

## Microwave and Radar Engineering BE Sem VII Set 1

1 mark

Q No	Question
1	One of the following radar systems is mainly used in remote sensing applications. a) Pulse compression radar b) FM-CW radar c) Synthetic aperture radar d) Phased array radar
2	Radar range primarily depends upon a) peak transmitted power b) average transmitted power c) independent of transmitted power d) distance between ends
3	Assuming perfect conductors of a transmission line, pure TEM propagation is NOT possible in (a) coaxial cable (b) air-filled cylindrical wave guide (c) parallel twin-wire line in air (d) semi-infinite parallel plate wave guide
4	Which mode of propagation is supported by a strip line? a) TEM mode b) TM mode c) TE mode d) None of the mentioned
5	Shunt stubs are preferred for: a) Strip and microstrip lines b) Coplanar waveguides c) Circular waveguide d) Circulators
6	For co-axial lines and waveguides, _____ is more preferred. a) Open circuited stub b) Short circuited stub c) Slotted section d) Co-axial lines cannot be impedance matched
7	The matrix of an ideal isolator is not _____ a) Unitary b) Symmetric c) Lossless d) None of the mentioned
8	The isolators constructed using ferrite materials must operate at: a) Gyro magnetic resonance b) Magnetic resonance c) Isolator resonance d) None of the mentioned
9	The primary purpose of the helix in a travelling wave tube is to a) reduce the noise figure b) ensure broadened operation

	c) reduce the axial velocity of the RF field d) prevent the electron beam from spreading in the long tube
10	Which microwave tube has a repeller? a) TWT b) Klystron c) Magnetron d) BWO
11	Which of the following is one of the mode in Reflex Klystron a) Give same frequency but different transit time b) Are caused by spurious frequency modulation c) Are just for theoretical consideration d) Result from excessive transit time across resonator gap
12	A space between two cavities in two cavity klystron is _____ a) Normal space b) Free space c) Running space d) Drift space
13	Magnetron is an _____ a) Amplifier b) Oscillator c) Phase shifter d) Both phase shifter & amplifier
14	The width of depletion region of a varactor diode _____ with increase in reverse bias voltage. a) Increases b) Decreases c) Remains constant d) None of the mentioned
15	GaAs is used in the fabrication of GUNN diodes because: a) GaAs is cost effective b) It less temperature sensitive c) it has low conduction band electrons d) less forbidden energy gap
16	To prevent an IMPATT diode from burning, a constant bias source is used to maintain _____ at safe limit. a) average current b) average voltage c) average bias voltage d) average resistance
17	Silicon junction transistors are used as amplifiers at frequency range of about: a) 5-10 MHz b) 2-10 GHz c) 40-50 MHz d) 12-45 GHz
18	In a radar transmitter, the function of modulator is to a) allow the use of same antenna for transmission and reception b) switch the tube OFF and ON as required c) control pulse repetition frequency (PRF) d) increase maximum range of the radar

19	The function of the quartz delay line in a MTI radar is to a) help in subtracting a complete scan from the previous scan b) match the phase of the coho and the output oscillator c) match the phase of the coho and the stabo d) delay a sweep so that the next sweep can be subtracted from it
20	The minimum range of detection by a pulse radar depends on a) pulse width b) average transmitter power c) beam width of the antenna d) all of the above

2 mark

21	The phase velocity of an electromagnetic wave propagating in a hollow metallic rectangular waveguide in the TE <sub>10</sub> mode is A) equal to its group velocity                      B) less than the velocity of light in free space C) equal to the velocity of light in free space   D) greater than the velocity of light in free space
22	<b>A rectangular air-filled waveguide has cross section of 4 cm × 10 cm. The minimum frequency which can propagate in the waveguide is</b> <b>(a) 1.5 GHz                      (b) 2.0 GHz</b> <b>(c) 2.5 GHz                      (d) 3.0 GHz</b>
23	<b>A transmission line having <math>50\Omega</math> impedance is terminated in a load of <math>(40 + j30)\Omega</math>. The VSWR is</b> <b>(a) <math>j\ 0.033</math>                      (b) <math>0.8 + j\ 0.6</math></b> <b>(c) 1                                  (d) 2</b>
24	The effective dielectric constant of a micro strip line is 2.4, then the phase velocity in the micro strip line is given by: a) $1.5 \times 10^8$ m/s b) $1.936 \times 10^8$ m/s c) $3 \times 10^8$ m/s d) None of the mentioned
25	
26	If $V_1$ is the voltage at port 1 and $V_2$ is the voltage at port 2, then the attenuation in dB is? a) $20 \log_{10} (V_1/V_2)$ b) $10 \log_{10} (V_1/V_2)$ c) $20 \log_{10} (V_2/V_1)$ d) $10 \log_{10} (V_2/V_1)$
27	For TM mode. The wave equation in cylindrical co ordinates is: a) $(\partial^2/\partial \rho^2 + 1/\rho \partial/\partial \rho + 1/\rho^2 (\partial^2/\partial \phi^2 + k^2)) = 0$ b) $\partial^2 E^2/\partial \rho^2 + 1/\rho (\partial E/\partial \rho) = 0$ c) $\partial^2 E^2/\partial \rho^2 + 1/\rho^2 (\partial^2 E^2/\partial \phi^2) = 0$ d) None of the mentioned
28	In case the antenna diameter in a radar system is increased to four times, the maximum range will increase by a) 1.5 time b) 2 times

	c) 4 times d) 8 times
29	The relation between incident voltage matrix, reflected voltage matrix and S matrix for a microwave network: a) $[v^-] = [s] [v^+]$ . b) $[v^+] = [s] [v^-]$ . c) $[v^-] [v] = [s]$ . d) $[s] = [v] [v^-]$ .
30	A target is moving with a velocity of 360 km/hour radially towards the transmitting frequency generator of 3 GHz will be a) 300 Hz b) 1 kHz c) 1.5 kHz d) 2 kHz
31	For a load impedance of $Z_L = 60 - j80$ . Design of 2 single-stub shunt tuning networks to match this load to a $50\Omega$ line is to be done. What is the normalized admittance obtained so as to plot it on smith chart? a) $1 + j$ b) $0.3 + j0.4$ c) $0.4 + j0.3$ d) $0.3 - j0.4$
32	If a ferrite slab provides a phase shift of $48^\circ/\text{cm}$ , then the length of the ferrite slab required to produce a phase shift of $180^\circ$ is: a) 4 cm b) 3.75 cm c) 4.5 cm d) 3.5 cm
33	The cutoff frequency for operation of a varactor diode at a specific bias is given by: a) $1/2\pi R_s C_{jv}$ b) $1/2\pi C_s R_{jv}$ c) $1/2\pi\sqrt{LC}$ d) None of the mentioned
34	In the series configuration of a PIN diode switch, the terminated load impedance was found to be $50\Omega$ and the diode impedance was $60\Omega$ . Then the insertion loss of the switch is: a) 4 dB b) 2 dB c) 3.6 dB d) 4.8 dB
35	In a Gunn diode oscillator, the electron drift velocity was found to be 107 cm/second and the effective length is 20 microns, then the intrinsic frequency is: a) 2 GHz b) 6 GHz c) 4 GHz d) 5 GHz