Asst. Prof. in Electrical Engg.

*APEE/21*

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE ASKED TO DO SO.

**PRELIMINARY SCREENING**

**TEST BOOKLET**

**Electrical Engineering**

TEST BOOKLET SERIES

**A**

Time allowed : $1\frac{1}{2}$ hours

Full marks : 100

Answer *all* the questions.

Questions are of equal value.

**Serial No.** 0145 ..... *Roll No.:*

*Signature of the Candidate:*

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*INSTRUCTIONS*

Candidates should read the following instructions carefully before answering the questions:

1. This booklet consists of 12 pages including this front page, containing 100 questions. **Verify the Page Nos. and Test Booklet series on each page and bring at once to the Invigilator's notice any discrepancy.**
2. Answers will have to be given in the OMR Sheet supplied for the purpose.
3. Before you proceed to mark in the OMR Sheet in response to various items in the Test Booklet, you have to fill in some particulars in the OMR Sheet. ***Do not fold the OMR Sheet as this will result in error in your marks.***
4. All questions are of multiple-choice answer-type. You will find ***four*** probable answers **(A)**, **(B)**, **(C)** and **(D)** against each question. Find out which of the four answers appears to you to be correct or the best. Now darken the circle corresponding to the letter of the selected answer in the OMR Sheet with **Black Ball Point Pen.**
5. One and only one circle is to be fully blackened for answer. Any spot in any other circle (multiple circle) or in wrong circle will be considered as wrong answer. If more than one circle is encoded for a particular answer, it will be treated as a wrong answer. Use of whitener is strictly prohibited.
6. ***There will be negative marking of $\frac{1}{3}$ mark for each wrong answer.***
7. ***There is a blank page at the end of this Booklet for Rough Work.***
8. ***The OMR Sheet should be handed over to the Invigilator before leaving the Examination Hall. You are permitted to take away the used Test Booklet after completion of the examination.***

**1.** Energy stored by a coil is doubled when its current is increased by percent—

(A) 25
(B) 50
(C) 41.4
(D) 100

**2.** The pressure coil of a dynamometer type wattmeter is

(A) highly inductive
(B) highly resistive
(C) purely resistive
(D) purely inductive

**3.** Gilbert is a unit of

(A) electromotive force
(B) magnetomotive force
(C) conductance
(D) permittivity

**4.** Identify the part of the sentence that is grammatically incorrect:

She went to the gym despite of her illness.

(A) the
(B) gym
(C) of
(D) her

**5.** Choose the correct option:

Our teacher teaches History _____ English.

(A) across
(B) besides
(C) beside
(D) both

**6.** The phenomenon of a rise in voltage at the receiving end of the open-circuited or lightly loaded line is called the

(A) Seeback effect
(B) Ferranti effect
(C) Raman effect
(D) Proximity effect

**7.** Two capacitances, C1 = 150 ± 2.4 μF and C2 = 120 ± 1.5 μF are connected in parallel. What is the limiting error of the resultant capacitance C?

(A) 0.9 μF
(B) 1.95 μF
(C) 3.9 μF
(D) 4.8 μF

**8.** The crawling in the induction motor is caused by

(A) low voltage supply.
(B) high loads.
(C) harmonics developed in the motor.
(D) None of the above

**9.** An e.m.f. of 16 volts is induced in a coil of inductance 4H. The rate of change of current must be

(A) 64 A/s
(B) 32 A/s
(C) 16 A/s
(D) 4 A/s

**10.** If the length of a cable is doubled, its capacitance

(A) becomes one-fourth.
(B) becomes one-half.
(C) becomes double.
(D) remains unchanged.

**11.** What is the even component of a discrete-time signal?

(A) $x_e(t)=\frac{1}{2}[x(t)+x(-t)]$

(B) $x_e(n)=\frac{1}{2}[x(n)+x(-n)]$

(C) $x_e(t)=\frac{1}{2}[x(t)-x(-t)]$

(D) $x_e(n)=\frac{1}{2}[x(n)-x(-n)]$

**12.** An air gap is usually inserted in magnetic circuits to

(A) increase m.m.f.

(B) increase the flux.

(C) prevent saturation.

(D) None of the above

**13.** For V-curves for a synchronous motor the graph is drawn between

(A) field current and armature current.

(B) terminal voltage and load factor.

(C) power factor and field current.

(D) armature current and power factor.

