



# MUSLIM ARTS COLLEGE

A Muslim Minority Institution - Estd 1982

Affiliated to Manonmaniam Sundaranar University, Tirunelveli, Recognized u/s 2(f) & 12(B) of UGC Act.  
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ISO 9001:2000  
Reg. No. : RQ91/2688

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Principal

Date :

## 1.1 Curricular Planning and Implementation

  
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PRINCIPAL  
MUSLIM ARTS COLLEGE  
THIRUVITHANCODE-629 174



(7 pages)

Reg. No. : ROAR 3092521213

Code No. : 6385

Sub. Code : ZPHM 13

M.Sc. (CBCS) DEGREE EXAMINATION,  
NOVEMBER 2022.

First Semester

Physics - Core

INTEGRATED ELECTRONICS

(For those who joined in July 2021 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

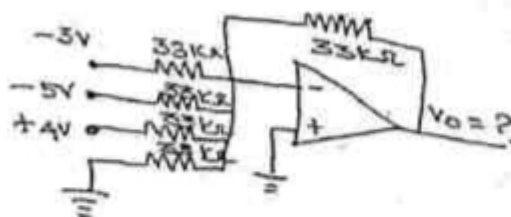
Choose the correct answer :

- In the saturation region the  $I_D - V_{DS}$  characteristics of a MOSFET are \_\_\_\_\_  
(a) Linear (b) Quadratic  
(c) Exponential (d) Hyperbolic
- In reverse biased condition SCR behaves as \_\_\_\_\_  
(a) Diode (b) Transistor  
(c) JFET (d) MOSFET

- If propagation delay time  $t_p = 10$  ns the outputs change approximately \_\_\_\_\_ after the arrival of the clock signal.  
(a) 20 ns (b) 15 ns  
(c) 10 ns (d) 5 ns
- The circuit responds only where the clock is transaction between its two voltage states \_\_\_\_\_  
(a) RC triggering (b) Level triggering  
(c) Edge triggering (d) None
- Given a choice, integrators are almost invariably preferred over differentiators in analog circuits because \_\_\_\_\_  
(a) differentiators cause more noise at the output  
(b) differentiators don't allow frequency signals to pass  
(c) integrators are more immune to low frequency noise  
(d) the gain of a differentiator increases with frequency and therefore they are difficult to stabilize with respect to spurious oscillations

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- What is the expected output voltage in the following circuit?



- Monostable multivibrator circuit is sometimes called as \_\_\_\_\_ multivibrator.  
(a) free running  
(b) one shot  
(c) neither free running nor one shot  
(d) none
- A pulse train has a pulse width 5 ns and a period of 64 ns. Then the duty cycle is \_\_\_\_\_ percent.  
(a) 8.81 (b) 7.81  
(c) 6.81 (d) 5.81

- Shielding is only effective against \_\_\_\_\_ fields if it provides a low impedance path to ground.  
(a) Electric (b) Magnetic  
(c) Electro-magnetic (d) Coloumb
- Signal conditioning often requires the \_\_\_\_\_ signal to be filtered and isolated to remove unwanted back ground noise.  
(a) Output  
(b) Input  
(c) Neither input and output  
(d) None

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

- (a) Explain the operation of enhancement MOSFET with diagram.  
Or  
(b) A 100  $\mu$ m thick silicon wafer has been doped uniformly with Boron of concentration  $\frac{10^{18}}{\text{cm}^3}$ . Find its sheet resistance. Given that for a p-type wafer  $\gamma$  is given to be 100  $\mu$ m and hole mobility in a silicon is 500  $\text{cm}^2/\text{V}\cdot\text{S}$ .

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U.G. (CBCS) DEGREE EXAMINATION,  
NOVEMBER 2022.

First Semester

Part IV — ENVIRONMENTAL STUDIES

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks.

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer.

1. Which of the following energy resource is nonrenewable?
  - (a) Biomass
  - (b) Geothermal
  - (c) Fossil Fuel
  - (d) Hydropower

2. What is the driving force of the water cycle?
  - (a) Evaporation from the ocean
  - (b) Heat from the sun
  - (c) Precipitation from rainfall
  - (d) Runoff from mountains
3. Where can we find coniferous forest in India?
  - (a) Deserts
  - (b) River Deltas
  - (c) Grassland
  - (d) Himalayas
4. Which biome contains cacti and small bushes?
  - (a) Grassland
  - (b) Taiga
  - (c) Tundra
  - (d) Desert
5. Biologists put extra effort into protecting these because they have many species living in them.
  - (a) Cities
  - (b) Biodiversity Hotspot
  - (c) Farms
  - (d) Conservation stations
6. The biggest threat to biodiversity is
  - (a) Climate change
  - (b) Overharvesting
  - (c) Habitat loss
  - (d) Pollution

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7. Photochemical smog mainly is
  - (a)  $H_2O_2$
  - (b) Methyl Chlorate
  - (c) Ozone
  - (d) Peroxyacetyl nitrate
8. Extremely harmful sound for human health
  - (a) Above 20 decibels
  - (b) Above 60-65 decibels
  - (c) Above 80 decibels
  - (d) Above 30 decibels
9. When was the Indian Board for Wildlife constituted?
 

