

**Serial No.**

64057

# QUESTION BOOKLET



## ELECTRICAL ENGINEERING (06)

*Time Allowed :*

1 Hour for Objective

*Maximum Marks :*

100 Marks for Objective

### INSTRUCTIONS FOR CANDIDATES

1. This Question Booklet consists of **two** Parts (Objective and Subjective). Candidate has to attempt both the Parts.
2. **In Objective Part, there are 50 questions carrying 2 marks each. There is no negative marking for any wrong answer. In Subjective Part, four (4) questions should be answered in which Question No. 1 is compulsory.**
3. Please do not open this Question Booklet until you are told to do so.
4. Candidate must fill up the necessary information in the space provided on the OMR Answer Sheet before commencement of the test.
5. For marking the correct answer, darken one circle by **black or blue** ball-point pen only. Please do not mark on more than one circle. Darkening on more than one circle against an answer will be treated as wrong answer.
6. Do not detach any leaf from this Question Booklet. After the examination, hand over the OMR Answer Sheet to the Room Invigilator.
7. Possession and use of Calculator, Mobile Phone and Pager is prohibited in the Examination Hall.
8. Candidates are informed that evaluation of OMR Sheets will be done by Electronic Machine. So, they should shadow the bubbles of Roll No., Booklet Series and Booklet No. properly, otherwise Machine will not be able to evaluate it. Failure to comply this instruction will be sole responsibility of the candidates.

SEAL

PART—A

( Objective )

1. Power transfer capability of a HVDC transmission line varies with distance as
  - (A) square of the distance
  - (B) square root of the distance
  - (C) independent of the distance
  - (D) directly with the distance
2. The time of operation of distance relay is a function of
  - (A) magnitude of fault current
  - (B) magnitude of line voltage at the relay
  - (C) ratio of the line voltage at the relay to the fault current
  - (D) ratio of the fault current to the line voltage at the relay
3. The moderator used in fast breeder reactor is
  - (A) graphite
  - (B) heavy water
  - (C) ordinary water
  - (D) None of the above
4. In order to have lower cost of electric energy generation
  - (A) the load factor and diversity factor should be low
  - (B) the load factor should be low but the diversity factor should be high
  - (C) the load factor should be high but the diversity factor should be low
  - (D) both the load factor and diversity factor should be high
5. For transient stability of a system, which of the following is correct?
  - (A)  $\frac{d\delta}{dt} > 0, \frac{dP}{d\delta} > 0$
  - (B)  $\frac{d\delta}{dt} < 0, \frac{dP}{d\delta} < 0$
  - (C)  $\frac{d\delta}{dt} = 0, \frac{dP}{d\delta} > 0$
  - (D)  $\frac{d\delta}{dt} < 0, \frac{dP}{d\delta} = 0$
6. Which relays are best suited for the detection of the occurrence of severe synchronizing power surges?
  - (A) Reactance relays
  - (B) Split-phase relays
  - (C) mho relays
  - (D) Impedance relays

7. Series compensation on EHV lines is resorted to
- (A) reduce the fault level
  - (B) improve the stability
  - (C) as a substitute for synchronous phase modifier
  - (D) None of the above
8. The mechanical power developed by the d.c. motor is maximum, when
- (A) back e.m.f. is equal to applied voltage
  - (B) back e.m.f. is equal to zero
  - (C) back e.m.f. is equal to half of the applied voltage
  - (D) None of the above
9. In the equivalent circuit of double-cage induction motor, the two rotor cages can be considered
- (A) in parallel
  - (B) in series-parallel
  - (C) in series
  - (D) in parallel with stator
10. When a bank of two single-phase transformers in an open delta arrangement is used, each of them supplies
- (A) 33.3% of its output rating
  - (B) 86.6% of its output rating
  - (C) 76.6% of its output rating
  - (D) 66.6% of its output rating
11. Under balanced load conditions, main transformer rating in the Scott connection is
- (A) 10% greater than teaser transformer
  - (B) 15% greater than teaser transformer
  - (C) 20% greater than teaser transformer
  - (D) 25% greater than teaser transformer
12. The leakage reactance of a 3-phase alternator is determined by performing
- (A) open-circuit and zero power factor tests
  - (B) zero power factor and slip tests
  - (C) open-circuit and short-circuit tests
  - (D) short-circuit and slip tests

