Model questions Electromagnetic Engineering (ECC503 & CBCGS-H)

1) Find the force between 2C and -1C charges separated by a distance 1m in air (in newton).(2 M)
   a) 18 X 10^9
   b) -18 X 10^9
   c) 18 X 10^-6
   d) -18 X 10^-6
2) A field line and an equi potential surface are(1M)
   a) always parallel
   b) always at 90°
   c) inclined at any angle theta
   d) depends on charge
3) A uniform line charge with density 3 uC /m lies along the x axis. What flux crosses a spherical surface centered at the origin with r = 3 m. (2M)
   a) 3uC
   b) 6uC
   c) 9uC
   d) 0uC
4) One of these equations is not Maxwell's equation for a static electromagnetic field (2M)
   a) ▼ X B = 0
   b) ▼X D = 0
   c) $\oint B \cdot dl = \mu_0 I$
   d) $\oint D \cdot ds = Q$
5) What would be the Standing Wave Ratio (SWR) for a line with reflection coefficient equal to 0.16? (2M)
   a) 1.5
   b) 2.0
   c) 1.38
   d) 0.724
6) Standing wave ratio is defined as the (1M)
   a) Ratio of voltage maxima to voltage minima
   b) Ratio of current maxima to current minima
   c) Product of voltage maxima and voltage minima
   d) Product of current maxima and current minima
7) The propagation constant of a wave with attenuation and phase constant given by 3 and 4 respectively is given by (2M)
   a) 5∟53.13
   b) 5∟36.86
   c) 5∟-53.13
   d) 5∟-36.86

8) The magnetic field component of an EM wave propagating through a non magnetic medium (μ=μ0), $H = 25\sin(2 * 10^8\, t + 6x)a_y$ mA/m. What is Direction of Propagation of Wave (1M)
   a) x Direction
   b) -x direction
   c) y direction
   d) –y direction
9) Calculate Magnetic field at a point 4m in radius due to current in infinite conductor carrying 4 ampere current.(2M)
   a) 1.59 A/m
   b) 0.159 A/m
   c) -1.59 A/m
   d) -0.59 A/m
10) A transmission line has a characteristics impedance of 50 ohm and terminate in a load ZL= 25+j50 ohm. Calculate VSWR (2M)
   a) -4.26
   b) 2.0
   c) 4.26
   d) 0.23
11) The ratio of magnitudes of electric field intensity to the magnetic field intensity is regarded as _____ (1M)

a) Intrinsic Impedance
b) Characteristic Impedance
c) Loss tangent
d) TEM

12) Find a flux crossing the plane surface between 0.5m <r <2.5 m and B=(20/r) aϕ T.(2M)

a) 5.81 Wb
b) 6.44 Wb
c) 2.56 Wb
d) 7.41 Wb

13) What would be the depth of penetration for copper at 1MHz frequency with σ = 5.8 x 10^7mho/m.(2M)

a) 107.17 m
b) 66.08m
c) 55.04m
d) 0M

14) Determine E at origin due to uniform line charge distribution with ρl=3.30nC/m located at x=3m, y=4. (2M)
   a) -7.13 ax-9.5ayV/m
   b) 8.02ax+ 9.5ay V/m
   c) -8.02ax- 9.5ay V/m

d) 7.13 ax + 9.5ayV/m

15) Calculate charge in the volume defined by 0<x<1 ,0<y<1 and 0<z<1 m if ρ=30x^2y C/m^2. (2M)

a) 5μC b) 0.5 μC c) 50μC 0.05μC

16) V* E = 0 signifies (2M)

a) Field is irrotational
b) Field is solenoidal
c) Field is not present
d) Field is not conservative

17) V=3x^2+3y^2 Volts .Find Electric Field at (1,1,1) (2M)

a) -6ax-6ay V/m
b) 6ax+ 6ay V/m
c) 0.6ax+ 0.6ay V/m
d) 0.6ax+ 6ay V/m

18) In free space region x<0 has E1=2ax + 5ay-3az V/m. if εr2=3.6 then find En2(2M)

a) 0.833ax V/m
b) 10.8 ax V/m
c) 0.833ay V/m
d) 10.8 ay V/m

19) If B =0.2 sin 10^3 t az T. Calculate flux crossing circular loop of radius 0.1 m.(2M)

a) 6.28 sin 10^3 t az mWb
b) 0.8 sin 10^3 t az mWb
c) 2.8 sin 10^3 t az mWb
d) 7.18 sin 10^3 t az mWb

20) The propagation constant of a transmission line with impedance and admittance of 9 and 16 respectively is --- (2M)

a) 25
b) 144
c) 12
d) 49

21) The wavelength of a line with a phase constant of 6.28 units is—(2M)

a) 2
b) 1
c) 0.5
d) 3.14

22) What is the value of characteristics impedance for loss free transmission line? (2M)

a) √(L/C)
b) √(R/C)
c) √(LC)
d) √(C/L)

23) The reflection coefficient lies in the range of (2M)

a) $0 < \tau < 1$

b) $-1 < \tau < 1$
c) $1 < \tau < \infty$
d) $0 < \tau < \infty$

24) For matched line, the standing wave ratio will be (2M)
a) 0
b) ∞
c) -1
d) 1

25) Find phase constant of non magnetic material having $\mu r = 1$, $\varepsilon e = 8$ and $\sigma = 0.25$ pS/m, if frequency is 1.6 MHz. (2M)

a) 9.48*10^-2 rad/m
b) 11.35 10^-2 rad/m
c) 7.79 10^-2 rad/m
d) 9.08 10^-2 rad/m

26) Calculate Intrinsic impedance for a conducting medium $\sigma = 58$ MS/m, $\mu r = 1$ and at frequency 100 MHz. (2M)
a) 3.7*10^-3 ∟45 ohm
b) 5.2*10^3 ∟45 ohm
c) 0.7*10^-3 ∟45 ohm
d) 8.2*10^3 ∟45 ohm

27) Intrinsic impedance of a free space is (1M)
a) 377 ohm
b) 3.77 ohm
c) 37.7 ohm
d) 33770 ohm

28) The Smith chart consists of the
a) Constant R and variable X circles
b) Variable R and constant X circles
c) Constant R and constant X circles
d) Variable R and variable X circles

29) **The ratio of magnitudes of electric field intensity to the magnetic field intensity is regarded as _____**

a) Intrinsic Impedance
b) Characteristic Impedance
c) Loss tangent
d) Image impedance

30) A plane wave in a nonmagnetic medium has E = 50 sin (10^8 t + 2z) ay V/m. Calculate εr. (2M)
a) 36
b) 49
c) 4
d) 81