



ELECTRICAL POWER SYSTEMS

ELECTRICAL MACHINES 1
5235

JUNE XXXX

INTERMEDIATE LEVEL

Centre No. & Name	
Candidate No.	
Candidate Name	

Mobile phones are **NOT** allowed in the examination room.

5235 ELECTRICAL MACHINES 1: MULTIPLE CHOICE QUESTION PAPER

1 HOUR 30 MINUTES

INSTRUCTIONS TO CANDIDATES

Read the following instructions carefully before you start answering the questions in this paper. Make sure you have a soft HB pencil and an eraser for this examination.

1. USE A SOFT HB PENCIL THROUGHOUT THE EXAMINATION.
2. DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO.

Before the examination begins:

3. Check that this question booklet is headed “**Intermediate Level – 5235 ELECTRICAL MACHINES 1.**”
4. Insert the information required in the spaces above.
5. Insert the information required in the spaces provided on the answer sheet using your HB pencil:

Candidate Name, Exam Session, Subject Code, Centre Number and Candidate Number.

Take care that you do not erase or fold the answer sheet or make any marks on it other than those asked for in these instructions.

How to answer the questions in this examination:

6. Answer **ALL** the **50** questions in this Examination. All questions carry equal marks.
7. Each question has FOUR suggested answers: **A, B, C** and **D**. Decide which answer is correct. Find the number of the question on the Answer Sheet and draw a horizontal line across the letter to join the square brackets for the answer you have chosen.
For example, if C is your correct answer, mark **C** as shown below:
[A] [B] [**C**] [D]
8. Mark only one answer for each question. If you mark more than one answer, you will score a zero for that question. If you change your mind about an answer, erase the first mark carefully, then mark your new answer.
9. Avoid spending too much time on any one question. If you find a question difficult, move on to the next question. You can come back to this question later.
10. Do all rough work in this booklet, using, where necessary, the blank spaces in the question booklet.
11. **You must not take this booklet and the answer sheet out of the examination room. All question booklets and answer sheets will be collected at the end of the examination.**

Turn Over

1. The unit of magnetic flux is:

A	Weber
B	Tesla
C	Ampere-turn
D	Ampere/metre

2. In a short shunt dc generator, the series field is excited by:

A	I _{sh}
B	I _a
C	I _a -I _L
D	I _L

3. The flux in the air-gap of a machine is 0.2Mwb and the cross-sectional area of the gap is 500mm². What is the flux density in the air gap?

A	2.5T
B	0.4T
C	0.0004T
D	100T

4. A dc motor is considered as a generator when the power flow is:

A	Reduced
B	Increase
C	Reversed
D	Modified

5. The main reason for providing compensating winding in a dc generator is to:

A	Compensate for decrease in the main flux
B	Neutralize armature magnetomotive force
C	Neutralize cross magnetizing flux
D	Maintain uniform flux distribution

6. The quantities which is greater when a machine is working as a motor is:

A	The terminal voltage
B	The generated emf
C	The back emf
D	The terminal voltage and the generated emf

7. A machine which is suitable in a wood workshop has:

A	Sound proof characteristics
B	Damp proof characteristics

C	Dust proof characteristics
D	Radiation proof characteristics

8. A coil of 400 turns carries a current of 0.5A and is wound uniformly on a magnetic circuit which is 20cm long. What is the magnetizing force?

A	200 At/m
B	20 At/m
C	100 At/m
D	1000 At/m

9. Laminations of core are used in a machine in order to reduce:

A	Hysteresis loss
B	Eddy current loss
C	Mechanical losses
D	Copper losses

10. The efficiency of a given transformer is maximum when:

A	It runs at half load
B	It runs at full load
C	Its copper losses is equal to iron losses
D	It is overloaded

11. The external characteristic of a shunt generator can be obtained directly from its:

A	Load characteristic
B	Open circuit characteristic
C	Internal characteristic
D	Performance characteristic

12. A universal motor is one which:

A	Is available universally
B	Can be marketed internationally
C	Can be operated either on dc or ac supply
D	Runs at dangerously high speed on no-load

13. The rotor torque developed by a single phase motor at starting is:

A	More than the rated torque
B	Rated torque
C	Less than the rated torque
D	Zero

14. The motor which can be run on ac and or dc supply is:

A	Reluctance motor
B	Universal motor
C	Series motor
D	Split phase motor

15. The rating of transformer is expressed in:

A	KW
B	HP
C	KVAr
D	KVA

16. The value for the relative permeability of a vacuum is:

A	$4\pi \times 10^{-7} \text{H/m}$
B	1
C	$8.85 \times 10^{-12} \text{F/m}$
D	0

17. Which of the following is a ferromagnetic material?

A	Tungsten
B	Nickel
C	Copper
D	Aluminium

18. The emf induced in the armature of a shunt generator is 600V. The armature resistance is 0.1 while the armature current is 200A. What will be the terminal voltage?

