A (Printed Pages 7)

Roll No. _____

S-617

B.Sc. (Part III) Examination, 2015

ELECTRONICS

Second Paper

(Linear Electronics)

Time Allowed : Three Hours] [Maximum Marks : 75

Note : Answer five questions in all. Question No.1 is compulsory. Attempt one question from each unit.

keâue heeÜe ØeMvee keâ Gòej oeepeS~ ØeMve me.1 DeeveJeeÙe n~ ØelÙekeâ FkeâeF me Skeâ ØeMve keâeepeS~

1. Write short answer of the following :

evecveeueeKele keâ mee#ehle Gòej eueeKeÙe: 3×10=30

(i) Define input offset voltage and input off-set current of an op-Amp.

Skeâ op-Amp keâ eveJeMe DeeHeâmeš Jeeušpe SJe eveJeMe DeeHeâmeš Oeeje keâe heejYeee<ele keâejÙe~

P.T.O.

(ii) What is common mode rejection ratio? Explain its importance.

GYeÙeeve‰ eJeOee evejekeâjCe Deveheele keÙee n? cenlJe keâe mecePeeFÙe~

(iii) Explain the parameters that should be considered for ac and dc application of an op-amp.

Skeâ op-Amp keâ S.mee. SJe [e.mee. DeveØeÙeeie keâ eueÙe eJeÛeejeLe ceeheo[e keâe mecePeeFÙe~

(iv) What is thermal drift? How does it affect the performance of an op-Amp?

G<ceeÙe yeneJe keÙee n? Ùen op-Amp keâ ØeoMeve keâe keâme ØeYeeeJele keâjlee n~

(v) Explain the limitations of open loop op-Amp configuration.

op-Amp keâ Keue uehe Deekeâejkeâe meeceeDee keâe mec eeFÙe~

(vi) Differentiate between active and passive filters.

mee>eâÙe eHeâušj SJe evee<>eâÙe eHeâušj ce Devlej mhe° keâejÙe~

put voltage. If a squre wave is applied to the input of differentiator sketch the output wave form.

DeJekeâuekeâ keÙee n? GheÙeòeâ heejheLe DeejKe Éeje op-Amp DeJekeâuekeâ keâe keâeÙeeJeeOe mecePeeFÙe Deej Fmekeâ yeenJeMee Jeeušpe keâ eueÙe yÙepekeâ Øeehle keâejÙe~ Ùeeo DeJekeâuekeâ keâ eveJeMee hej mkeJeeÙej lejie keâe Deejeehele ekeâÙee peeÙe lee Fmekeâ yeenJeMee lejie keâe DeejeKele keâejÙe~

9. What is the function of voltage regulator? Discuss the various factors to determine the quality of regulated power supply. Draw the block diagram of a regulated power supply and explain its working.

Jeeušpe eveÙeecekeâ keâe keÙee keâeÙe n? Skeâ eveÙeecele eJeÅele Øeoehe keâe ieCeJeòee eveOeejCe keâjve keâ eueÙe eJeeYeVe keâejkeâe hej ÛeÛee keâejÙe~ Skeâ eveÙeecele eJeÅele Øeoehe keâe yueekeâ DeejKe KeeÛekeâj Fmekeâ keâeÙeØeCeeuee keâe mecePeeFÙe~

keâe meceleuÙe heejheLe eKeeÛeÙe Deej Gmekeâ Jeeuš pe nmleevlejCe Je>eâ keâe mecePeeFÙe~

(b) Draw the circuit diagram of an ideal op-Amp based non investing amplifier and explain the expression for voltage gain.
Skeâ DeeoMe op-Amp DeeOeeejle iej FveJeeŠie ØeJeOekeâ keâe heejheLe DeejKe KeeeÛeS SJe Gmekeâ yeenJeMee yeeušlee keâe JÙepekeâ Øeehle keâejÙe~

3. (a) The differential input op-Amp shown in fig.1 consists of a base amplifier of infinite gain. Show that

$$Vout = \frac{R_2}{R_1}(v_2 - v_1)$$

eÛe$e 1 ce oeMele eJeYeoe eveJeMee op-Amp Devele ueeYe keâ Skeâ DeeOeej ØeJeOekeâ me eceuekeâj yevee n~ ekeâ

$$Vout = \frac{R_2}{R_1}(v_2 - v_1)$$

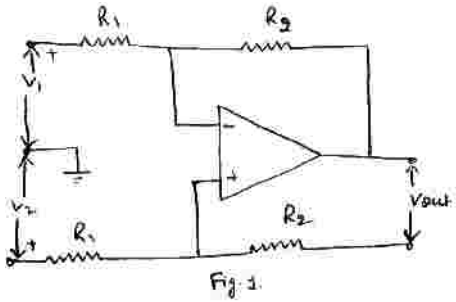

Fig. 1.

