

Open Book Examination (OBE) Activity

Subject: Electronic Devices & Circuits

Class: II ECE-A

Academic Year: 2016 – 17

Semester: I

Topic: MOSFET

MCO (Multiple Choice Questions)

1. Choose the correct answer in the following the MOSFET combines the areas of

Options	Correct Answer	Answer
A	✓	field effect & MOS technology
B		semiconductor & TTL
C		mos technology & CMOS technology
D		none of the mentioned

2. Mark the correct answer Which of the following terminals does not belong to the MOSFET?

Options	Correct Answer	Answer
A		Drain
B		Gate
C	✓	Base
D		Source

3. Select the correct answer considering for MOSFET

Options	Correct Answer	Answer
A		MOSFET is a uncontrolled device
B	✓	MOSFET is a voltage controlled device
C		MOSFET is a current controlled device
D		MOSFET is a temperature controlled device

4. Mark the correct answer the arrow on the symbol of MOSFET indicates

Options	Correct Answer	Answer
A		that it is a N-channel MOSFET
B	✓	the direction of electrons
C		the direction of conventional current flow
D		that it is a P-channel MOSFET

5. Choose the correct answer The controlling parameter in MOSFET is

Options	Correct Answer	Answer
A		V_{ds}
B	✓	I_g
C		V_{gs}
D		I_s

6. Mark the correct answer In the internal structure of a MOSFET, a parasitic BJT exists between the.

Options	Correct Answer	Answer
A		source & gate terminals

B	✓	source & drain terminals
C		rain & gate terminals
D		there is no parasitic BJT in MOSFET

7. Select the transfer characteristics of a MOSFET, the threshold voltage is the measure of the

Options	Correct Answer	Answer
A	✓	minimum voltage to induce a n-channel/p-channel for conduction
B		minimum voltage till which temperature is constant
C		minimum voltage to turn off the device
D		none of the above mentioned is true

8. Mark the correct answer the output characteristics of a MOSFET, is a plot of

Options	Correct Answer	Answer
A		I_d as a function of V_{gs} with V_{ds} as a parameter
B		I_d as a function of V_{ds} with V_{gs} as a parameter
C	✓	I_g as a function of V_{gs} with V_{ds} as a parameter
D		I_g as a function of V_{ds} with V_{gs} as a parameter

9. Select the correct answer the output characteristics of a MOSFET with low values of V_{ds} , the value of the on-state resistance is

Options	Correct Answer	Answer
A		V_{ds}/I_g
B	✓	V_{ds}/I_d
C		0
D		∞

10. Select the correct answer At turn-on the initial delay or turn on delay is the time required for the

Options	Correct Answer	Answer
A		input inductance to charge to the threshold value
B	✓	input capacitance to charge to the threshold value
C		input inductance to discharge to the threshold value
D		input capacitance to discharge to the threshold value

11. Mark the correct answer ,Which among the following devices is the most suited for high frequency applications?

Options	Correct Answer	Answer
A		BJT
B		IGBT
C	✓	MOSFET
D		SCR

12. Decide the correct answer an ideal MOSFET. If $V_{gs} = 0V$, then $I_d = ?$

Options	Correct Answer	Answer
A	✓	Zero

B		Maximum
C		$I_{d(on)}$
D		I_{dd}

13. Select the correct answer For a MOSFET $V_{gs}=3V$, $I_{dss}=5A$, and $I_d=2A$. Find the pinch of voltage V_p

Options	Correct Answer	Answer
A		4.08
B	✓	8.16
C		16.32
D		0V

14. Choose the correct answer ,How does the MOSFET differ from the JFET?

Options	Correct Answer	Answer
A		JFET has a p-n junction
B	✓	They are both the same
C		JFET is small in size
D		MOSFET has a base terminal

15. Decide The basic advantage of the CMOS technology is that

Options	Correct Answer	Answer
A		It is easily available
B		It has small size
C	✓	It has lower power consumption
D		It has better switching capabilities

16. Decide The N-channel MOSFET is considered better than the P-channel MOSFET due to its

Options	Correct Answer	Answer
A		low noise levels
B		TTL compatibility
C		lower input impedance
D	✓	faster operation

