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B.Tech DEGREE EXAMINATION, DECEMBER 2023

Fourth Semester

18EEC206J - ANALOG ELECTRONICS

(For the candidates admitted during the academic year 2020 - 2021 & 2021 - 2022)

Note:

i. **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.

ii. **Part - B** and **Part - C** should be answered in answer booklet.

Time: 3 Hours **Max. Marks: 100**

PART - A (20 × 1 = 20 Marks)

Answer **all** Questions

		Marks	BL	CO
1.	There are _____ h-parameters of a transistor. (A) Two (B) Four (C) Three (D) Six	1	1	1
2.	Emitter follower is used for ..... (A) Current gain (B) Impedance matching (C) Voltage gain (D) Power gain	1	2	1
3.	The channel of a JFET is between the ..... (A) gate and drain (B) drain and source (C) gate and source (D) input and output	1	2	1
4.	What is the current gain of a transistor amplifier circuit if I_i = 10mA, Io = 20mA, Vi = 25V, Vo = 15V? (A) -0.5 (B) -1 (C) 1.5 (D) 2	1	3	1
5.	In an ideal Differential Amplifier, if the same signal is given to both inputs, then the output will be (A) zero (B) same as input (C) double the input (D) triple the input	1	1	2
6.	..... coupling provides the maximum voltage gain. (A) RC (B) Transformer (C) Direct (D) Impedance	1	2	2
7.	What is the conduction angle of a Class A amplifier? (A) 90 degrees (B) 180 degrees (C) 270 degrees (D) 360 degrees	1	2	2
8.	In Class B amplifier the Q point lies on ..... (A) Active point (B) Cut off point (C) Saturation point (D) Between active and saturation points	1	2	2
9.	When a negative voltage feedback is applied to an amplifier, its bandwidth..... (A) increases (B) remains the same (C) decreases (D) reduces by two times	1	1	3
10.	The value of the negative feedback fraction is always ..... (A) greater than 1 (B) less than 1 (C) equal to 1 (D) zero	1	1	3

11.	The number of RC network required to be cascaded in a RC phase shift oscillator is	1	1	3
	(A) 4 (B) 3 (C) 2 (D) 1			
12.	The signal generators generally used in laboratories are _____ oscillators.	1	2	3
	(A) Wein bridge (B) Hartley (C) Colpitt (D) RC phase shift			
13.	If a capacitor is placed in the feedback path of an op-amp circuit, then the circuit can act as	1	1	4
	(A) divider (B) differentiator (C) integrator (D) multiplier			
14.	Another name for unity gain amplifier is	1	1	4
	(A) difference amplifier (B) comparator (C) voltage follower (D) subtractor			
15.	A zero-crossing detector is a type of _____	1	1	4
	(A) differentiator (B) Voltage comparator (C) multiplier (D) divider			
16.	Which of the following can be used to detect the missing heartbeat?	1	1	4
	(A) Monostable multivibrator (B) Astable multivibrator (C) Schmitt trigger (D) Bistable multivibrator			
17.	An 'n' bit ADC using V as reference has a resolution of	1	1	5
	(A) $\frac{V}{2^n}$ (B) $V(n)$ (C) $\frac{V}{2^n-1}$ (D) 2 V (n)			
18.	A filter circuit has a series capacitor of 0.05 μF and a shunt resistor of 1.2 kΩ. What is the type of filter and its cut-off frequency?	1	3	5
	(A) high-pass, 21 Hz (B) low-pass, 21 Hz (C) high-pass, 2.65 kHz (D) low-pass, 2.65 kHz			
19.	In the band elimination filter, the frequency of resonance of individual arms is geometric.....	1	1	5
	(A) mean of two cut-off frequencies (B) difference of two cut-off frequencies (C) product of two cut-off frequencies (D) division of two cut-off frequencies			
20.	The output of quadrature controlled oscillator has a phase shift of	1	1	5
	(A) 0 degree (B) 90 degrees (C) 180 degrees (D) 270 degrees			

PART - B (5 × 4 = 20 Marks) — Marks | BL | CO

Answer **any 5** Questions

21.	Draw the small signal equivalent circuit of the CS amplifier and obtain its current gain and voltage gain.	4	4	1
22.	Show that the maximum efficiency of Class A amplifier is 25%.	4	4	2
23.	Obtain the output voltage of Integrator and differentiator with its circuit.	4	2	3
24.	Discuss inverting voltage comparator with its circuit and waveform.	4	2	4
25.	Elaborate how IC 723 is used as low voltage regulator.	4	2	5

		Marks	BL	CO
26.	Explain the method of determining DC load line and operating point of a transistor.	4	4	1
27.	Discuss the operation of a shunt voltage regulator.	4	2	2

PART - C (5 × 12 = 60 Marks)

Answer **all** Questions

		Marks	BL	CO
28.	(a) Explain any three types of biasing circuits for transistors and derive their output current and output voltage.	12	4	1
	(OR)			
	(b) Discuss the operation and characteristics of the common drain FET amplifier.			
29.	(a) Give a detailed DC analysis of the differential amplifier.	12	1	2
	(OR)			
	(b) Explain the working principle of a class B push-pull amplifier and also derive the efficiency of a class B push-pull amplifier.			
30.	(a) Discuss the working of RC phase shift oscillator and also derive the expression for the frequency of oscillation.	12	4	3
	(OR)			
	(b) Explain the working of the Hartley oscillator.			
31.	(a) Derive the output voltage equation of the Instrumentation amplifier.	12	4	4
	(OR)			
	(b) Explain the DC characteristics of an operational amplifier.			
32.	(a) Derive the transfer function of a second-order low-pass filter.	12	4	5
	(OR)			
	(b) Explain the working principle of different types of DAC with neat diagram.			

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