(b) Draw the schematic diagram of an 741 op-Amp IC and describe function of each pin.
op-Amp IC 741 keâe Ùeepeveeyeæ DeejKe KeeeÛeÙe Deej Fmekeâ ØelÙekeâ eheve keâ keâeÙe keâe JeCeve keâejÙe~

Unit-II / FkeâeF-II 11

4. Define slew rate and explain its causes. Determine the full power bandwidth of the 741 op-Amp with Vin = supply voltage = 15 v, consider slew rate for 741 op-Amp is 0.8v/μ sec.
õle leCeve keâe heejYeee<ele keâejÙe Deej Gmekeâ keâejCee keâe JÙeeKÙee keâeepeÙe~ 741 op-Amp keâ õle leCeve keâe 0.8v/μ sec ceevele nÙe Vin = mehueeF Jeeuš pe = 15 v keâ meeLe leCe Meeòeâ Je[eJe[Le keâe eveOeejCe keâejÙe~

5. What is voltage follower? Explain the advantage of voltage follower amplifiers. Draw the circuit diagram of voltage follower and explain its working.
Jeeuš pe HeâeueeJej keÙee n? Jeeuš pe HeâeueeJej ØeJeOekeâ keâ ueeYe keâe JÙeeKÙee keâeepeÙe~ Skeâ Jeeuš pe HeâeueeJej keâe heejheLe DeejKe KeeeÛeS SJe Gmekeâe keâeÙe eJeeOe keâe mecePeeFÙe~

Unit-III / FkeâeF-III 11

6. What is summing amplifier? Draw the circuit diagram of op-Amp based summing amplifier using non investing configuration and determine expression for output voltage.

Ùeepee ØeJeOekeâ keÙee n? iej FveJeeŠie Deekeâej keâe GheÙeeie keâj Skeâ op-Amp DeeOeeejle Ùeepee ØeJeOekeâ keâe heejheLe DeejKe KeeeÛeS SJe Fmekeâ yeenJeMee Jeeušlee keâe JÙepekeâ Øeehle keâejÙe~

7. What is an instrumentation amplifier? How does it differ from ordinary amplifier? Draw the schematic diagram of an instrumentation amplifier and explain its working.

Ùe$eekeâjCe ØeJeOekeâ keÙee n? Ùen meeOeejCe ØeJeOekeâ me keâme Deueie n? Ùe$eekeâjCe ØeJeOekeâ keâe Ùeepeveeyeæ DeejKe yeveekeâj Fmekeâ keâeÙe ØeCeeuee keâe mecePeeFÙe~

Unit-IV / FkeâeF-IV 12

8. What is differentiator? Explain the working of on op-Amp differentiator with suitable circuit diagram and determine the expression for out-

(vii) How we can improve the accuracy of dc amplifiers?

nce [e.mee. ØeJeOekeâ keâe meŠekeâlee ce keâme meOeej keâj mekeâle n?

(viii) Explain the difference between positive scalar and voltage to current converter.

OeveelcekeâmkeâuejSJe yeeušpe me Oeeje heejJelekeâ keâ Devlej keâe mecePeeFÙe~

(ix) What are the limitations of linear voltage regulator?

jKeeÙe Jeeušpe eveÙeecekeâ keâe keÙee meeceeÙe n?

(x) Explain the resolution of a DAC.

Skeâ [e.S.mee. keâ mekeâuhe keâe mecePeeFÙe~

Unit-I / FkeâeF-I 15

2. (a) What are the properties of an ideal op-Amp? Draw the equivalent circuit of an op-Amp and explain its voltage transfer curve.

Skeâ DeeoMe op-Amp keâ keÙee ieCe n? Skeâ op-Amp