සියලු ම හිමිකම් ඇවිරිණි / முழுப் பதிப்புரிமையுடையது / All Rights Reserved]

නව නිර්දේශය/புதிய பாடத்திட்டம்/New Syllabus

NEW

ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව
இலங்கைப் பரீட்சைத் திணைக்களம்
Department of Examinations, Sri Lanka

90 | E | I, II

අධ්‍යයන පොදු සහතික පත්‍ර (සාමාන්‍ය පෙළ) විභාගය, 2016 දෙසැම්බර්
கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தர)ப் பரீட்சை, 2016 டிசெம்பர்
General Certificate of Education (Ord. Level) Examination, December 2016

නිර්මාණකරණය, විද්‍යුලිය හා ඉලෙක්ට්‍රොනික තාක්ෂණවේදය I, II
வடிவமைப்பும் மின் இலத்திரனியல் தொழினுட்பவியலும் I, II
Design, Electrical & Electronic Technology I, II

පැය තුනයි
மூன்று மணித்தியாலம்
Three hours

Design, Electrical & Electronic Technology I

Important :

(i) Answer **all** questions.
(ii) In each of the questions **1** to **40**, pick one of the alternatives (1),(2),(3),(4) which you consider as **correct** or **most appropriate**.
(iii) **Mark a cross (×) on the number corresponding to your choice in the answer sheet provided.**
(iv) Further instructions are given on the back of the answer sheet follow them carefully.

1. The slope of the cutting plane, when a cone cuts parallel to its base across the sloping height, is a/an
(1) Circle. (2) Parabola. (3) Triangle. (4) Ellipse.

2. The number of equal parts received when the circumference of a circle is marked by its radius/half the diameter shall be
(1) four. (2) five. (3) six. (4) eight.

3. What is the shape of development received by a student, when he constructed the development of a cavity cylinder without top and bottom surfaces with a thin sheet of which diameter is 50mm and height is 60mm?
(1) Rhombus (2) Square (3) Rectangle (4) Regular pentagon

4. What is the accessory used to minimize accidents that could caused by over current flows in electricity when a temporary electric extension is made?
(1) Isolator
(2) Residual Current Circuit Breaker (RCCB)
(3) Miniature Circuit Breaker
(4) Main switch

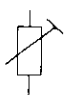
5. What is the reason for connecting an earth cable to an electric plug?
(1) Prevent an electric shock during a leakage when an electric appliance is connected to the plug.
(2) Protect the appliances from lightning
(3) As all three conductors in three core cable should be used
(4) To prevent over current flows through the circuit.

6. What type of switches are needed for controlling a lamp from two positions?
(1) 2 oneway switches
(2) 3 oneway switches
(3) 2 double pole switches
(4) 2 twoway switches

7. Tin and Lead ratio of the soldering Lead is
(1) 40% and 60%. (2) 60% and 40%. (3) 20% and 80%. (4) 80% and 20%.

8. What is the value of a resister with Red, Red, Gold, Gold colour bands in that order?
(1) 2.2 Ω ±5% (2) 2.2 Ω ±10% (3) 22 Ω ±5% (4) 22 Ω ±10%

9. What is the equivalent capacitance of 10PF, 15PF and 30PF capacitors connect in serial?
(1) 25 PF (2) 10 PF (3) 6 PF (4) 5 PF

10. What is the symbol use for preset resister?
(1)  (2)  (3)  (4) 

[See page two.

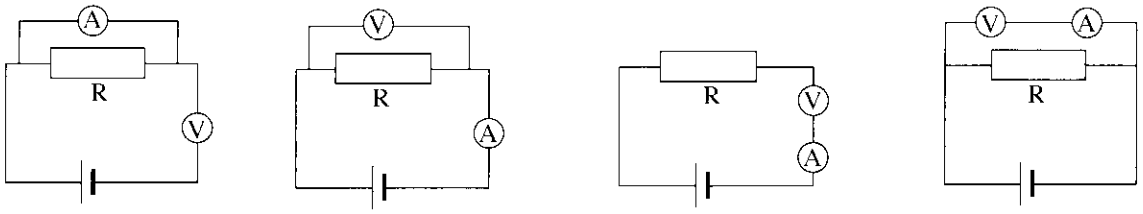
11. The capacitance of a miler type capacitor is given as 152 in a code. What is the value of that capacitor?
(1) 0.0015 μF (2) 0.015 μF (3) 0.15 μF (4) 1.5 μF