17. Mark , The depletion N-channel MOSFET

Options	Correct	Answer
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	Answer	
A		Can be operated as a JFET with zero gate voltage
B	✓	Can be operated as an enhancement MOSFET by applying +ve bias to gate
C		Can be operated as an enhancement MOSFET by applying -ve bias to gate
D		Cannot be operated as an enhancement MOSFET

18. Select the correct answer MOSFET has greatest application in digital circuit due to

Options	Correct Answer	Answer
A	✓	Low power consumption
B		Less noise
C		Small amount of space it takes on a chip
D		All of the above

19. Select The enhancement N-channel MOSFET

Options	Correct Answer	Answer
A	✓	Cannot be operated as an enhancement MOSFET
B		Can be operated as a JFET with zero gate voltage
C		Can be operated as an enhancement MOSFET by applying -ve bias to gate
D		Can be operated as an enhancement MOSFET by applying +ve bias to gate

20. Decide The MOSFET stands for

Options	Correct Answer	Answer
A		Metal oxidized selenium FET
B		Metal oxide surface FET
C	✓	Metal oxide semiconductor FET
D		Metal of surface FET

21. Mark correct answer ,The enhancement MOSFET is

Options	Correct Answer	Answer
A		Normally of MOSFET
B		Useful as a very good constant voltage source
C		Widely used because of easy in its fabrication
D	✓	Normally on MOSFET

22. Choose the correct answer In MOSFETs N-channel is more preferred than P-channel because

Options	Correct Answer	Answer
A		It is cheaper
B	✓	It is faster
C		It has better drive capability
D		It has better noise immunity

23. Decide the MOSFET is almost ideal as switching device because

Options	Correct Answer	Answer
A		It has longer life
B		It works progressively
C	✓	It consumes low power
D		It has linear characteristics

24. Choose IGFET is a device

Options	Correct Answer	Answer
A		Linear
B		Logarithmic
C		Half power
D	✓	Square law

25. Choose the correct answer ,The main types of field effect transistor are

Options	Correct Answer	Answer
A		BJT and FET
B		UJT and FET
C	✓	JFET and MOSFET
D		None of the above

26. Mark the input gate current of a FET is

Options	Correct Answer	Answer
A		A few micro-amperes
B		A few mili-amperes
C		A few amperes
D	✓	Negligible

27. Decide, The transistor can be operated in

Options	Correct Answer	Answer
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A		Active region
B		Saturation region
C		Cut-off region
D	✓	All of the above regions

28. Select the arrow in a transistor terminal represents

Options	Correct Answer	Answer
A	✓	Emitter
B		Collector
C		Base
D		None of the above

29. Select the correct answer ,The germanium transistors can be used upto

Options	Correct Answer	Answer
A		60°C
B	✓	100°C
C		150°C
D		300°C

30. Decide A transistor is said to be operating in the cut-off region if

Options	Correct Answer	Answer
A		Emitter junction is forward biased and collector junction is forward biased
B	✓	Emitter junction is reverse biased and collector junction is reverse biased
C		Emitter junction is reverse biased and collector junction is forward biased
D		Emitter junction is forward biased and collector junction is reverse biased

31. Select the Transistor is a device which is a

Options	Correct Answer	Answer
A		Transferring voltage device
B	✓	Current operated one
C		Power operated one
D		Voltage operated one

32. Select, The transistor can transfer

Options	Correct Answer	Answer
A	✓	A signal from low resistance to high resistance
B		A weak signal of only higher frequencies through it
C		A weak signal of only lower frequencies through it
D		A signal from high resistance to low resistance

33. Choose the correct answer When the transistor is in saturation, the collector to emitter voltage

Options	Correct Answer	Answer
A	✓	Is nearly zero
B		Depends on reverse saturation current
C		Is between zero and supply voltage
D		Is nearly supply voltage

34. Decide transistor works as an open switch when emitter junction is.....biased and collector junction is.....biased

Options	Correct Answer	Answer
A		Forward, forward
B	✓	Reverse, reverse
C		Reverse, forward
D		Forward, reverse

35. Consider when a transistor is in active region the resistance is between

Options	Correct Answer	Answer
A		Emitter to collector
B	✓	Base to collector
C		Emitter to base
D		All of the above

