FIJI NATIONAL UNIVERSITY

COLLEGE OF ENGINEERING SCIENCE & TECHNOLOGY

SCHOOL OF ELECTRICAL & ELECTRONICS ENGINEERING

FINAL EXAMINATION-PENSTER 2-2016

RADIO ELECTRONICS & TELEVISION SERVICING CERTIFICATE

EEE282 RADIO & TELEVISION SERVICING

DAY/TIME : To be determined. **TIME :** To be determined

INSTRUCTIONS TO STUDENTS

1. You are allowed 10 minutes EXTRA time during which you are not to write.
2. Write your candidate number on the top of each sheet of the answer booklet.
3. Write all your answers in the ANSWER BOOKLET provided.
4. For all sheet of papers on which rough/draft work has been done, cross it through and attach these to your answer script.
5. There are 7 questions worth a total of 110 MARKS.
6. Attempt all questions

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QUESTION A **[20 MARKS]**

Fill the blank with the correct word or number to complete each statement?
One blank carries 1 mark. **DO IT RIGHT THE FIRST TIME.**

1	The main purpose of a power supply is to convert ac voltage to _____
2	The main function of a transformer in a power supply is to _____ the voltage
3	The number of diodes used in a bridge rectifier is _____
4	In a full-wave rectifier using center-tapped transformer there are ___ diodes
5	The number of diodes that pass the current to flow in a Bridged Rectifier in the positive ½ cycle is _____
6	When the positive side of the voltage source is connected to the anode of the zener diode it is said to be _____ biased.
7	When the negative side of the voltage source is connected to the anode of the zener diode the diode is said to be _____ biased.
8	The two terminals of the zener diode are the anode and the _____
9	If the number of turns of a power transformer is more in the primary than the secondary then the function is to step _____ the voltage.
10	If the number of turns of a power transformer is less in the primary than the secondary then the function is to step _____ the voltage.
11	The main sections of a power supply are transformer, rectifier, filter and ____
12	The filter circuit of a power supply usually consists of inductance and _____
13	The type of transformer used to reduce shock hazard is called _____ and the primary to secondary turns ratio is usually _____
14	The three basic transistor amplifiers are usually called common emitter, _____ and _____
15	The input voltage to an amplifier is 1millivolt and the output is 100millivolt The gain of this amplifier is calculated by the formula , _____ = _____
16	Other characteristics of transistor amplifiers are current gain, power input _____ and output_____.

QUESTION B [20 MARKS]

Write in your answer sheet the letter T if the statement is true and the letter"F" if it's false ?
DO IT RIGHT THE FIRST TIME (0.5mark each)

1	A zener diodes are more properly called breakdown diodes	T	F
2	In radio the intelligence which is the modulating signal fall between the frequency range of 20Hz to 20KHz	T	F
3	The output voltage of a differential amplifier is proportional to the difference between the two inputs V1 and V2 .	T	F
4	The input impedance of an ideal op-amp is infinite	T	F
5	The output impedance of an ideal op-amp is zero	T	F
6	The current conduction angle of a Class C amplifier is less than 180 degrees	T	F
7	The current conduction angle of a Class A amplifier is more than 180 degrees	T	F
8	Class A amplifier is less efficient than Class B amplifier	T	F
9	Out of Class A, Class B and Class C amplifiers the most efficient is the Class C amplifier	T	F
10	In a common emitter transistor amplifier, the emitter terminal of the transistor is common to the input and the output	T	F
11	In a half-wave rectifier circuits the center-tapped transformer in used at the input	T	F
12	In a power supply circuits the regulator is to protect the primary turns of the transformer	T	F
13	The function of an oscillator is to produce or generate ac signals	T	F
14	Positive feedback is a necessity of an oscillator circuit	T	F
15	In an oscillator the portion of the output is normally negatively fed back to the input in order to oscillate	T	F
16	The frequency of an oscillator is determined by the two quantities called capacitance and inductance	T	F
17	A high pass filter is an electronic circuit whereby components are connected together to stop high frequencies	T	F
18	A low pass filter is an electronic circuit whereby components are connected together to pass only low frequencies	T	F
19	The resonant frequency of a tuned circuit can be calculated by the formula f = 1/2LC	T	F
20	A voltage divider is useful in calculating the bias voltage of a NPN transistor	T	F
21	The base emitter voltage of a PNP transistor determines the amount of current flow through the emitter and collector	T	F
22	In a PNP transistor the current flows from the base	T	F
23	In a NPN transistor the current flows into the base	T	F
24	The distinguishing feature of the Hartley circuit is that the feedback needed for oscillation is taken from a tap on the coil, or the junction of two coils in series.	T	F
25	The distinguishing feature of the Colpitts circuit is that the feedback signal is taken from a voltage divider made by two capacitors in series.	T	F
26	The differential amplifier produces an output only when the two input signals are different.	T	F

