b)



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