



Government of Karnataka

Karnataka Secondary Education Examination Board

Question Paper

ANSWER KEY



CCE RF/RR

ಕರ್ನಾಟಕ ಶಾಲಾ ಪರೀಕ್ಷೆ ಮತ್ತು ಮೌಲ್ಯನಿರ್ಣಯ ಮಂಡಲಿ, ಮಲ್ಲೇಶ್ವರಂ, ಬೆಂಗಳೂರು - 560 003

**KARNATAKA SCHOOL EXAMINATION AND ASSESSMENT BOARD,
MALLESHWARAM, BENGALURU - 560 003**

ಮಾರ್ಚ್/ಏಪ್ರಿಲ್ 2025 ರ ಪರೀಕ್ಷೆ-1
MARCH/APRIL 2025 EXAMINATION-1

ಮಾದರಿ ಉತ್ತರಗಳು
MODEL ANSWERS

ಸಂಕೇತ ಸಂಖ್ಯೆ : **51**

CODE NO. : 51

ವಿಷಯ : ಎಲಿಮೆಂಟ್ಸ್ ಆಫ್ ಎಲೆಕ್ಟ್ರಿಕಲ್ ಇಂಜಿನಿಯರಿಂಗ್ - IV

Subject : ELEMENTS OF ELECTRICAL ENGINEERING-IV

(ಶಾಲಾ ಅಭ್ಯರ್ಥಿ / ಶಾಲಾ ಪುನರಾವರ್ತಿತ ಅಭ್ಯರ್ಥಿ)

(Regular Fresh / Regular Repeater)

ದಿನಾಂಕ : 01. 04. 2025]

[ಗರಿಷ್ಠ ಅಂಕಗಳು : 80

Date : 01. 04. 2025]

[Max. Marks : 80



Qn. Nos.	Value Points	Total
1.	The S.I. unit of frequency is (A) hertz (B) ampere (C) volt (D) watt Ans. (A) hertz	1
2.	For a sine wave RMS value is (A) 0.637 (B) 1.11 (C) 0.707 (D) 1.414 Ans. (C) 0.707	1

CCE RF/RR(A)/101/1829 (MA)

[Turn over

Qn. Nos.	Value Points	Total
3.	The core of an alternator is made of (A) Brass (B) Silicon steel (C) Aluminium (D) Copper Ans. (B) Silicon steel	1
4.	An A.C. generator converts (A) Mechanical energy into DC electrical energy (B) Mechanical energy into chemical energy (C) Electrical energy into mechanical energy (D) Mechanical energy into A.C. electrical energy Ans. (D) Mechanical energy into A.C. electrical energy	1
5.	In step-up transformer (A) $N_1 < N_2$ (B) $I_1 = I_2$ (C) $N_1 > N_2$ (D) $N_1 = N_2$ Ans. (A) $N_1 < N_2$	1
6.	Electrical bell is an example for (A) heating effect (B) lighting effect (C) chemical effect (D) magnetic effect Ans. (D) magnetic effect	1

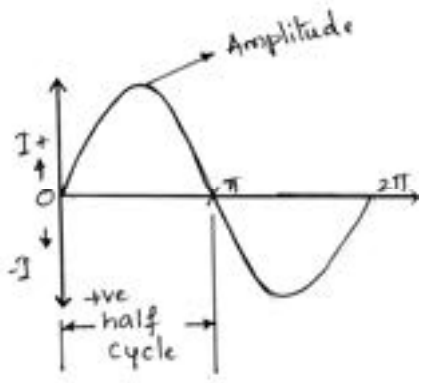


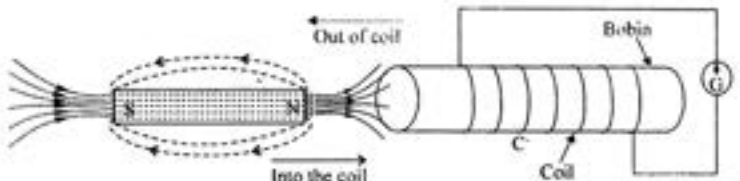
Qn. Nos.	Value Points	Total
7.	Which of the following is a non-renewable source of energy ? (A) Hydroelectric energy (B) Solar energy (C) Nuclear energy (D) Wind energy <i>Ans.</i> (C) Nuclear energy	1
8.	Which of the following power plants uses coal ? (A) Solar power plant (B) Nuclear power plant (C) Thermal power plant (D) Hydroelectric power plant <i>Ans.</i> (C) Thermal power plant	1
9.	An impurity which accepts the electron is called (A) Acceptor impurity (B) Pentavalent impurity (C) Donor impurity (D) Trivalent impurity <i>Ans.</i> (A) Acceptor impurity	1