27	The radio system consists of audio frequencies as the modulating signals	T	F
28	There are basically four transducers in a complete radio system namely, antenna, rectifier loudspeakers and microphone	T	F
29	Basically a television system consists of six transducers namely video camera, microphone, transmitting antenna, crt and loudspeakers	T	F
30	A LCD like a CRT are both display devices in a television system	T	F
31	A radio system is established so that it can carry to a distant place audio signals the frequencies of which fall within the range of 20 Hz to 20KHz	T	F
32	The function of a transducer is to convert one form of energy to another form	T	F
33	The function of a microphone is to convert electrical energy to sound energy	T	F
34	In a television system the function of the video camera is to convert light energy to electrical energy	T	F
35	In both radio and television system the purpose of transmitting antenna is to convert electrical energy to electromagnetic energy	T	F
36	The function of the loudspeaker in a radio system is to convert electrical energy to sound energy	T	F
37	In a television system the CRT and loudspeaker are classified as input devices devices	T	F
38	In a radio system the microphone and loudspeakers are classified as output devices	T	F
39	In a radio system transmitting antenna is always connected to the driver	T	F
40	The function of the detector in a radio receiver is to extract audio from the modulated wave	T	F

QUESTION C [15 MARKS]

Refer to Figure 1 and Figure 2 below and answer the following questions ;

1. Name the circuit in Figure 1 and Figure 2 ? **(2 m)**
2. State the formula for the frequency of oscillation in Fig 1.? **(1 m)**
3. Name the two un-labeled capacitors of Figure 1? **(2 m)**
4. State the two functions of the two un-labeled capacitor of Figure 2? **(2 m)**
5. Explain the functions of the tank circuit of Figure 1? **(2 m)**
6. Explain the functions of the tune circuit of Figure 2? **(2 m)**
7. If in Figure 1 C1=1000 pF,C2=1000 pF, L=10 µH, determine the resonant frequency ? **(4 m)**

Figure 1 -

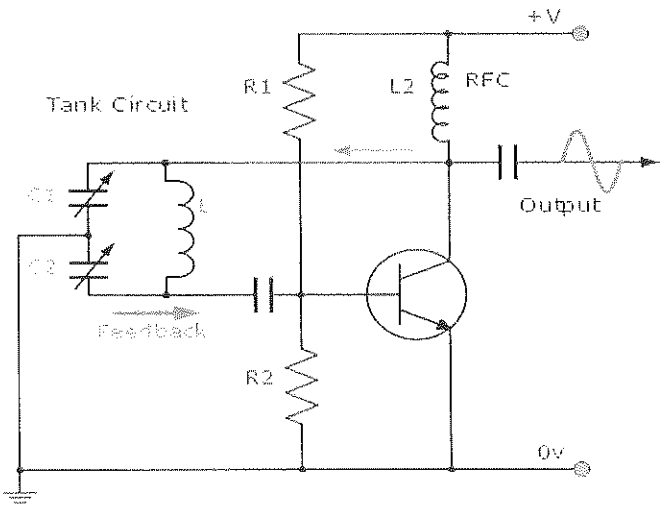
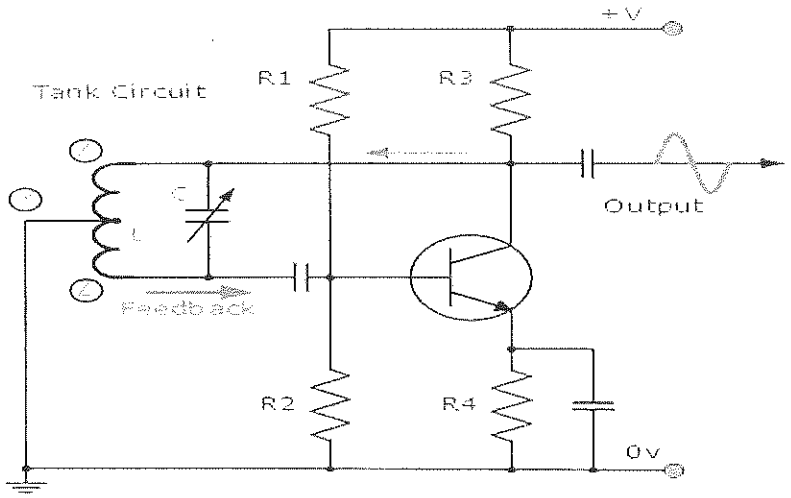