12. What is the most suitable statement from the given statements below, for Electro mechanical multimeter?
(1) When the current is measured, it is not necessary to connect polarity accurately.
(2) When measuring the voltage, internal resistance of the Electro mechanical analog multimeter will be infinite.
(3) When measuring the voltage, the resistance of the Electro mechanical analog multimeter is less than Digital multimeter.
(4) When direct to measure the resistance, a positive voltage can be achieved from the red prob.

13. Generally, to light the LED a flow of 12 mA current is needed under 2V. If it is to light with 5V supply, what is the value of serially connected resistor?
(1) 56 Ω (2) 250 Ω (3) 1 KΩ (4) 10 KΩ

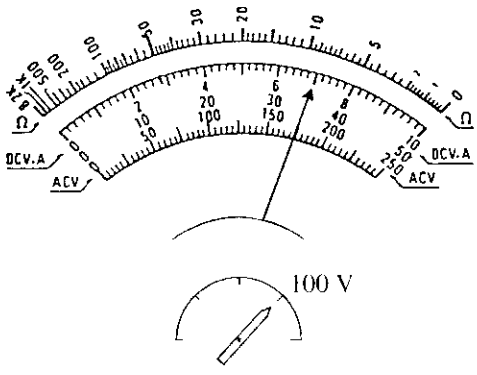
14. What is the most secure and effective method to light several 3V LEDs with 12V Direct Current (DC) supply?
(1) Connecting four 3V LEDs in serial
(2) Connecting three 3V LEDs in serial and connecting several such systems in parallel
(3) Connecting three 3V LEDs in serial and an appropriate resistance
(4) Connecting five 3V LEDs in serial

15. What is the circuit Diagram that shows the accurate method of connecting the voltmeter and ammeter?

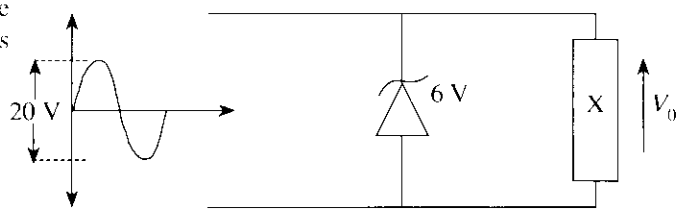


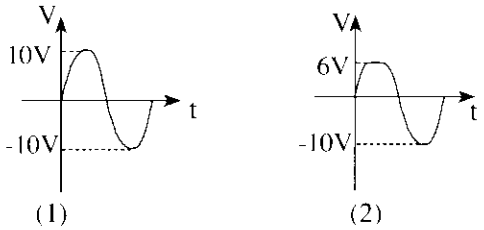
(1) (2) (3) (4)

16. The figure shows a multimeter dial used to measure the voltage. What is the voltage that appear on it?
(1) 6.5 V
(2) 7.0 V
(3) 65 V
(4) 70 V

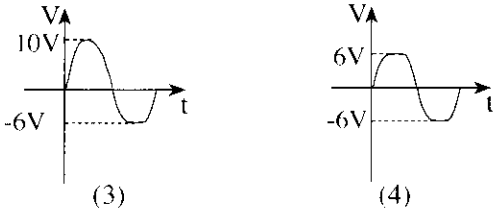


17. What is the pattern of the output voltage wave across 'X' in the given picture? (forward bias voltage of the Diode is zero)





(1) (2)