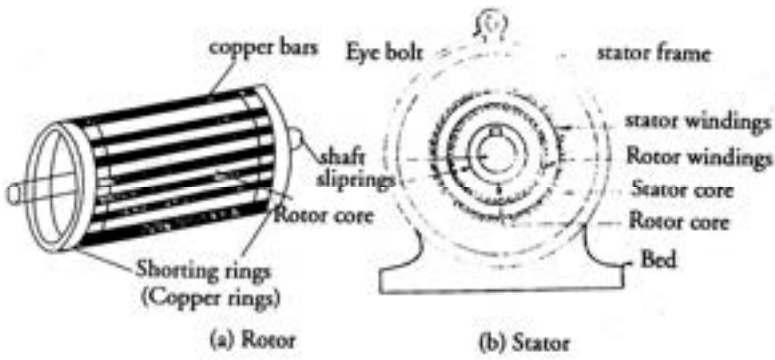
Qn. Nos.	Value Points	Total
10.	A pure semiconductor is called (A) Extrinsic semiconductor (B) P-type semiconductor (C) Intrinsic semiconductor (D) N-type semiconductor Ans. (C) Intrinsic semiconductor	1
11. a)	Define A.C. Ans. The current which changes both magnitude and direction at regular intervals of time is called alternating current.	2
b)	Explain the following terms : i) RMS value ii) Frequency Ans. i) <u>RMS value</u> When direct current flows through a given circuit for a given time produces heat as produced by alternating current for the same time is called RMS value. $I_{rms} = 0.707$ $V_{rms} = 0.707$	

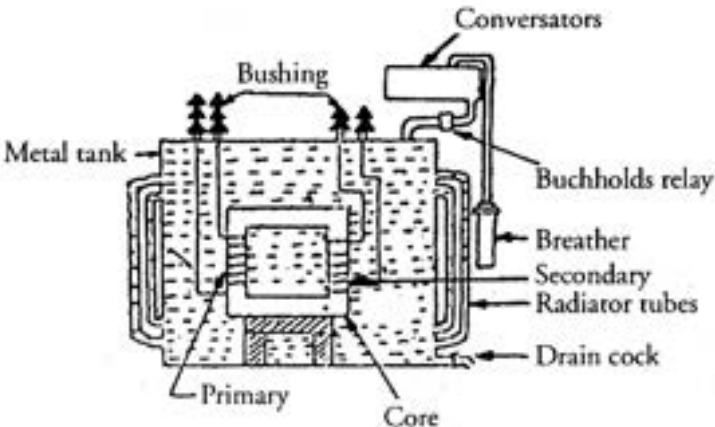


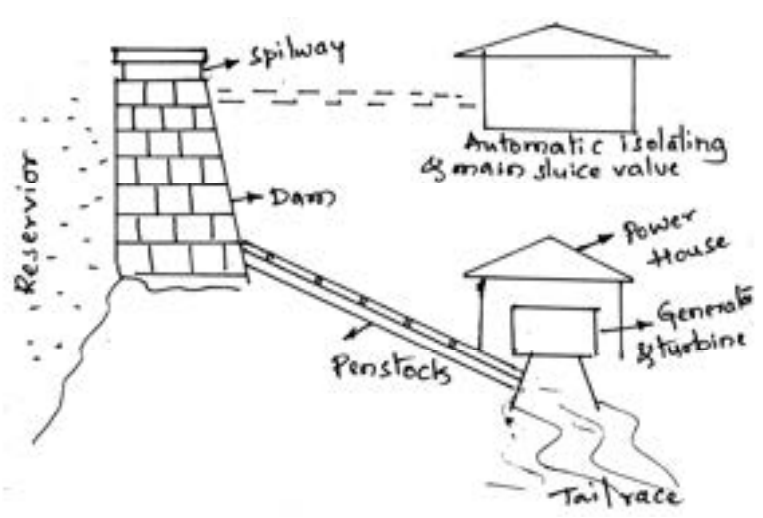
Qn. Nos.	Value Points	Total
	ii) <u>Frequency</u> : Number of cycles completed by an alternating quantity in one second is called frequency. It is measured in hertz.	$1\frac{1}{2} + 1\frac{1}{2}$
	c) Draw the neat diagram of sine wave and mark the following : i) Positive half-cycle ii) Amplitude Ans. 	3 + 2
12. a)	Define A.C. Generator. Ans. <u>A.C. Generator</u> A.C. Generator is a electromagnetic machine which converts mechanical energy into alternating current electrical energy.	2
b)	List the types of induced <i>emf</i>. Ans. <u>Types of <i>emf</i></u> i) Dynamically induced <i>emf</i> ii) Statically induced <i>emf</i> a) Self-induced <i>emf</i> b) Mutually induced <i>emf</i>	3

