ROLL NO. _____

Code: AE53/AC53/AT53/AE103
Subject: ELECTRONIC DEVICES & CIRCUITS

AMIETE – ET/CS/IT (Current & New Scheme)

Time: 3 Hours **JUNE 2017** **Max. Marks: 100**

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.

- **Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.**
- **The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.**
- **Out of the remaining EIGHT Questions, answer any FIVE Questions. Each question carries 16 marks.**
- **Any required data not explicitly given, may be suitably assumed and stated.**

Q.1 Choose the correct or the best alternative in the following: (2×10)

a. The filters are employed after rectifier to
(A) Avoid diode breakdown **(B)** Increase output voltage
(C) Remove ripple **(D)** Improve rectifier efficiency

b. Transistor can be used as an amplifier by operating in
(A) Forward-Active region **(B)** Cut-off region
(C) Saturation region **(D)** Reverse-Active region

c. In two port networks admittance parameter $\overline{Yi}$ is known as
(A) open circuit input admittance **(B)** short circuit input admittance
(C) short circuit output admittance **(D)** open circuit output admittance

d. Most stable transistor circuit is _____
(A) Fixed bias **(B)** Voltage divider bias
(C) Amplified bias **(D)** Floating bias

e. _____ diode has negative resistance characteristics
(A) LASER diode **(B)** Schottky diode
(C) Tunnel diode **(D)** Varactor / Varicap diode

f. The Thevenin equivalent circuit of a network consists only of a resistor (Thevenin voltage is zero). Then which of the following elements might be contained in the network?
(A) Resistor and independent sources
(B) Resistor only sources
(C) Resistor and dependent sources
(D) Resistor, independent sources and dependent sources.

g. Emitter bias provides
(A) stable bias point **(B)** stable base voltage
(C) high reluctance **(D)** High voltage drop

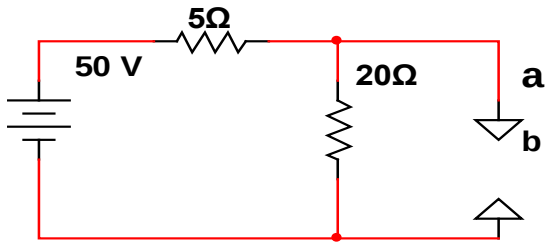
h. In JFET transit time of carriers in channel is reduced, if
(A) Channel doping is reduced **(B)** Channel conductivity is increased
(C) Channel length is reduced **(D)** Gate area is reduced

i. Maximum efficiency for class B push-pull amplifier is approximately
(A) 30% **(B)** 52%
(C) 79% **(D)** 89%

j. The low-frequency response of an amplifier is determined in part by
(A) Power gain **(B)** Current gain
(C) Input voltage **(D)** Coupling capacitor

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

Q.2 a. For the circuit shown in the figure, Find out the thevenin's equivalent parameter. **(6)**



b. What do you mean by resonance? Draw RLC parallel resonant circuit and also show that quality factor 'Q' is given as

$$Q = 2\pi\left(\frac{\text{maximum energy stored in the circuit}}{\text{energy lost per period}}\right)$$ **(10)**

Q.3 a. A full wave bridge rectifier uses four identical diodes of forward resistance 5Ω each. It is supplied from a transformer with output voltage of 20 V(rms) and secondary winding of 10Ω. Calculate
(i) output dc voltage at a dc load current of 100 mA
(ii) percentage regulation for a full-load current of 200 mA
(iii) RMS value of output voltage at a dc load current of 200 mA
(iv) RMS value of the ac component of voltage in part (iii). **(8)**

b. Explain the significance of Metal-Semiconductor diode / Schottky diode with its internal construction and symbol. **(8)**

Q.4 a. Give the difference between BJT and FET. Explain different operating modes of BJT. **(6)**

b. Explain the construction of SCR with its two-transistor model and characteristics. **(10)**

Q.5 a. Draw hybrid-π equivalent circuit of BJT and discuss origin of associated circuit elements. **(6)**

b. What is BJT biasing? Enlist different methods to achieve biasing and explain any one of them in detail. **(10)**

Q.6 a. Draw the circuit of single stage RC-Coupled amplifier using BJT & discuss its frequency response curve in detail. **(10)**

b. What do you mean by gain-bandwidth product? Highlight its significance in amplifiers. **(6)**

Q.7 a. Draw and discuss class-A power amplifier. Also find out its efficiency. **(8)**

b. Draw and discuss class-B (push-pull) power amplifier. Also find out its efficiency. **(8)**

Q.8 a. Enlist the properties of negative feedback. Discuss the effect of negative feedback on gain and bandwidth. **(8)**

b. Mention the Barkhausen criterion for oscillation. Explain Wein-bridge oscillator. **(8)**

Q.9 a. Describe masking and etching process as a part of IC fabrication planner process. **(8)**

b. Discuss the fabrication of monolithic bipolar transistor. **(8)**