- 13.** What would happen if the field of d.c. shunt motor is opened?
- (A) The speed of the motor will be reduced
  - (B) It will continue to run at its normal speed
  - (C) The speed of the motor will be enormously high and might destroy itself
  - (D) The current in the armature will increase
- 14.** The heating time constant of an electrical machine gives an indication of its
- (A) temperature rise
  - (B) normal rating
  - (C) overload capacity
  - (D) short-time rating
- 15.** For the minimum-phase system to be stable
- (A) phase margin should be negative and gain margin positive
  - (B) phase margin should be positive and gain margin negative
  - (C) both phase margin and gain margin should be positive
  - (D) both phase margin and gain margin should be negative
- 16.** In control systems excessive bandwidth is not employed, because
- (A) noise is proportional to bandwidth
  - (B) noise is proportional to the square of bandwidth
  - (C) it leads to low relative stability
  - (D) it leads to slower response
- 17.** Integral error compensation in a control system
- (A) increases steady-state error
  - (B) minimizes steady-state error
  - (C) reduces steady-state error to zero
  - (D) has no effect on steady-state error
- 18.** The damping ratio of the characteristic equation
- $$s^2 + 2s + 8 = 0$$
- is
- (A) 0.353
  - (B) 0.350
  - (C) 0.300
  - (D) 0.333

19. In a nonlinear control system, limit cycle is self-sustained oscillation of
- (A) variable amplitude
  - (B) variable frequency
  - (C) fixed frequency
  - (D) fixed frequency and amplitude
20. When a charge is given to a conductor
- (A) it distributes uniformly all over the surface
  - (B) it distributes uniformly all over the volume
  - (C) it distributes on the surface, inversely proportional to the radius of curvature
  - (D) it stays where it was placed
21. What is the purpose of impedance matching between the output of previous stage and the input of next stage in cascaded amplifier?
- (A) To achieve high efficiency
  - (B) To achieve maximum power transfer
  - (C) To achieve reduced distortion
  - (D) To achieve reduced noise
22. Which one of the following is considered as amplitude-modulated signal?
- (A) BPSK
  - (B) DPSK
  - (C) PSK
  - (D) None of the above
23. An amplifier without feedback has a gain of 1000. What is the gain with a negative feedback of 0.009?
- (A) 900
  - (B) 125
  - (C) 100
  - (D) 10
24. Which one of the following factors is limited in case of FM?
- (A) Maximum frequency
  - (B) Maximum permissible modulation index
  - (C) Signal-to-noise voltage ratio
  - (D) minimum permissible modulation index

- 25.** A modulator is a device to
- (A) separate two frequencies
  - (B) impress the information on- to a radio frequency carrier
  - (C) extract information from the carrier
  - (D) amplify the audio frequency signal

- 26.** Darlington pair is mainly used for
- (A) impedance matching
  - (B) wide-band voltage amplification
  - (C) power amplification
  - (D) reducing distortion

- 27.** What is the main source of distortion in a push-pull amplifier?
- (A) Fundamental component
  - (B) Second harmonic
  - (C) All even harmonics
  - (D) Third harmonic

- 28.** In the root locus analysis, the angle between adjacent asymptotes is

- (A)  $\frac{180^\circ}{m+n}$
- (B)  $\frac{360^\circ}{m+n}$
- (C)  $\frac{180^\circ}{m-n}$
- (D)  $\frac{360^\circ}{m-n}$

- 29.** A feedback control system is represented by the equation

$$\frac{d^2e}{dt^2} + 6.4 \frac{de}{dt} = 160e$$

where  $e = r - 0.4c$  and  $c$  is the output variable,  $r$  is the input variable.