**14.** A 3-phase 440 V, 50 Hz induction motor has 4% slip. The frequency of rotor e.m.f. will be

(A) 2 Hz

(B) 50 Hz

(C) 200 Hz

(D) 0.2 Hz

**15.** The voltage across the circuit breaker pole after final current zero is

(A) Restriking voltage

(B) Supply voltage

(C) Recovery voltage

(D) None of the above

**16.** Replace the underlined idiomatic expression proverb with correct alternative:

I stumbled upon some interesting old letters in my father's desk.

(A) fell

(B) jumped

(C) surveyed

(D) discovered by chance

**17.** In squirrel cage induction motors, the rotor slots are usually given slight skew in order to

(A) reduce windage losses.

(B) reduce eddy currents.

(C) reduce accumulation of dirt and dust.

(D) reduce magnetic hum.

**18.** An ammeter has a current range of 0-5 A and its internal resistance is 0.2 Ω. In order to change the range to 0-25 A, we need to add a resistance of

(A) 0.8 Ω in series with the meter.

(B) 1.0 Ω in series with the meter.

(C) 0.04 Ω in parallel with the meter.

(D) 0.05 Ω in parallel with the meter.

**19.** The load cycle for a motor driving a power press will be

(A) variable load.

(B) continuous.

(C) continuous but periodical.

(D) intermittent and variable load.

**20.** In an intrinsic semiconductor

(A) there are no holes in the material.

(B) the number of holes is too small.

(C) electrons in the material are neutralized by holes.

(D) there are no electrons in the material.

**21.** Power factor of an electrical circuit is equal to

(A) R/Z.
(B) cosine of phase angle difference between current and voltage.
(C) kW/kVA.
(D) All of the above

**22.** Fill in the blank with correct option:
"Where's the _____ Post Office please?"

(A) near
(B) most near
(C) more near
(D) nearest

**23.** Thermal overload relays are used to protect the motor against overcurrent due to

(A) short-circuits
(B) heavy loads
(C) grounds
(D) All of the above

**24.** A 4-pole generator with 16 coils has a two layer lap winding. The pole pitch is

(A) 32
(B) 16
(C) 8
(D) 4

**25.** Replace the underlined words with the correct option given below:

They thought that the young man would simply give up on the matter if he came to know that it would be a long legal case. Now they realise, they have caught a tartar!

(A) an expert
(B) dealing with a troublesome person
(C) forced to leave
(D) take risk

**26.** Where has India's First Moss Garden been inaugurated?

(A) Kevadia, Gujarat
(B) Nainital, Uttarakhand
(C) Mandi, Himachal Pradesh
(D) Subansiri, Arunachal Pradesh

**27.** Choose the synonym of the given word:
Parochial

(A) Stagnant
(B) Observer
(C) Inability
(D) Conservative

**28.** The materials having low retentivity are suitable for making

(A) weak magnets.
(B) temporary magnets.
(C) prevent saturation.
(D) None of the above

**29.** For insulators, the forbidden gap is of the order of

(A) 5 eV
(B) 1 eV
(C) 0.1 eV
(D) zero

**30.** Ohm's law in point form in field theory can be expressed as

(A) $V = RI$
(B) $J = E/\sigma$
(C) $J = \sigma E$
(D) $R = \rho \frac{1}{A}$

**31.** Which of the following is a vector quantity?

(A) Relative permeability

(B) Magnetic field intensity

(C) Flux density

(D) Magnetic potential

**32.** Which one of the following statements states that electrostatic field is conservative?

(A) The Curl of E is identically zero.

(B) The potential difference between two points is zero.

(C) The electrostatic field is a gradient of a scalar potential.

(D) The work done in a closed path inside the field is zero.

**33.** Choose the synonym of the given word:

Abstract

(A) Notional

(B) Valuable

(C) Attractive

(D) Jewel

**34.** Find out which part of the sentence has an error. If there is no mistake, the answer is 'No error'.

(A) Now that he is living alone in his house

(B) he cooks twice a week

(C) cleans thrice a week.

(D) No error

**35.** Where has been India's first solar-based Integrated Multi-Village Water Supply Project (IMVWSP) inaugurated?

(A) Gujarat

(B) Assam

(C) Sikkim

(D) Arunachal Pradesh

**36.** A transformer cannot raise or lower the voltage of a D.C. supply because

(A) there is no need to change the D.C. voltage.