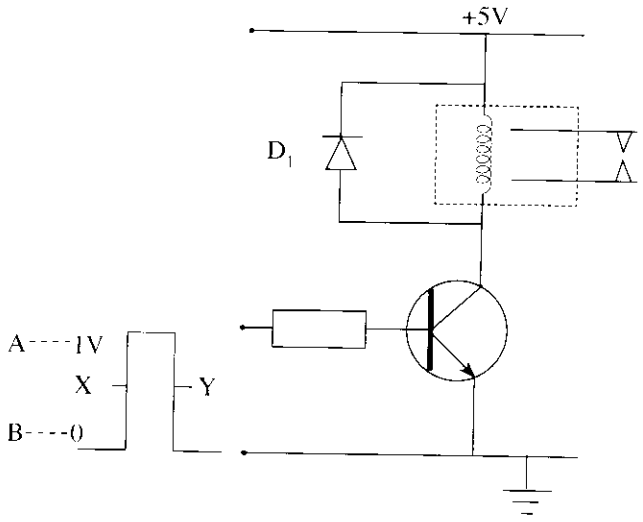


(3) (4)

[See page three.

18. Peak Inverse Voltage (PIV) of a Diode is
(1) maximum forward bias voltage across the Diode Terminals.
(2) maximum reverse bias voltage across the Diode Terminals.
(3) maximum positive voltage that can be obtained by Diode.
(4) maximum negative voltage that can be obtained by Diode.

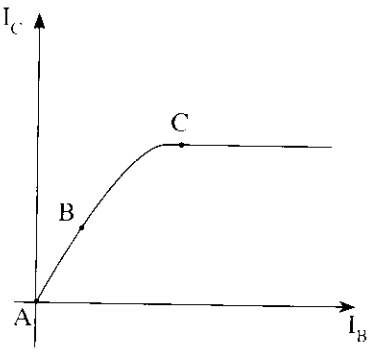
● Use the figure given below to answer the question No. **19** and **20**.



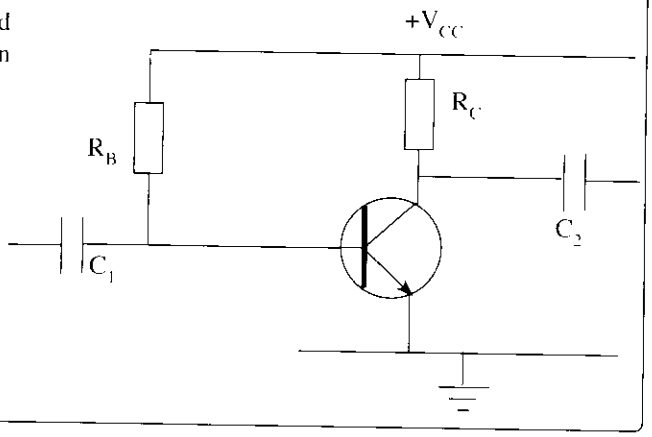
19. The Relay in the above circuit operates when the output voltage is in
(1) A. (2) B. (3) X. (4) Y.

20. Function of the D_1 Diode across the relay coil in the above figure is to
(1) stop the circuit if the polarity of power supply changed.
(2) rectify the main voltage induced in the relay coil.
(3) maintain a 0.7V voltage across the relay terminals.
(4) protect the transistor from back electro motive force (Back E.M.F) induced in the relay coil.

21. Mutual characteristic curve of a transistor is given in the figure. A, B and C areas are known as
(1) saturated, active and cut off regions respectively.
(2) active, saturated and cut off regions respectively.
(3) cut off, active and saturated regions respectively.
(4) cut off, saturated and active regions respectively.



22. Figure shows a circuit where a transistor can be used as an amplifier, what is the Biasing method used in this circuit?
(1) fixed bias
(2) self bias
(3) potential divider bias
(4) emitter bias

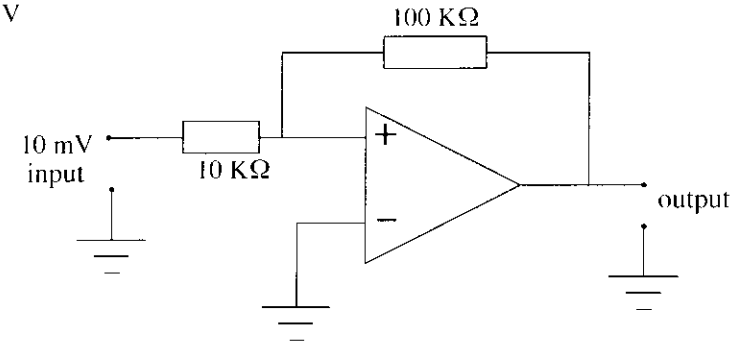


[See page four.