Figure 2 -



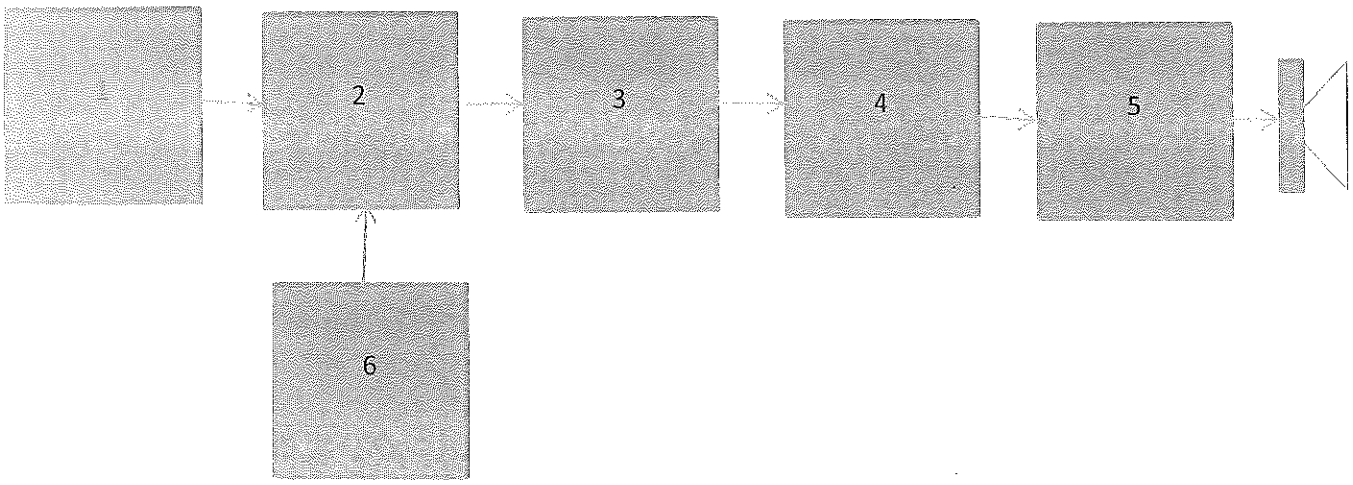
QUESTION D [10 MARKS]

On the diagram below is the block diagram of an AM Medium Wave Broadcast radio receiver with 6 stages, tuned to a transmitter with a carrier of 500KHz being modulated with a 1KHz tone.

1. Write the numbers 1 to 5 on your answer sheet and beside each the name of each block? **(5 marks)**

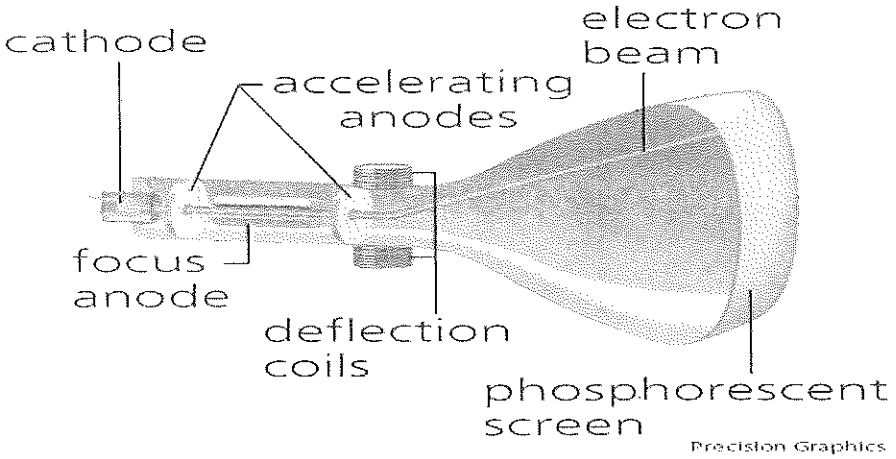
2. Sketch the waveform at the output of the block 1 ? **(1 mark)**

3. Sketch the waveform at the output of block 5? **(1 mark)**
4. Name the two transducers used and their function ? **(2 marks)**
5. Describe the function of the circuit in block 6 ? **(1 mark)**



QUESTION E [10 MARKS]

1. Name the device shown on the diagram below and comment on its use ?
   (1 mark)
2. Write down the name of each part of the device on your answer sheet and explain its function?
   (1.5 mark each)