A	640V
B	620V
C	600V
D	580V

19. In order to reduce the starting current in a dc motor:

A	Connect a resistance in series with the armature
B	Connect a resistance in parallel with the armature
C	The armature could be temporarily open circuited
D	A high value resistance can be connected across the field winding

20. In a dc generator, the iron losses occurs in:

A	Yoke
B	Commutator windings
C	Armature conductors
D	Rotor core

21. A three phase 440V, 50Hz induction motor has a slip of 4%. What will be the frequency of the rotor current?

A	2Hz
B	50Hz
C	5Hz
D	25Hz

22. A 50Hz, 3 phase induction motor has a full load speed of 1440rpm. The number of poles in the motor is:

A	2
B	6
C	4
D	8

23. A 3 phase, 50Hz induction motor has a full load speed of 1440rpm. The full load slip will be:

A	2%
B	4%
C	3%
D	5%

24. The essential condition for parallel operation of two or more single phase transformers is that, they should have the same:

A	KVA rating
B	Frequency
C	KW rating
D	Rotating flux

25. Oil is provided in a transformer for:

A	Cooling
B	Lubrication
C	Insulation
D	Both for cooling and insulation

26. The path of the magnetic flux in a transformer should have:

A	Low resistance
B	High reluctance
C	High resistance
D	Low reluctance

27. As per faraday's law of electromagnetic induction, an emf is induced in a conductor whenever it:

A	Lie perpendicular to the magnetic flux
B	Lies in a magnetic field
C	Cuts magnetic flux
D	Moves parallel to the direction of magnetic field

28. The formulae which is not correct for a d.c shunt generator is:

A	$I_a - I_f - I_L = 0$
B	$V_f - V_L = 0$
C	$E - I_a R_a + V_f = 0$
D	$E - I_a R_a - V_L = 0$

29. The main reason for providing compensating windings in a d.c generator is to:

A	Compensate for the decrease in the main flux
B	Neutralize magnetomotive force introduced in the armature
C	Neutralize cross – magnetizing flux
D	Maintain uniform flux distribution

30. The armature current for a 240V d.c motor having a back emf of 230V and an armature resistance of 0.25Ω is :

A	10A
B	20A
C	30A
D	40A

31. A three – phase, 50Hz asynchronous motor has a slip of 4%. What will be the frequency of the rotor current ?

A	2Hz
B	4Hz
C	50Hz
D	60Hz

32. The purpose of connecting transformers in parallel is to:

A	Increase the current to the load
B	Increase the voltage to the load
C	Increase both current and voltage to the load
D	Increase the transformer efficiency

33. The efficiency of an auto transformer is usually higher than that of the double wound transformer because the auto transformer has:

A	negligible losses
B	no copper losses
C	lesser iron loss
D	lesser copper losses than that of the double wound

34. The formula for the true power taken by a single phase induction motor is:

A	$P = VI \sin \theta$
B	$P = VI \cos \theta$
C	$P = VI^2 \cos \theta$
D	$P = VI^2 \sin \theta$

35. Iron losses in a transformer are due to:

A	Eddy current loss
B	Flux linkage
C	Both Eddy current and Hysteresis losses
D	Hysteresis losses

36. A 1KV/250V transformer has 500 turns on the secondary winding. The number of turns on the primary is:

A	2000
B	125
C	1000
D	250

37. A step up transformer has a turn ratio of 10. If the output current is 5A, calculate the input current:

A	500A
B	5A
C	0.5A
D	50A

38. Calculate the coil inductance when a current of 4A in a coil of 800 turns produces a flux of 5mWb linking with the coil:

A	10H
B	100H
C	1H
D	1mH

39. When a current of 1.5A flows in a coil, the flux linking with the coil is 90 μ Wb. If the coil inductance is 60H, calculate the number of turns of the coil:

A	1000 turns
B	10000 turns
C	100000 turns
D	100 turns

40. The d.c generator used for battery charging is:

A	Series d.c generator
B	Shunt d.c generator
C	Compound excited d.c generator
D	Separately excited d.c generator

41. The emf induced in an alternator is 550V when the flux per pole is 0.5Wb. Speed remaining constant, if the flux per pole is increased to 0.55Wb, what is the new emf?

A	500V
B	600V
C	550V
D	605V

42. Transformers are rated in:

A	KWH
B	KVA
C	KV
D	KWA

43. the speed at which a 6 – pole alternator is to be driven to obtain the frequency of emf induced to be 50Hz is:

A	300rpm
B	600rpm
C	1000rpm
D	3000rpm

44. The transformer whose secondary winding is always kept close is a:

A	Power transformers
B	Potential transformers
C	Distribution transformers
D	Current transformers

45. The compensating windings in a d.c machine is housed:

A	In slots of pole faces
B	In slots of armature
C	Partly in armature slots and partly in pole faces
D	Around the interpoles

46. A d.c machine will operate at its maximum efficiency when:

A	Field copper loss equals iron loss
B	Field copper equals constant loss
C	Armature copper loss equals iron loss
D	Armature copper loss equals constant loss

47. According to Faraday's law of electromagnetic induction, an emf is induced in a conductor when the conductor:

A	lies in a magnetic field
B	moves parallel to the direction of the magnetic field
C	cuts the lines of magnetic flux
D	lies perpendicular to the magnetic flux

48. In dc machines, commutating poles are also called:

A	main poles
B	drum poles
C	Magnetic poles
D	interpoles

49. The method which permit the reversal of the direction of rotation of a three phase induction motor is:

A	Interchanging of all the phases
B	Interchanging of any two phases
C	Reversal of all the phases
D	Reversal of any two phases

50. Open circuit test on a transformer gives:

A	Windage losses
B	Friction losses
C	Copper losses
D	Iron losses