(a) 1952	(b) 1950
(c) 1949	(d) 1948
10. Acid rain has a pH <
 

(a) 5	(b) 6
(c) 7	(d) 8

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PART B — (5 × 5 = 25 marks)  
Answer ALL questions, choosing either (a) or (b).  
Each answer should not exceed 250 words.

11. (a) What is the importance of natural resource? Why is necessary to conserve them?  
Or  
(b) Discuss about water conservation and watershed management.
12. (a) Explain the ecological pyramid and its types.  
Or  
(b) Short notes on types of the forest ecosystem.
13. (a) Explain the values of biodiversity.  
Or  
(b) What is biodiversity and its conservation?
14. (a) Enlist Various source of air pollutants.  
Or  
(b) Define environmental pollution and its effect.
15. (a) What is the greenhouse effect and why does an increased greenhouse effect lead to climate.  
Or  
(b) What is the main provision of the environmental protection act of 1986?

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[P.T.O.]

M.Sc. (CBCS) DEGREE EXAMINATION,  
NOVEMBER 2022.

Third Semester

Mathematics — Core

MEASURE AND INTEGRATION

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Let  $A$  be the set of irrational numbers in  $[0, 1]$ . Then  $m^*(A)$  is

- (a)  $\infty$  (b)  $0$   
(c)  $1$  (d)  $1/2$

6. Define  $g_n = \chi_{(0, n+1)}$ . Then  $\lim_{n \rightarrow \infty} \int_{\mathbb{R}} g_n$  is

- (a)  $0$  (b)  $1$   
(c)  $\infty$  (d)  $n$

7.  $[-5f]^*$  is

- (a)  $-5f^*$  (b)  $5f^-$   
(c)  $5f^*$  (d)  $-5f^-$

8. For all  $a \leq u \leq v \leq b$ ,  $\int_u^v \text{Diff}_h f$  is

- (a)  $0$  (b)  $A v_h f(v) + A v_h f(u)$   
(c)  $A v_h f(v) - A v_h f(u)$  (d)  $A v_h f(u) - A v_h f(v)$

9. A function  $f$  on  $[a, b]$  is absolutely continuous on  $[a, b]$  if and only if

- (a) it is an indefinite integral over  $[a, a]$

- (b)  $\int_a^b f' = f(b) - f(a)$

- (c)  $f$  is differentiable almost everywhere on  $(a, a)$

- (d)  $f$  is differentiable

2. If  $A$  is a measurable set of finite outer measure that is contained in  $B$  then  $m^*(B - A) = m^*(B) - m^*(A)$ . This property is known as

- (a) finite subadditivity (b) translation invariant  
(c) countably additive (d) excision property

3. For a function  $f$  defined on  $E$ ,  $f^*(x)$  is defined by

- (a)  $\max\{f(x) - f(x)\}$  (b)  $\max\{f(x), 0\}$   
(c)  $\max\{-f(x), 0\}$  (d)  $\min\{f(x), 0\}$

4. If for each  $\epsilon > 0$ , there is an index  $N$  for which  $|f - f_n| < \epsilon$  on  $A$  for all  $n \geq N$ , we say that

- (a)  $\{f_n\}$  converges to  $f$  uniformly on  $A$   
(b)  $\{f_n\}$  converges to  $f$  pointwise a.e. on  $A$   
(c)  $\{f_n\}$  converges to  $f$  pointwise on  $A$

- (d)  $\{f_n\} \rightarrow f$  as  $n \rightarrow \infty$

5. Let  $f$  be a nonnegative measurable function on  $E$ . Then for any  $\lambda > 0$ ,  $m\{x \in E \mid f(x) \geq \lambda\}$  is

- (a)  $\lambda \int_E f$  (b)  $\leq \lambda \int_E f$

- (c)  $\geq \lambda \int_E f$  (d)  $= \frac{1}{\lambda} \int_E f$

Defini

Defini

6. Define  $g_n = \chi_{(0, n+1)}$ . Then  $\lim_{n \rightarrow \infty} \int_{\mathbb{R}} g_n$  is

- (a)  $0$  (b)  $1$   
(c)  $\infty$  (d)  $n$

7.  $[-5f]^*$  is

- (a)  $-5f^*$  (b)  $5f^-$   
(c)  $5f^*$  (d)  $-5f^-$

8. For all  $a \leq u \leq v \leq b$ ,  $\int_u^v \text{Diff}_h f$  is

- (a)  $0$  (b)  $A v_h f(v) + A v_h f(u)$   
(c)  $A v_h f(v) - A v_h f(u)$  (d)  $A v_h f(u) - A v_h f(v)$

