

University of Mumbai
Examination 2020 under cluster 3 (FCRIT)

Program: BE Electronics and Telecommunication Engineering

Curriculum Scheme: Revised **2016**

Examination: Third Year Semester **V**

Course Code and Course Name: **ECC503 Electromagnetic Engineering**

Time: **1 hour**

Max. Marks: **50**

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Note to the students:- All Questions are compulsory and carry equal marks .

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| Q1. | The electric flux density D is the product of |
| Option A: | permittivity and flux lines |
| Option B: | permittivity and electric field intensity |
| Option C: | flux lines and electric field intensity |
| Option D: | permeability and electric field intensity |
| | |
| Q2. | Using Gauss's law as reference we can derive |
| Option A: | Coulomb's law |
| Option B: | Faraday's law |
| Option C: | Ohm's Law |
| Option D: | Ampere law |
| | |
| Q3. | Which is an example of convection current? |
| Option A: | Electric current flowing in a copper wire |
| Option B: | An electron beam in a television tube |
| Option C: | Electric current flowing in a coaxial cable |
| Option D: | Current flowing through conducting sheet |
| | |
| Q4. | Electric field in the ideal conducting medium is |
| Option A: | Infinite |
| Option B: | Zero |
| Option C: | Non linear |
| Option D: | linear |
| | |
| Q5. | The point form of Ampere law is given by |
| Option A: | $\text{Curl}(\mathbf{B}) = \mathbf{I}$ |
| Option B: | $\text{Curl}(\mathbf{D}) = \mathbf{J}$ |
| Option C: | $\text{Curl}(\mathbf{V}) = \mathbf{I}$ |
| Option D: | $\text{Curl}(\mathbf{H}) = \mathbf{J}$ |
| | |
| Q6. | The value of $\int \mathbf{H} \cdot d\mathbf{L}$ will be |
| Option A: | J |
| Option B: | I |

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| Option C: | B |
| Option D: | H |
| | |
| Q7. | The characteristic impedance of free space is |
| Option A: | 489 |
| Option B: | 265 |
| Option C: | 192 |
| Option D: | 377 |
| | |
| Q8. | For a dielectric, the condition to be satisfied is |
| Option A: | $\sigma/\omega\epsilon > 1$ |
| Option B: | $\sigma/\omega\epsilon < 1$ |
| Option C: | $\sigma = \omega\epsilon$ |
| Option D: | $\omega\epsilon = 1$ |
| | |
| Q9. | According to Smith diagram, where should be the position of reflection coefficient value for a unity circle with unity radius? |
| Option A: | On or inside the circle |
| Option B: | Outside the circle |
| Option C: | At the origin |
| Option D: | At Infinity |
| | |
| Q10. | The open wire transmission line consists of |
| Option A: | Conductor and Dielectric |
| Option B: | Piezoelectric material |
| Option C: | Paramagnetic material |
| Option D: | Ferromagnetic material |
| | |
| Q11. | For a transmission line with a propagation constant $0.650 + j2.55$, what is the value of phase velocity for 1 kHz frequency |
| Option A: | 1.18×10^3 km/sec |
| Option B: | 1.5×10^3 km/sec |
| Option C: | 2.46×10^3 km/sec |
| Option D: | 4.58×10^3 km/sec |
| | |
| Q12. | Graphene is the name for |
| Option A: | Honeycomb sheet of carbon atoms |
| Option B: | Nanoscale cube of carbon atoms |
| Option C: | An invisible plastic membrane |
| Option D: | Scientific name for graphite in 6B pencil |
| | |
| Q13. | A dielectric material having _____ dielectric constant is favored for capacitor. |
| Option A: | low |
| Option B: | high |
| Option C: | zero |

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| Option D: | negative |
| Q14. | If the radius of a sphere r is $1/(4\pi)$ m (one over four times pi) and the electric flux density \mathbf{D} is 8π (eight times pi) units, the total flux is given by |
| Option A: | 0 units |
| Option B: | 1 units |
| Option C: | 2 units |
| Option D: | 4 units |
| Q15. | Electric flux density present on the surface of conductor-free space boundary is due to |
| Option A: | Free charge present in the free space |
| Option B: | Charge density on the interface |
| Option C: | Water particles in the free space |
| Option D: | Pressure in the free space |
| Q16. | The divergence of which quantity will be zero? |
| Option A: | E |
| Option B: | D |
| Option C: | H |
| Option D: | B |
| Q17. | The relation between energy transfer and the electric and magnetic fields specified by |
| Option A: | Poynting theorem |
| Option B: | Stoke's theorem |
| Option C: | Helmholtz theorem |
| Option D: | Lagrange's theorem |
| Q18. | Find the curl of \mathbf{E} when \mathbf{B} is given as $15t$. |
| Option A: | 15 |
| Option B: | -15 |
| Option C: | 7.5 |
| Option D: | -7.5 |
| Q19. | Which transmission line is called as one to one transformer? |
| Option A: | λ |
| Option B: | $\lambda / 4$ |
| Option C: | $\lambda / 2$ |
| Option D: | $\lambda / 8$ |
| Q20. | What is the Standing wave ratio if a 75Ω antenna load is connected to a 50Ω transmission line? |
| Option A: | 1 |
| Option B: | 2 |
| Option C: | 1.5 |

University of Mumbai
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| Option D: | 1.43 |
| | |
| Q21. | The flux density of line charge of radius 5m (five meters) with a Gaussian surface cylinder and line charge density of π (pi) units is given by |
| Option A: | 0.1 units |
| Option B: | 0.25 units |
| Option C: | 0.5 units |
| Option D: | 0.75 units |
| | |
| Q22. | A parallel-plate capacitor connected to a battery stores twice as much charge with a given dielectric as it does with air as dielectric, the susceptibility of the dielectric is |
| Option A: | 0 |
| Option B: | 1 |
| Option C: | 2 |
| Option D: | 3 |
| | |
| Q23. | When the conduction current density and displacement current density are same, the dissipation factor will be |
| Option A: | Zero |
| Option B: | Minimum |
| Option C: | Maximum |
| Option D: | Unity |
| | |
| Q24. | A plane wave is travelling in the positive X- direction in a lossless unbounded medium having permeability the same as the free space and a permittivity 9 times that of the free space, the phase velocity of the wave will be |
| Option A: | 3×10^8 m/s |
| Option B: | 10^8 m/s |
| Option C: | $(1/3) \times 10^8$ m/s |
| Option D: | $\sqrt{3} \times 10^8$ m/s |
| | |
| Q25. | The propagation constant of a transmission line with impedance and admittance 9 and 16 respectively is |
| Option A: | 25 |
| Option B: | 144 |
| Option C: | 12 |
| Option D: | 7 |