(B) a D.C. circuit has more losses.

(C) Faraday's laws of electromagnetic induction are not valid since the rate of change of flux is zero.

(D) None of the above

**37.** Replace with correct tense forms of verbs given in bracket/s from the given options:

When Shyam reached the station, the train (leave).

(A) left

(B) had left

(C) had had left

(D) have left

**38.** Which is the first Indian documentary to win an Oscar award?

(A) Stranger at the Gate

(B) How do you Measure a Year?

(C) The Elephant Whisperers

(D) All that Breathes

**39.** Overhead lines generally use

(A) copper conductors

(B) all aluminium conductors

(C) A.C.S.R. conductors

(D) None of the above

**40.** Sum of two periodic signals is a periodic signal when the ratio of their time periods is

(A) a rational number.

(B) an irrational number.

(C) a complex number.

(D) All of the above

**41.** A circuit has two parallel branches. In one branch, $R$ and $L$ are connected in series while in the other $R$ and $C$ are connected in series. If $R = \sqrt{L/C}$, which one of the following is not correct?

(A) The circuit is in resonance.
(B) The two branch currents are in quadrature.
(C) The circuit has an impedance impendent of its frequency.
(D) The two branch currents are in phase.

**42.** Name the first country to launch the world's first 6G satellite named "UESTC" satellite (Star Era-12) to test communications from space.

(A) China
(B) United States (US)
(C) Japan
(D) France

**43.** Hysteresis loss and eddy current loss are used in

(A) induction heating of brass.
(B) dielectric heating.
(C) induction heating of steel.
(D) resistance heating.

**44.** Percentage differential protection is used to prevent against

(A) Inter-turn faults
(B) Heavy loads
(C) External faults
(D) Magnetizing current

**45.** The initial response when the output is not equal to input is called

(A) Transient response
(B) Error response
(C) Time response
(D) None of the above

**46.** The Lai Haraoba festival is observed in

(A) Mizoram
(B) Sikkim
(C) Nagaland
(D) Manipur

**47.** The 'equal area criterion' for the determination of transient stability of a synchronous machine connected to an infinite bus

(A) ignores line as well as synchronous machine resistance and shunt capacitance.
(B) assumes accelerating power acting on the rotor as constant.
(C) ignores the effect of voltage regulator and governor but considers the inherent damping present in the machine.
(D) takes into consideration the possibility of machine losing synchronism after it has survived during the first swing.

**48.** When was UN's International Day of Older Persons observed annually?

(A) October 2
(B) September 29
(C) October 1
(D) September 30

**49.** The terminal across the source are _____ if a current source is to be neglected.

(A) open circuited
(B) short circuited
(C) replaced by a capacitor
(D) replaced by a source resistance

**50.** Air-core coils are practically free from

(A) hysteresis losses
(B) eddy current losses
(C) Both (A) and (B)
(D) None of the above

**51.** _____ has the highest value of thermal conductivity.

(A) Copper
(B) Aluminum
(C) Brass
(D) Steel

**52.** If the length of a wire of resistance $R$ is uniformly stretched to $n$ times its original value, its new resistance is

(A) $nR$
(B) $R/n$
(C) $n^2R$
(D) $R/n^2$

**53.** Two 3-limb, 3-phase delta-star connected transformers are supplied from the same source. One of the transformers is Dy1 and the other Dy11 connection. The phase difference between the corresponding phase voltage of the secondary's would be

(A) 0°
(B) 30°
(C) 60°
(D) 120°

**54.** Induction cup relays responds to

(A) Current
(B) Power
(C) Voltage
(D) Impedance

**55.** If the load current and flux of a dc motor are held constant and voltage applied across it armature is increased by 5%, the speed of the motor will

(A) increase by 5%.
(B) reduce by 5%.
(C) remain unaltered.
(D) depend on other factors.

**56.** A square matrix all of whose elements except the main diagonal are zeros is called a

(A) null matrix
(B) singular matrix
(C) diagonal matrix
(D) symmetric matrix

**57.** Which of the following statements is incorrect?

(A) Resistance is a passive element.
(B) Inductor is a passive element.
(C) Current source is a passive element.
(D) Voltage source is an active element.