36. Predict which one of the following Transistor is said to be operating in the active region if

Options	Correct Answer	Answer
A	✓	Emitter junction is forward biased and collector junction is reverse biased
B		Emitter junction is forward biased and collector junction is forward biased
C		Emitter junction is reverse biased and collector junction is forward biased
D		Emitter junction is reverse biased and collector junction is reverse biased

37. Compared with Current base part of a transistor behaves like

Options	Correct Answer	Answer
A	✓	Constant current source
B		A resistance
C		Forward biased diode
D		None of the above

38. Choose the transistor which is affected by static electricity

Options	Correct Answer	Answer
A		N-P-N transistor
B		UJT
C		FET
D	✓	MOSFET

39. Mark which of the following an advantage of an alloy transistor

Options	Correct Answer	Answer
A	✓	Low saturation resistance
B		Better low frequency response
C		High cut-off frequency
D		High saturation resistance

40. Choose the transistor is said to be in quiescent state when

Options	Correct Answer	Answer
A	✓	No signal is applied to the input
B		No currents are flowing
C		It is unbiased
D		Emitter junction and collector junction biases are equal

41. Predict A transistor-terminal current is positive when the

Options	Correct Answer	Answer
A		Current is due to flow of electrons
B		Current is due to flow of holes
C		Electrons flow into the transistor at the terminal
D	✓	Electrons flow out of the transistor at the terminal

42. Select, the transistor is said to be in the.....region when both the junctions are forward biased

Options	Correct Answer	Answer
A	✓	Saturation
B		Cut-off
C		Active
D		Passive

43. Mark correct answer which transistor is most suitable for high frequency circuits

Options	Correct Answer	Answer
A		Hermetically sealed
B	✓	Grown-diffusion
C		Rate-grown
D		Alloy

44. Choose the Hermetically sealed transistor entails which of following advantages

Options	Correct Answer	Answer
A	✓	High thermal stability
B		Contamination of material is avoided
C		No heat sink is required
D		Better frequency response

45. Decide In CB configuration, a transistor transfers

Options	Correct Answer	Answer
A	✓	Voltage from high impedance circuit to low impedance
B		Voltage from low impedance circuit to high impedance
C		Current from high impedance circuit to low impedance circuit
D		Current from low impedance circuit to high impedance circuit

46. Select the correct answer A transistor acts like a diode and

Options	Correct Answer	Answer
A		Power supply
B	✓	Current source
C		Resistance
D		Voltage source

47. Choose the correct answer A MOSFET can be operated with

Options	Correct Answer	Answer
A		negative gate voltage only
B		positive gate voltage only
C	✓	positive as well as negative gate voltage
D		none of the above

48. Mark A MOSFET is sometimes called JFET

Options	Correct Answer	Answer
A		many gate
B		open gate
C	✓	insulated gate
D		shorted gate

49. Decide A MOSFET uses the electric field of a to control the channel

Options	Correct Answer	Answer
A	✓	capacitor
B		battery
C		generator
D		none of the above

50. Select the input impedance of a MOSFET is of the order of

Options	Correct Answer	Answer
A	✓	Ω
B		a few hundred Ω
C		$k\Omega$
D		several $M\Omega$

Assessment Method:

The assessment method used for the proposed study consist of on-line multiple choice questions, comprising 50 questions.

Test results of both the examinations were collected and statistical analysis is performed. The analyzed data is shown