The value of damping ratio is

- (A) 0.4
- (B) 0.15
- (C) 1/6.4
- (D) 1.00

- 30.** Human system is

- (A) an open-loop control system
- (B) a closed-loop control system
- (C) a multivariable feedback control system
- (D) a complex control system

31. For

$$0 < \xi < \frac{1}{2}$$

$\omega_r$  is equal to

(A) 0

(B)  $\frac{\omega_n}{\sqrt{1-\xi^2}}$

(C)  $\omega_n \sqrt{1-\xi^2}$

(D)  $\omega_n \sqrt{1-2\xi^2}$

32. The AND function can be realized by using  $N$  number of NOR gates. The minimum value of  $N$  is

(A) 2

(B) 3

(C) 4

(D) 5

33. A program structure that allows the repeated operation of a particular sequence of instructions until a specified termination is reached is called

(A) subroutine

(B) machine

(C) module

(D) loop

34. The disadvantage of dynamic storage elements is that

(A) storage cells are to be refreshed frequently

(B) information stored previously is lost

(C) power has to be kept on

(D) None of the above

35. Every processor must necessarily have

(A) a data bus

(B) a data bus and an address bus

(C) a control bus

(D) a data bus, a control bus and an address bus

36. Algorithm is used

(A) to bring itself into desired state by its own action  
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(B) to perform logarithmic operation

(C) to describe a set of procedures by which the given result is obtained

(D) None of the above

37. Programmable logic array (PLA) uses
- (A) ROM matrices
  - (B) PROM matrices
  - (C) RAM matrices
  - (D) Silo memory
38. Byte is synonymous with
- (A) band
  - (B) character
  - (C) bit
  - (D) word
39. The speed of digital ICs indicates
- (A) the rate at which output changes
  - (B) how fast input triggers the output
  - (C) how fast a flip-flop can change stages
  - (D) None of the above
40. In load flow studies a PV bus is treated as a PQ bus, when
- (A) voltage at the bus becomes high
  - (B) reactive power goes beyond limit
  - (C) phase angle becomes high
  - (D) None of the above
41. The method of neutral grounding affects the
- (A) positive sequence network
  - (B) negative sequence network
  - (C) zero sequence network
  - (D) All of the above
42. A synchronous generator is feeding an infinite bus. A shunt reactor is added at the infinite bus. The stability limit will
- (A) increase
  - (B) decrease
  - (C) remain the same
  - (D) Any of the above
43. The insulation strength of EHV lines is mainly governed by
- (A) switching over voltages
  - (B) lightning over voltages
  - (C) power frequency over voltages [www.pastpaper.in](http://www.pastpaper.in)
  - (D) None of the above
44. The reactive power transfer over a line mainly depends on
- (A) power angle
  - (B)  $V_r$
  - (C)  $|V_s| - |V_r|$
  - (D)  $V_s$



45. The corona loss in a 50-Hz system is 0.2 kW/phase/km. At a frequency of 60 Hz, the corona loss would be
- (A) 0.17 kW/phase/km  
 (B) 0.24 kW/phase/km  
 (C) 0.22 kW/phase/km  
 (D) 0.34 kW/phase/km
46. For a transmission line  
 $V_s = AV_r + BI_r$  and  $I_s = CV_r + DI_r$   
 Then,  $I_r$  equals
- (A)  $CV_s + AI_s$   
 (B)  $DV_s + AI_s$   
 (C)  $DV_s - BI_s$   
 (D)  $AV_s + DI_s$
47. A large number of commutator segments are used in a d.c. machine to
- (A) increase the magnitude of the output voltage  
 (B) increase the output current of the generator  
 (C) increase the kW power output  
 (D) make the d.c. output wave smooth
48. If the armature current is increased to double its previous value and the time of commutation is halved, the reactance voltage will
- (A) be halved  
 (B) remain the same  
 (C) be doubled  
 (D) become four times
49. If the field current of a shunt motor is changed, then
- (A) its torque remains constant but the horsepower will change  
 (B) the horsepower remains constant but the torque will change  
 (C) both torque and horsepower will change [www.pastpaper.in](http://www.pastpaper.in)  
 (D) both torque and horsepower will remain constant
50. The main purpose of the conservator in a transformer is to
- (A) store extra oil to compensate for the loss of oil due to leakage  
 (B) achieve better cooling of the transformer  
 (C) take up the expansion of oil due to heating  
 (D) have the Buchholz relay fitted

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