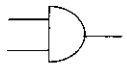
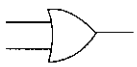
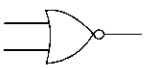
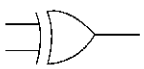
23. What is the most suitable Amplifier for the last stage of a power Amplifier?
(1) Voltage Amplifier
(2) Current Amplifier
(3) Voltage and Current Amplifier
(4) Amplifier of voltage Amplify and current attenuation

24. What is the operational Amplifier circuit **without** a negative feedback?
(1) Inverting Amplifier
(2) Non Inventing Amplifier
(3) Low pass filter
(4) Comperator

25. What is the output voltage for 10 mV input in this circuit?
(1) 1 mV
(2) 10 mV
(3) 100 mV
(4) 1000 mV

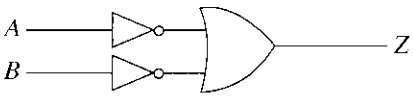


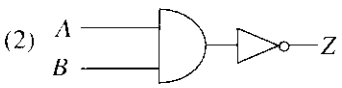
26. What is the value when the binary number 1101_2 is converted to decimal numbers?
(1) 11 (2) 12 (3) 13 (4) 14

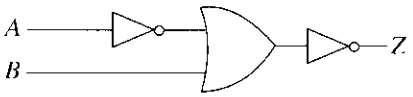
27. Out of the symbols given, what is the symbol of Ex-OR Gate?
(1)  (2)  (3)  (4) 

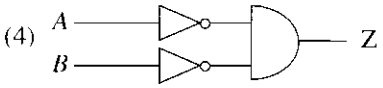
28. What is the logic gate circuit that can obtain the given truth table?

A	B	Z
0	0	1
0	1	0
1	0	0
1	1	0

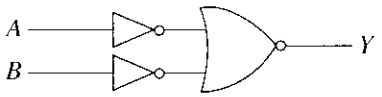
(1) 

(2) 

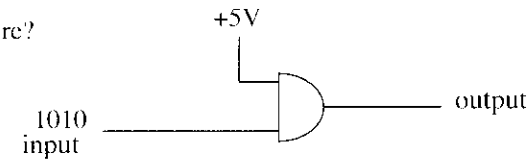
(3) 

(4) 

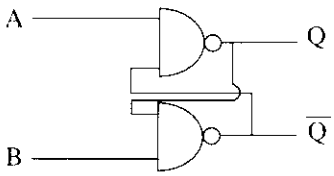
29. What is the boolean expression that can obtain an output equal to the output of the logic circuit given in the figure?
(1) $Y = \overline{A} \cdot \overline{B}$
(2) $Y = \overline{A+B}$
(3) $Y = \overline{A} + \overline{B}$
(4) $Y = A \cdot B$



30. What is the output of the circuit given in this figure?
(1) 1010
(2) 0101
(3) 1100
(4) 0011



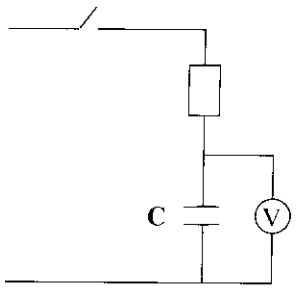
31. Circuit in the figure is a
(1) J-K type flip flop
(2) D type flip flop
(3) S-R type flip flop
(4) T type flip flop

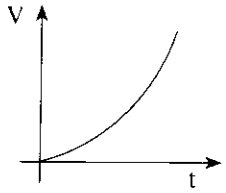


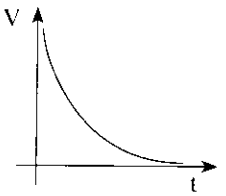
32. The speciality of a flip flop when compared to a general logic circuit is it
(1) includes more than one gate.
(2) has an ability to memories.
(3) has more than two outputs.
(4) always uses inverters.