9. A function  $f$  on  $[a, b]$  is absolutely continuous on  $[a, b]$  if and only if

- (a) it is an indefinite integral over  $[a, a]$

- (b)  $\int_a^b f' = f(b) - f(a)$

- (c)  $f$  is differentiable almost everywhere on  $(a, a)$

- (d)  $f$  is differentiable

10. If  $\{A, B\}$  is a Hahn decomposition for  $r$ , then  $r^+$  and  $r^-$  are defined by

- (a)  $r^+(E) = r(E \cap A)$ ,  $r^-(E) = -r(E \cap B)$

- (b)  $r^+(E) = -r(E \cap A)$ ,  $r^-(E) = r(E \cap B)$

- (c)  $r^+(E) = r(E \cup A)$ ,  $r^-(E) = -r(E \cup B)$

- (d)  $r^+(E) = -r(E \cup A)$ ,  $r^-(E) = r(E \cup B)$

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Define a measurable set and prove that any set of outer measure zero is measurable.

Or

- (b) If  $m$  is the Lebesgue measure and if  $\{A_k\}_{k=1}^{\infty}$  is an ascending collection of measurable sets,

prove that  $m\left(\bigcup_{k=1}^{\infty} A_k\right) = \lim_{k \rightarrow \infty} m(A_k)$ .

12. (a) Let  $f$  be an extended real-valued function on  $E$ . If  $f$  is measurable on  $E$  and  $f = g$  a.e. on  $E$ , prove that  $g$  is measurable on  $E$ .

Or

- (b) Let  $\{f_n\}$  be a sequence of measurable function on  $E$  that converges pointwise a.e. on  $E$  to the function  $f$ . Prove that  $f$  is measurable.

B.Sc. (CBCS) DEGREE EXAMINATION,  
NOVEMBER 2022.

Fifth Semester

Mathematics

Major Elective — OPERATIONS RESEARCH – I

(For those who joined in July 2017 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

- Linear programming problem involving only two decision variables can be solved by
  - Graphical method
  - Simplex method
  - Both (a) and (b)
  - None of the above

- In a balanced assignment problem the cost matrix is
  - Symmetric matrix
  - Square matrix
  - Unsymmetric matrix
  - Not a square matrix
- If an assignment problem having 4 workers and 3 jobs, then the total number of possible assignment is
 

(a) 4	(b) 3
(c) 7	(d) 12
- If indicates the time required by a job on each machine
 

(a) Elapsed time	(b) Processing time
(c) Idle time	(d) None
- Number of sequences require to evaluate sequencing problem with 6 jobs, 5 machines
 

(a) $(6!)^5$	(b) $(5!)^6$
(c) $5! \times 6$	(d) $5 \times 6$

- Simplex method was introduced by
 

(a) G.B Dantzig	(b) Konig
(c) Miller	(d) Taha
- If the primal problem has an unbounded solution then the dual problem has \_\_\_\_\_
  - feasible solution
  - basic solution
  - no feasible solution
  - optimal solution
- If the dual problem has  $n$  variables, then the primal problem has \_\_\_\_\_ constraints.
 

(a) $n$	(b) $n+1$
(c) $n-1$	(d) none
- All the basis for a transportation problem are
 

(a) triangular	(b) non-triangular
(c) equal	(d) unequal
- Which of the following method used to find the optimum solution of transportation problem?
  - VAM method
  - North-West corner rule
  - MODI method
  - Matrixminima method

PART B — (5 × 5 = 25 marks)

Answer ALL questions choosing either (a) or (b).

- (a) Solve the following LPP using graphical method

Maximize  $z = x_1 + x_2$

S.T

$x_1 + x_2 \leq 1$

$-3x_1 + x_2 \geq 3$

$x_1, x_2 \geq 0.$

Or

- (b) Solve the following LPP, using graphical method

Minimize  $z = x_1 + x_2$

S.t

$5x_1 + 3x_2 \leq 15$

$x_1 + x_2 \geq 6$

$x_1, x_2 \geq 0.$



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**Dr. G. Edwin Sheela, M.Sc., M.Phil., Ph.D.,**  
Principal

## DECLARATION

I hereby declare that the details and information given above are complete and true to the best of my knowledge and belief.

  
**Dr. G. EDWIN SHEELA**  
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