**58.** Buchholz's relay gives warning and protection against

(A) electrical fault inside the transformer itself.
(B) electrical fault outside the transformer in outgoing feeder.
(C) for both outside and inside faults.
(D) None of the above

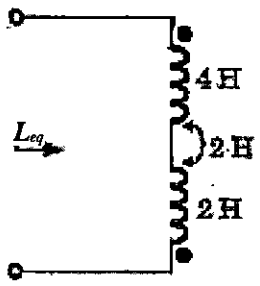
**59.** Earthing transformer is used to

(A) improve neutral wire's current capacity.
(B) avoid overheating of transformer.
(C) provide artificial earthing.
(D) avoid harmonics.

**60.** The energy radiated by sun on a bright sunny day is approximately

(A) 700 W/m$^2$
(B) 800 W/m$^2$
(C) 2 kW/m$^2$
(D) 1 kW/m$^2$

**61.** Calculate the equivalent inductance of the figure given below:




(A) 2 H
(B) 4 H
(C) 6 H
(D) 8 H

**62.** A transformer can have zero voltage regulation at
(A) leading power factor.
(B) lagging power factor.
(C) unity power factor.
(D) zero power factor.

**63.** Which of the following is not a characteristic of UJT?
(A) Intrinsic stand off ratio
(B) Negative resistance
(C) Peak-point voltage
(D) Bilateral conduction

**64.** Choose the correct option:
The students in our school are _____ in other school.
(A) as good as
(B) good
(C) bad
(D) dance

**65.** A 200 W, 230 V lamp is connected across 115 V supply. The lamp will draw power
(A) slightly more than 50 W.
(B) slightly less than 50 W.
(C) exactly 100 W.
(D) exactly 50 W.

**66.** The operator 'del' ($\nabla$) is a
(A) vector differential operator.
(B) vector time function.
(C) scalar space function.
(D) scalar time function.

**67.** Phase margin of a system is used to specify which of the following?
(A) Frequency response
(B) Absolute stability
(C) Relative stability
(D) Time response

**68.** The change of cross-sectional area of conductor in magnetic field will affect
(A) reluctance of conductor.
(B) resistance of conductor.
(C) (A) and (B) both in the same way
(D) None of the above

**69.** One word substitute of the given words 'one who possesses many talents' is
(A) Versatile
(B) Wisdom
(C) Clever
(D) Draw

**70.** A single-phase induction motor is
(A) inherently self-starting with high torque.
(B) inherently self-starting with low torque.
(C) inherently non-self-starting with low torque.
(D) inherently non-self-starting with high torque.

**71.** Split-phase relay responds to
(A) Overload faults
(B) Overvoltage
(C) Inter-turn faults
(D) All of the above

**72.** Fill in the blank with correct option:
"I don't like coffee." "_____ do it."
(A) So
(B) Neither
(C) Either
(D) No

**73.** A triac is equivalent to two SCRs _____.
(A) in parallel
(B) in series
(C) in inverse-parallel
(D) None of the above

**74.** Reluctance torque in rotating machines is present, when _____ varies.
(A) air gap is not uniform
(B) reluctance seen by stator mmf
(C) reluctance seen by rotor mmf
(D) reluctance seen by the working mmf

**75.** On which river is the Ratle Hydropower project located?
(A) Beas
(B) Ravi
(C) Chenub
(D) Sutlej

**76.** Unlike microprocessors, microcontrollers make use of batteries because they have
(A) high power dissipation.
(B) low power consumption.
(C) low voltage consumption.
(D) low current consumption.

**77.** Choose the correct preposition:
Looking at the old photograph, he took a walk _____ the memory lane.
(A) on
(B) to
(C) down
(D) off

**78.** In a series R-L-C circuit, excited by a 100V variable frequency source, has a resistance of 10Ω and an inductive reactance of 50Ω at 100 Hz. If the resonance frequency is 500 Hz, what is the voltage across the capacitor at resonance?
(A) 100 V
(B) 500 V
(C) 2.5 kV
(D) 5 kV

**79.** _____ motor is a constant speed motor.
(A) Universal
(B) Schrage
(C) Induction
(D) Synchronous

**80.** Change the voice:
Who stole your cycle?
(A) Your cycle was stolen by him?
(B) The cycle was stolen.
(C) By whom was your cycle stolen?
(D) Did someone steal the cycle?

**81.** Replace the underlined idiomatic expression proverb with correct alternative:

The teachers were completely <u>in the dark</u> concerning the student's plans.