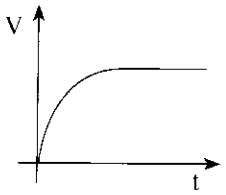
[See page five.

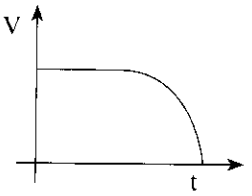
33. What is the graph that shows charging of the 'C' capacitor according to the time?



(1) 

(2) 

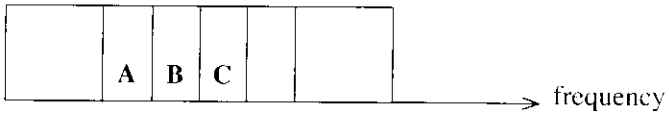
(3) 

(4) 

34. What type of a motor is used for the centrifugal water pump in domestic use?
(1) Induction type alternative current motors (2) Universal motors
(3) DC Motor (4) Pulse Motor

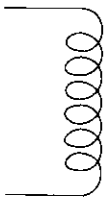
35. Out of the waves given below, what is the wave type **not** suitable for remote control?
(1) Radio waves (2) Micro waves (3) Inferred waves (4) Ultra Violet waves

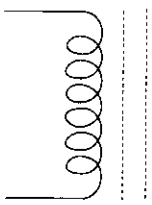
36. Different points of electro megnatic wave spectrum are given as **A**, **B** and **C** in the figure below.

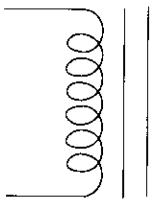


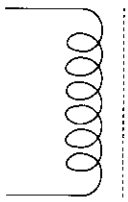
The correct order for **A**, **B** and **C** points of spectrum could be,
(1) Radio frequency, Inferred rays and Micro waves.
(2) Inferred rays, Micro waves and Radio frequency.
(3) Radio frequency, Micro waves and Inferred rays.
(4) Inferred rays, Radio frequency and Micro waves.

37. What is the correct symbol for an Inductor with soft iron core?

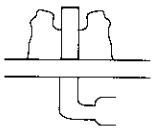

(1)

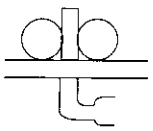

(2)

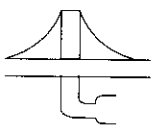

(3)

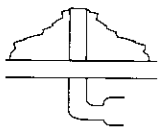

(4)

38. What is the placing of the Lead in correct soldering out of the figures given below?

(1) 

(2) 

(3) 

(4) 

39. It is mentioned as 1000V in the insulation of the handle of a multi-purpose pliers. Its meaning is
(1) it can only be used for more than 1000V voltage.
(2) it turns into a conductor at 1000V.
(3) the heat is generated in its handle when more than 1000V voltage.
(4) it can only be used for voltage less than 1000V.

40. Out of the following, what is the institute through which National Vocational Qualification (NVQ) Certificate **cannot** be obtained?
(1) Sri Lanka College of Technology (2) Sri Lanka Vocational Training Authority
(3) University of Peradeniya (4) University of Vocational and Technology

* *

[See page six.

සියලු ම හිමිකම් ඇවිරිණි/முழுப் பதிப்புரிமையுடையது/All Rights Reserved]

නව නිර්දේශය/புதிய பாடத்திட்டம்/New Syllabus

NEW

ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව
இலங்கைப் பரீட்சைத் திணைக்களம்
Department of Examinations, Sri Lanka