Qn. Nos.	Value Points	Total
c)	Explain the phenomenon of electromagnetic induction. Ans. <u>Phenomenon of electromagnetic induction :</u>  When the magnet moved into the coil galvanometer deflect indicates <i>emf</i> induced in the coil. When we remove again galvanometer deflect in opposite direction and indicates <i>emf</i> induced in the coil. If we keep the magnet constant the no-flux cut by the coil and induced <i>emf</i> is zero. This shows <i>emf</i> is induced in the coil when their is a relative motion between the coil and magnetic flux.	2 + 3
13. a)	List the applications of diode. Ans. <u>Applications of diode :</u> 1) used in rectifiers 2) used in clipping circuit 3) used in clamping circuit 4) used in voltage regulators.	2

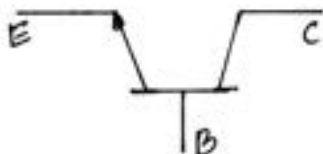


Qn. Nos.	Value Points	Total
b)	Explain Faraday's law of electromagnetic induction. <i>Ans.</i> <u>First law</u> : It states that "whenever changing flux linking with the conductor induces <i>emf</i>." <u>Second law</u> : "The magnitude of induced <i>emf</i> is directly proportional to the rate of change of flux linking with the conductor." $e = N \frac{d\phi}{dt} \text{ in volts.}$	$1\frac{1}{2} + 1\frac{1}{2}$ 3
c)	Draw a neat diagram of squirrel cage rotor induction motor and label the parts. <i>Ans.</i> <u>Squirrel cage rotor induction motor</u> : 	3 + 2
14. a)	Define semiconductor. <i>Ans.</i> <u>Semiconductor</u> : If the conductivity of the material lies between conductor and insulator then it is called semiconductor. Ex : Germanium.	2

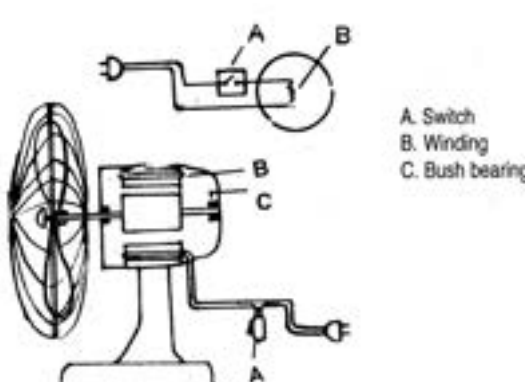
Qn. Nos.	Value Points	Total
b)	Write any three applications of transformer. Ans. <u>Application of transformer :</u> 1) used in generating stations 2) used in sub-stations 3) used for distribution of power 4) small transformer used in TV electronic goods, mobile charges, etc. 1 + 1 + 1	3
c)	Draw a neat diagram of transformer and label the parts. Ans. <u>Transformer :</u> 	3 + 2
15. a)	List the sources of energy. Ans. <u>Source of energy :</u> 1) Renewable sources of energy 2) Non-renewable sources of energy	1 + 1

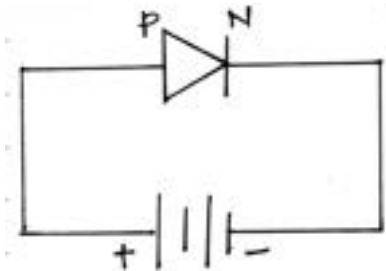
Qn. Nos.	Value Points	Total
b)	Write short notes on solar power plant. <i>Ans.</i> <u>Solar power plant :</u> When sunrays made fall on the photovoltaic cell (silicon cells) electricity is generated. This generates D.C. power only. Hence it is stored in the secondary cells. This is converted into A.C. by solar inverters, then it is used. Whenever necessary, presently these solar plants used in traffic signals, street lighting in the cities. These plants are free from ash, smoke and cheaper compared to other plants.	3
c)	Draw the neat diagram of hydroelectric power plant and label the parts. <i>Ans.</i> <u>Hydroelectric power plant :</u> 	3 + 2