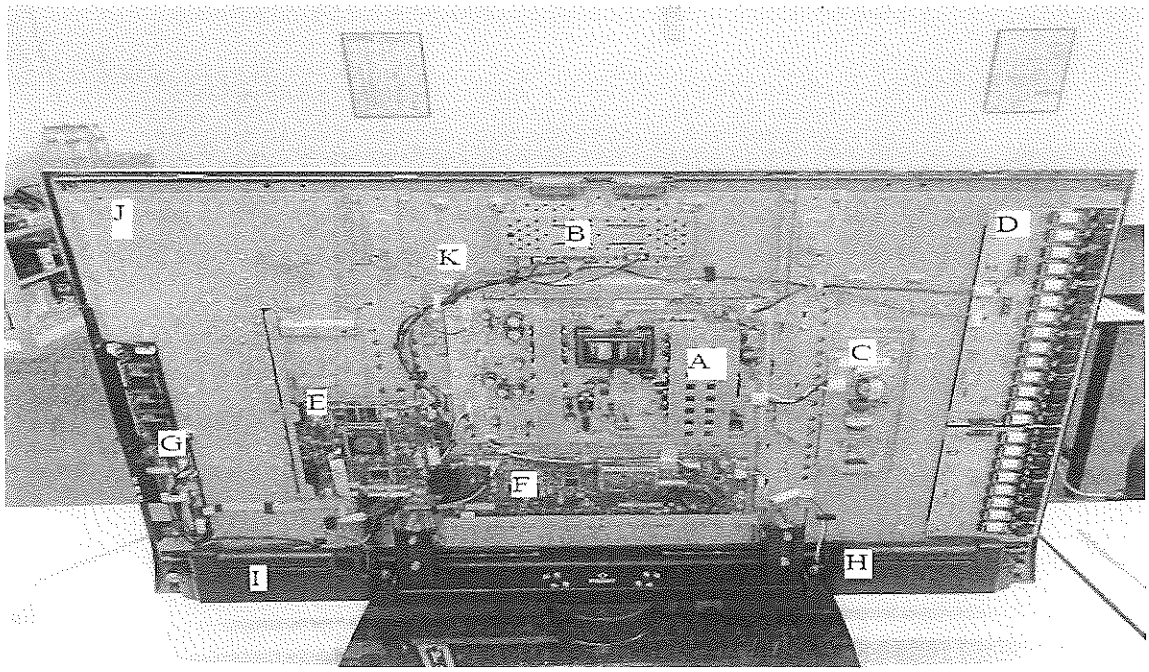


QUESTION F [10 MARKS]

Refer to the diagram below and answer the following questions :

(1) What is the name of the equipment which this diagram represents ?
(2 marks)

(2) Select 8 letters on the diagram and write down the name of the section they each represents ? **(1 mark each)**



QUESTION G [25 MARKS]

Match each term in the left hand side (LHS) to the correct meaning in the right hand side (RHS) Write your answer beside the question number in your answer sheet?

(1 mark each)

DO IT RIGHT THE FIRST TIME

LHS		ANS	RHS	
1	Zener breakdown		Sending signal from antenna to television receiver	A
2	LED Television		Reverse conduction which occurs at much higher reverse voltage in lightly doped silicon	B
3	4 diodes		An amplifier with two inputs opposite in phase	C
4	1 P-N junction		Used two inductances as frequency determining components	D
5	2 P-N junctions		Used in bridged rectifier of a power supply	E
6	OP amp		For matching antenna transmission line impedance to input impedance of a television receiver	F
7	Differential amplifier		Varying a carrier frequencies at audio rate	G
8	NPN transistor		Uses many light emitting diodes in the display device	H
9	Avalanche breakdown		Most popularly used type of linear IC	I
10	PNP		Current conduction angle is less than 180 degrees	J
11	Resonance		Its symbol uses an arrow pointing at the emitter	K
12	LCD Television		Changing carrier by use of intelligence frequencies in a channel of communication	L
13	Transducer		A type of oscillator whereby oscillation is stable at a single frequency	M
14	Balun transformer		A electronic device that convert a form of energy to another	N
15	Coaxial cable		A condition of LC circuit whereby the impedance is maximum	O
16	Yagi		Varying amplitude of a carrier wave at audio rate in a modulation process	P
17	Class C amplifier		Used in a diode	Q
18	Modulation		Its symbol uses an arrow pointing form emitter to base	R
19	Crystal oscillator		Current conduction angle is 360 degrees	S
20	Amplitude Modulation		It is made use of in the voltage regulator to keep the voltage constant	T
21	Class A amplifier		Used in a transistor	U
22	Hartley oscillator		A process of taking away the remnant magnetism	V
23	Degaussing		Consumes less power than CRT TV but more power than LED TV	W
24	Receiving antenna		A type of high gain antenna	X
25	FM		Usually connected to input of RF amplifier	Y

THE END – TOTAL MARK OF 110