(A) afraid
(B) ignorant about
(C) happy
(D) sad

**82.** India's first nuclear power plant was installed at

(A) Tarapore
(B) Kota
(C) Kalpakkam
(D) None of the above

**83.** The primary reason for the low power factor is due to the installation of

(A) Induction motors
(B) DC motors
(C) Synchronous motors
(D) Commutator motors

**84.** Choose the correct option:

Please, come _____ the classroom.

(A) out of
(B) over
(C) on
(D) in

**85.** Which Tiger Reserve received TX2 Tiger Conservation Awards 2020 for doubling the number of tigers in 4 years ahead of the target of 10 years?

(A) Nagarjunsagar-Srisailam Tiger Reserve, Andhra Pradesh
(B) Bor Tiger Reserve, Maharashtra
(C) Amrabad Tiger Reserve, Hyderabad
(D) Pilibhit Tiger Reserve, Uttar Pradesh

**86.** When the supply terminals of a dc shunt motor are interchanged

(A) the motor will stop.
(B) the motor will run at its normal speed in the same direction as before.
(C) the direction of rotation will reverse.
(D) the motor will run much faster in the same direction.

**87.** The 'cogging' of an induction motor can be avoided by

(A) proper ventilation.
(B) using DOL starter.
(C) auto-transformer starter.
(D) having the number of rotor slots more or less than the number of stator slots (not equal).

**88.** Change the voice:

Never disobey your elders.

(A) You are ordered not to disobey your elders.
(B) You are asked not to disobey your elders.
(C) It is good to obey your parents.
(D) You cannot disobey your parents.

**89.** The inertia constant of a 100 MVA 50 Hz, 4-pole generator is 10 MJ/MVA. If the mechanical input to the machine is suddenly raised from 50MW to 75 MW, the rotor acceleration will be equal to

(A) 225 electrical degrees/$s^2$
(B) 22.5 electrical degrees/$s^2$
(C) 125 electrical degrees/$s^2$
(D) 12.5 electrical degrees/$s^2$

**90.** An 800 kV transmission line is having per phase line inductance of 1.1 mH/km and per phase line capacitance of 11.68 nF/km. Ignoring the length of the line, its ideal power transfer capability in MW is

(A) 1,204 MW
(B) 1,504 MW
(C) 2,085 MW
(D) 2,606 MW

**91.** Where is the world's largest care and cure centre for elephants being set up in India?

(A) Kerala
(B) Meghalaya
(C) Chhattisgarh
(D) Odisha

**92.** Replace the underlined words with the correct option given below:

The owner of the house tried <u>every trick in the book</u> to sell the flat to my father, but failed.

(A) ready to bargain
(B) try every possible way
(C) stop talking
(D) judging someone

**93.** United Nations' (UN's) World Science Day for Peace and Development is observed on which date?

(A) November 7
(B) November 10
(C) November 8
(D) November 9

**94.** Which of the following methods of heating is not dependent on the frequency of supply?

(A) Induction heating
(B) Dielectric heating
(C) Electric resistance heating
(D) All of the above

**95.** A round rotor generator with internal voltage $E_1 = 2.0$ pu and $X = 1.1$ pu is connected to a round rotor synchronous motor with internal voltage $E_2 = 1.3$ pu and $X = 1.2$ pu. The reactance of the line connecting the generator to the motor is 0.5 pu. When the generator supplies 0.5 pu power, the rotor angle difference between the machines will be

(A) 57.42
(B) 1
(C) 32.58
(D) 122.58

**96.** A parallel circuit is said to be in resonance when the admittance is purely

(A) capacitive
(B) inductive
(C) susceptive
(D) conductive

**97.** Find out which part of the sentence has an error. If there is no mistake, the answer is 'No error'.

(A) The road
(B) to house
(C) passes through a forest.
(D) No error

**98.** Correct the given sentence grammatically:
Adesh, who he is my best friend, is a dancer.

(A) Adesh, who is my best friend, is a dancer.
(B) A dancer Adesh will be my friend.
(C) Adesh who is my best friend who is a dancer.
(D) My friend Adesh is reportedly a dancer.

**99.** A linear resistor having $0 < R <$ infinity is a

(A) current controlled resistor.
(B) voltage controlled resistor.
(C) both current controlled and voltage controlled resistor.
(D) None of the above

**100.** In tramways which of the following motors is used?

(A) D.C. shunt motor
(B) D.C. series motor
(C) A.C. three-phase motor
(D) A.C. single-phase capacitor start motor