90 | E | I, II

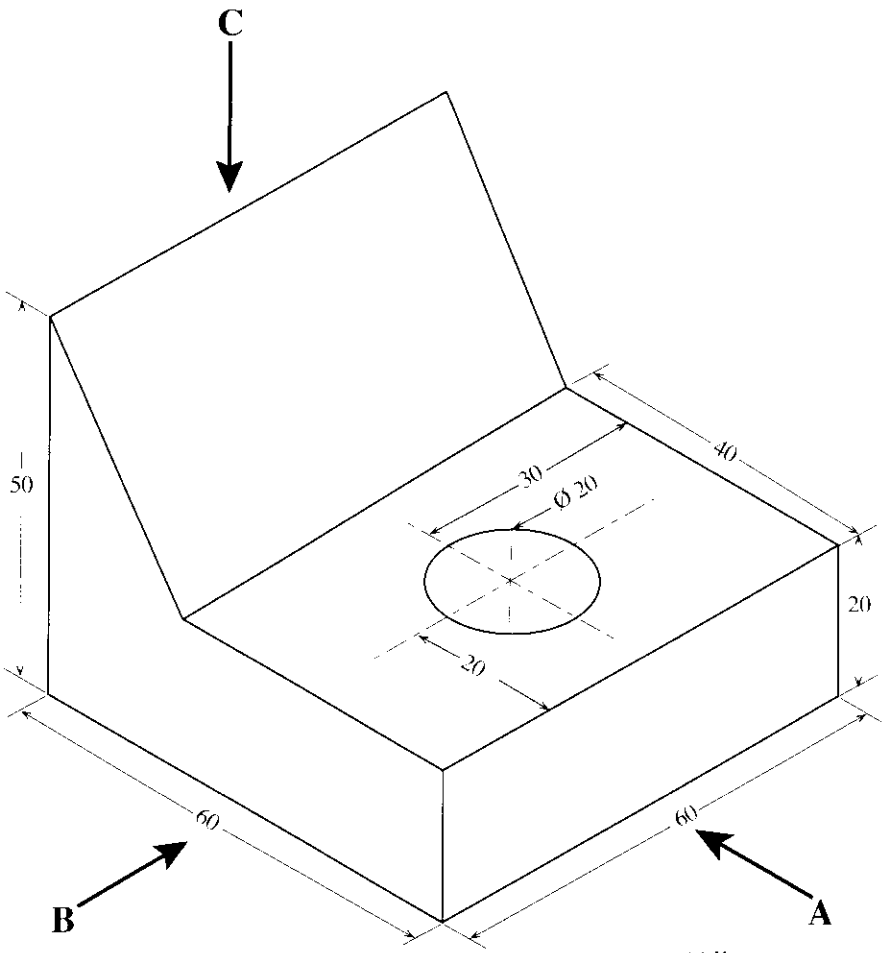
අධ්‍යයන පොදු සහතික පත්‍ර (සාමාන්‍ය පෙළ) විභාගය, 2016 දෙසැම්බර්
கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தர)ப் பரீட்சை, 2016 டிசெம்பர்
General Certificate of Education (Ord. Level) Examination, December 2016

නිර්මාණකරණය, විද්‍යුලිය හා ඉලෙක්ට්‍රොනික තාක්ෂණවේදය I, II
வடிவமைப்பும் மின் இலத்திரனியல் தொழினுட்பவியலும் I, II
Design, Electrical & Electronic Technology I, II

Design, Electrical & Electronic Technology II

* *Answer **five** questions only selecting question No. **1** and **four** others.*
* *question No. **1** carries **20** marks and **each** of the other questions carries **10** marks.*

1. (i) An isometric view of an object is given below.



(All measures are in millimeters)

Observing the principles of Orthographic projection, draw the following views to the scale 1 : 1 in third angle projection, according to the isometric figure above.

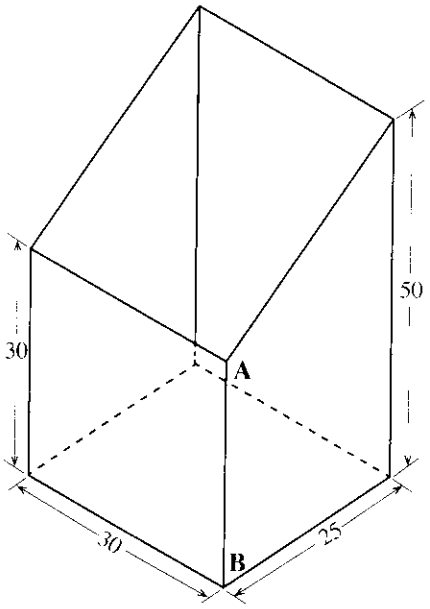
Front Elevation looking from the direction of arrow **A**

Side Elevation, looking from the direction of arrow **B**

Plan, looking from the direction of arrow **C**

[See page seven.