Open book and closed book analyzed data

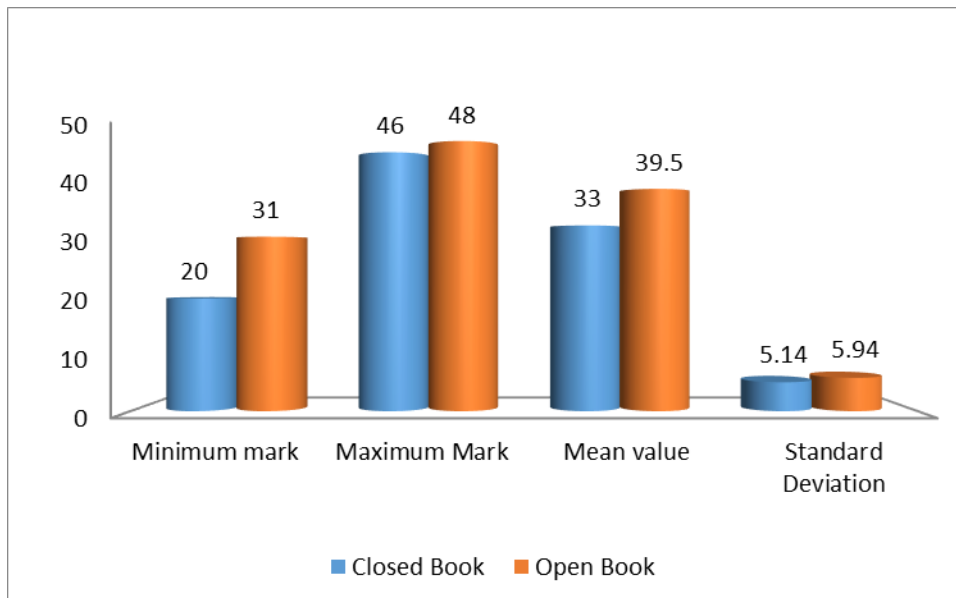
	Closed Book	Open Book
Minimum mark	20	31
Maximum Mark	46	48
Mean value	33	39.5
Standard Deviation	5.14	5.94
No. of students completed test	66	66

Closed Book analysis:

The minimum and maximum scores for the closed book sitting were 40% and 92% respectively, with a mean of 66%

Open Book Sitting

The minimum and maximum scores for the closed book sitting were 62% and 96% respectively, with a mean of 79%. There is an increase of 13% mean value and standard deviation of both methods are nearer.



Comparison of marks of all students who completed the assessments both OBE and CBE

Time limit:

The time taken by students to complete the open book assessment, over and above the time limit of 60 minutes was recorded. However, some students are allowed to continue examination beyond time limit also. 54 students completed the test within the time limit, while 12 students required

additional time to complete the assessment.

The influence of time on students marks in the open book sitting

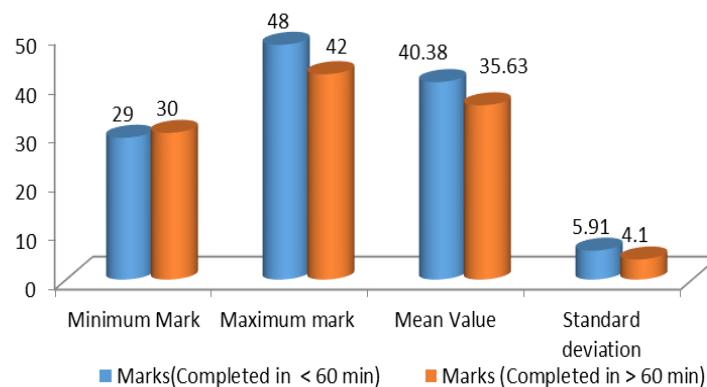
	Completed in < 60 min	Completed in > 60 min	
	Marks	Marks	Extra time in min
Minimum Mark	29	30	5
Maximum mark	48	42	14
Mean Value	40.38	35.63	9.13
Standard deviation	5.91	4.10	2.85
No, of students completed test	54	6	6

Students completed in < 60 min:

The minimum and maximum scores for the open book sitting were 58% and 98% respectively, with a mean of 80.76%

Students exceeded 60 min:

The minimum and maximum scores for the open book sitting were 60% and 84% respectively, with a mean of 71.26%



Comparison of open book sitting marks of students who completed in < 60 min time and > 60 min.

Post Reflections:

- There is a significant improvement in minimum mark and mean value Open book Examination. The increase of 13.34% in mean for open book test shows that the average mark of most of the students is increased, which it indicates that there is an improvement in students performance in OBE sitting when considered average marks.
- The maximum mark in OBE and CBE sittings is almost same and only two marks difference (48 and 47 marks respectively) for intelligent student whether it is open book or closed book examination is immaterial.