Qn. Nos.	Value Points	Total										
16. a)	Draw the symbolic representation of <i>N-P-N</i> transistor. Ans. <u>Symbolic representation of <i>N-P-N</i> transistor :</u> 	2										
b)	Write the comparison between renewable and non-renewable sources of energy. Ans. <u>Comparison :</u> <table><tr><th>Renewable sources</th><th>Non-renewable sources</th></tr><tr><td>1. These sources are available regularly and they can be stored</td><td>These sources are available for short period of time</td></tr><tr><td>2. They produce ash, smoke, dust</td><td>They are free from ash, smoke, dust</td></tr><tr><td>3. To exist plant it need large space</td><td>They need less space compare to them</td></tr><tr><td>4. Cost of the plant is very high</td><td>Cost of the plant is less</td></tr></table>	Renewable sources	Non-renewable sources	1. These sources are available regularly and they can be stored	These sources are available for short period of time	2. They produce ash, smoke, dust	They are free from ash, smoke, dust	3. To exist plant it need large space	They need less space compare to them	4. Cost of the plant is very high	Cost of the plant is less	$1\frac{1}{2} + 1\frac{1}{2}$
Renewable sources	Non-renewable sources											
1. These sources are available regularly and they can be stored	These sources are available for short period of time											
2. They produce ash, smoke, dust	They are free from ash, smoke, dust											
3. To exist plant it need large space	They need less space compare to them											
4. Cost of the plant is very high	Cost of the plant is less											



Qn. Nos.	Value Points	Total
c)	Draw a neat diagram of electrical fan and label the parts. Ans. Electric fan : 	3 + 2
17. a)	Define doping. Ans. Doping : It is the process of adding impurity to the pure semiconductor called doping.	2
b)	Explain the following terms : i) Average value ii) Power factor Ans. i) <u>Average value</u> : When direct current flows in the circuit for a given period of time it transfers heat as transferred by A.C. for the same period of time. ii) <u>Power factor</u> : the cosine of the angle between applied voltage (V) and total current (I) in the circuit is called power factor.	$1\frac{1}{2} + 1\frac{1}{2}$

Qn. Nos.	Value Points	Total
c)	Explain with neat sketch forward biasing of diode. <i>Ans.</i> <u>Forward biasing :</u>  When positive terminal is connected to <i>P</i>-type semiconductor and negative terminal is connected to <i>N</i>-type semiconductor, then it is said to be forward biased. In forward biasing electrons are repelled by negative terminal & holes are repelled by positive terminal. Hence it reduces potential barrier, electron cross & move to left through holes. Similarly holes move to right and conducts flow of electric current.	2 + 3



AglaSem Earn While You Learn Program!

Share your recent question papers with us and get paid!

अपने हाल के प्रश्न पत्र हमें भेजें और कमाएँ!

To participate, email us with the following details:

भाग लेने के लिए हमें निम्न विवरण के साथ ईमेल करें:

- Your Name
 - Your Class
 - Your Board
 - Details of the Question Papers you have
- आपके पास उपलब्ध प्रश्न पत्रों का विवरण

Our team will reach out to you with the next steps.

हमारी टीम आगे की प्रक्रिया के लिए आपसे संपर्क करेगी।

Email: **support@aglasem.com**

Study Materials

aglasem.com

Model Papers

Sample Papers

Half Yearly Sample Papers

Important Resources

Periodic Table

Writing Skills / Formats

Maps of India / World

Notes

☐ [Class 6 Notes](#)

☐ [Class 7 Notes](#)

☐ [Class 8 Notes](#)

☐ [Class 9 Notes](#)

☐ [Class 10 Notes](#)

☐ [Class 11 Notes](#)

☐ [Class 12 Notes](#)

Books and Solutions

NCERT Books

NCERT Book Solutions

HC Verma Chapter Wise Solutions

RD Sharma Solutions

CGBSE Solutions