(ii) Figure shows a part of a square shaped pipe, made out of thin sheets, with right angled corners, whose apex is cut at an angle.



(All measures are in millimeters)

Split it along A-B to the scale of 1:1 and draw the surface development of the above.

2. (i) Indicate in a block diagram in sequential order, the components from those belonging to the Electric power supply Authority to the end of consumer unit.
(ii) Out of the components you mentioned in (i) above, name all the safety components.
(iii) Explain how **two** of the above named safety components work.
(iv) Draw the circuit from the consumer unit to a electric bulb and a socket outlet.

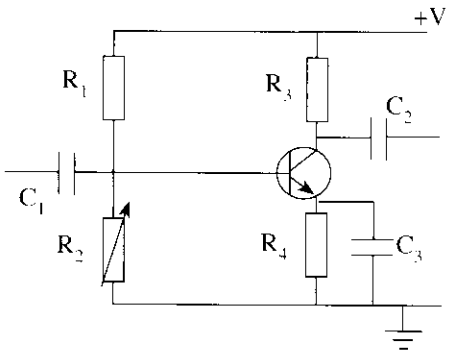
3. (i) Draw a circuit needed to assemble a direct current (DC) power supply. Using the following accessories.

- 230V/12V-0-12V, 500mA Step Down Transformer
- 1000μF / 50V Electrolitic Capacitor
- 1N 4007 Diode

(ii) The direct current voltage measured after 1000μF capacitor was connected to the circuit is more than the DC voltage measured before the 1000μF capacitor was connected to the circuit. Explain the reason.
(iii) Name the integrated circuit (IC) that can be used to obtain 5V stabilized power supply from the above circuit.
(iv) Redraw the circuit connecting 5V integrated circuit to the above circuit.

4. (i) State Fleming's left hand rule.
(ii) Name the **three** types of direct current motor.
(iii) How can the direction of the rotation be changed in Permanent Magnet Direct Current Motor?
(iv) Indicate in a circuit diagram how a Double Pole Double Throw (DPDT) can be used to change the direction of rotation in a Permanent Magnet Direct Current Motor.

5. The figure shows a Transistor Amplifier circuit.
(i) What is the name of biasing method of this circuit?
(ii) Explain the functions of C_1 and C_2 capacitors.
(iii) Explain the functions of R_4 and C_3.
(iv) What is the loss caused to the output signal when the R_2 variable resistor is changed?



[See page eight.

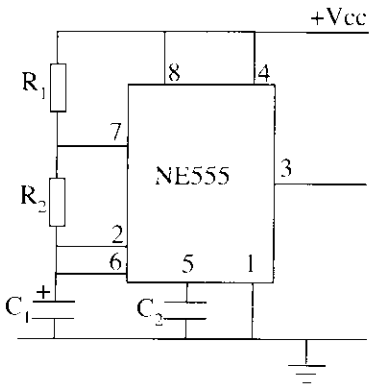
6. The figure shows a practical circuit made using by NE 555 linear integrated circuit.

(i) What is the name of this circuit according to the output?

(ii) Draw the output wave form in circuit.

(iii) Value of which components should be changed to change the frequency of output wave form?

(iv) Name **two** uses of this circuit.



7. (i) Describe the function of encorders and decoders used in Digital Electronic circuits.

(ii) Any number from 0 to 9 can be converted to a binary number through 74147 digital integrated circuit. Draw a suitable block diagram to display the converted numbers 0 to 9 through a seven segment display.

(iii) Prepare a list of components and tools to construct (assemble) a driver circuit to operate the seven segment display with LED.

(iv) Prepare a specification list of a circuit to display through seven segment display the number of patients who went to meet a doctor in a medical center.

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