Students participating in Open book Examination

EDC OBE exam results A sec - Microsoft Excel											
A	B	C	D	E	F	G	H	I	J	K	
1	S.NO	Test Name	DATE	Student HallTicket No	Student Name	Start time	End time	Duration	Student Department	Secured score	Total Score
2	1	EDC TEST	26-09-2016	15NM1A0401	Allavarapu Ganeswari Rupavathi	1:06 PM	1:59 PM	53 mins	ECE	22	50
3	2	EDC TEST	26-09-2016	15NM1A0402	Andiboyina Janaki	1:02 PM	2:11 PM	70 mins	ECE	29	50
4	3	EDC TEST	26-09-2016	15NM1A0403	Amampalli Jhansi	1:04 PM	2:12 PM	68 mins	ECE	26	50
5	4	EDC TEST	26-09-2016	15NM1A0404	Arisankala Yasoda Sridevi	1:00 PM	1:57 PM	57 mins	ECE	26	50
6	5	EDC TEST	26-09-2016	15NM1A0405	Avulla Bharathi Lakshmi	1:03 PM	2:05 PM	63 mins	ECE	36	50
7	6	EDC TEST	26-09-2016	15NM1A0406	Ayenampudi Alekhyia	1:11 PM	1:49 PM	39 mins	ECE	30	50
8	7	EDC TEST	26-09-2016	15NM1A0407	Baddi Vijaya	1:11 PM	2:09 PM	58 mins	ECE	29	50
9	8	EDC TEST	26-09-2016	15NM1A0408	Bandaru Saranya	1:01 PM	1:57 PM	56 mins	ECE	26	50
10	9	EDC TEST	26-09-2016	15NM1A0409	Barri Rama Devi	1:07 PM	1:51 PM	44 mins	ECE	36	50
11	10	EDC TEST	26-09-2016	15NM1A0410	Basa Kavya Vijaya Lakshmi	1:04 PM	2:05 PM	62 mins	ECE	23	50
12	11	EDC TEST	26-09-2016	15NM1A0411	Basangi Sharun Roja	1:08 PM	1:47 PM	39 mins	ECE	44	50
13	12	EDC TEST	26-09-2016	15NM1A0412	Baswa Rajani	1:00 PM	2:12 PM	73 mins	ECE	36	50
14	13	EDC TEST	26-09-2016	15NM1A0413	B Shammukalakshmi Katyayani	1:29 PM	2:05 PM	37 mins	ECE	30	50
15	14	EDC TEST	26-09-2016	15NM1A0414	Boddapu Priyanka	1:00 PM	2:12 PM	72 mins	ECE	44	50
16	15	EDC TEST	26-09-2016	15NM1A0415	Boddepalli Sandhyarekha	1:01 PM	2:12 PM	71 mins	ECE	20	50
17	16	EDC TEST	26-09-2016	15NM1A0416	Bugatha Leela	1:01 PM	1:59 PM	58 mins	ECE	35	50
18	17	EDC TEST	26-09-2016	15NM1A0417	Chandaka Vasavi	12:59 PM	2:12 PM	74 mins	ECE	36	50
19	18	EDC TEST	26-09-2016	15NM1A0418	Chappa Padmini	1:04 PM	2:02 PM	58 mins	ECE	29	50
20	19	EDC TEST	26-09-2016	15NM1A0419	Chilaka Lalita Lavanya	1:03 PM	1:44 PM	41 mins	ECE	42	50
21	20	EDC TEST	26-09-2016	15NM1A0420	Chintala Mounica	12:58 PM	1:49 PM	51mins	ECE	41	50
22	21	EDC TEST	26-09-2016	15NM1A0421	Chitmisetti Haritha	1:15 PM	1:29 PM	14 mins	ECE	34	50
23	22	EDC TEST	26-09-2016	15NM1A0422	Chukka Shyamala	1:01 PM	1:57 PM	56 mins	ECE	41	50

Activity Outcome:

- Compare the characteristics between JFET and MOSFET.
- Summarize the various types of MOSFET.
- Importance the use of MOSFET construction and working of transistors.

Activity Outcomes: PO Mapping Table:

Activity Outcome	Mapping to PO's
Compare the characteristics between JFET and MOSFET	PO1,PO5,PO12
Summarize the various types of MOSFET	PO1,PO6,PO12
Importance the use of MOSFET construction and working of transistors.	PO3,PO5,PO10,PO12

Post Implications:

- All the students actively taken the test conducted in open book exam.
- Few students were felt hard during closed book exam.
- Few students were enthusiastic to refer standard reference books to learn and understand the concept.